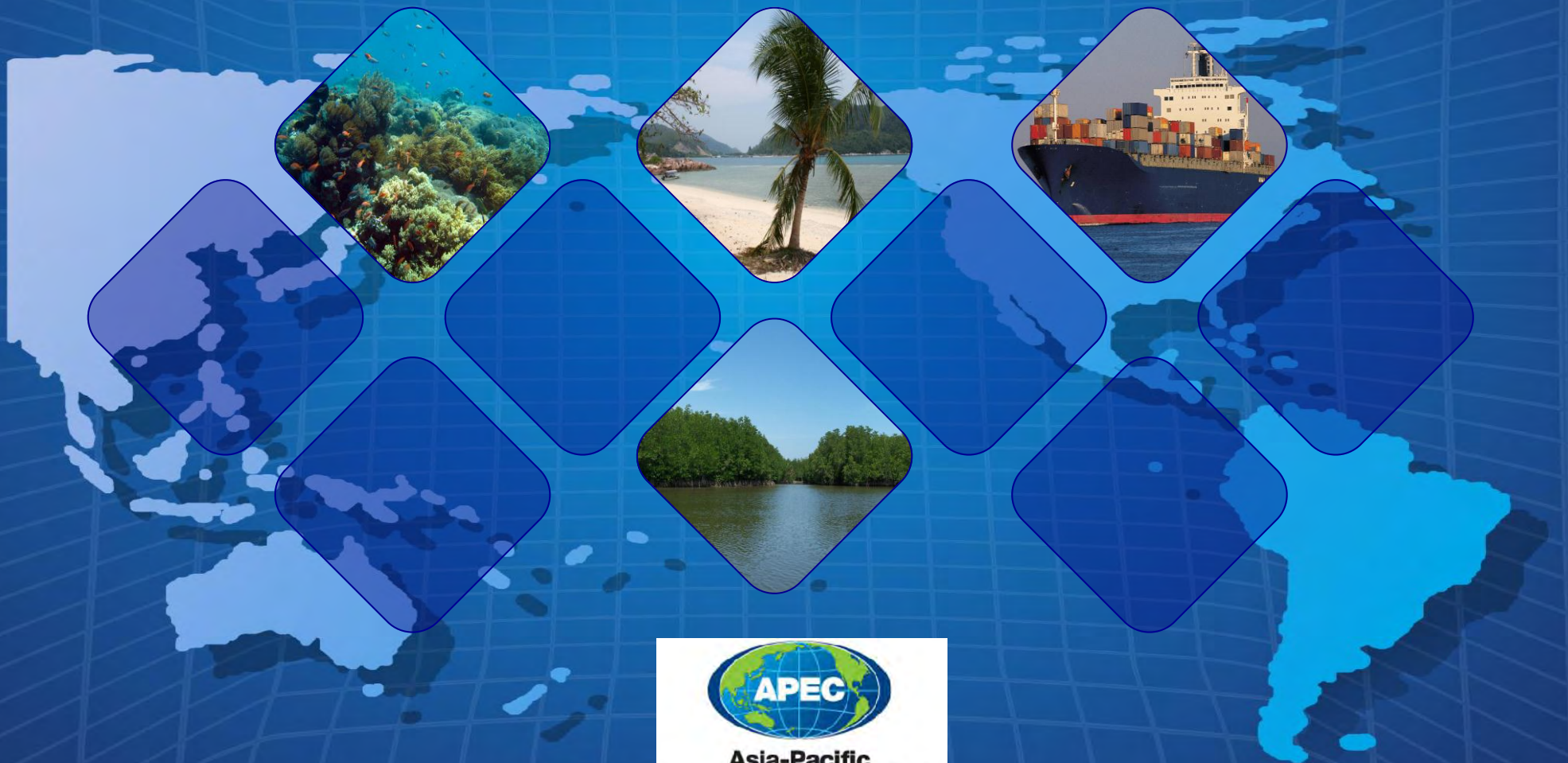


A Guide to Transboundary Spatial Marine Management



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Acronyms

AC	Arctic Council	GEF	Global Environment Facility
AGP	Arctic Governance Project	GIS	Geographic Information System
APEC	Asia–Pacific Economic Cooperation	IADB	Inter-America Development Bank
APIA	Australian Pipeline Industry Association	ICOM	Integrated Coastal and Ocean Management
AQIS	Australian Quarantine Inspection Service	ICZM	Integrated Coastal Zone Management
BEAC	Barents Euro-Arctic Council	IMP	Integrated Maritime Policy
BEAR	Barents Euro-Arctic Region	IOC	International Oceanography Commission
BPA	Bali Plan of Action	JAC	Joint Advisory Council
BRC	Barents Regional Council	JFC	The Joint Fishery Committee
BVM	Biological Valuation Mapping	KPI	Key Performance Indicators
CBO	Community-based organisations	LME	Large Marine Ecosystem
CBSS	Council of the Baltic Sea States	MEAM	Marine Ecosystems and Management
CCA	Carrying Capacity Assessment	MPA	Marine Protected Area
CFP	Common Fisheries Policy	MRCWG	Marine Resources Conservation Working Group
COBSEA	Coordinating Body of the Seas of East Asia	MSUZP	Marine Space Use Zonation Plan
COTS	Commercial-off-the-shelf	MSP	Marine Spatial Planning
DIAC	Department of Immigration and Citizenship	NCM	Nordic Council of Ministers
DPSIR	Driving forces, Pressures, State, Impact, Response	ND	Northern Dimension
EAF	Ecosystem Approach to Fisheries	NGO	Non-Government Organisation
EBM	Ecosystem-based Management	NOWPAP	Northwest Pacific Action Plan
EEA	European Environment Agency	NSC	North Sea Commission
EIA	Environmental Impact Assessment	PHES	Physical, ecological and social
EU	European Union	PNG	Papua New Guinea
		SEA	Strategic Environmental Assessment
		SOD	Seoul Oceans Declaration
		TBCAs	Transboundary conservation areas

Acronyms (continued)

TBPs	Transboundary parks
TIM	Traditional Inhabitants' Meeting
TLM	Treaty Liaison Meeting
TRANSMASP	Transboundary Maritime Spatial Planning
TMSM	Transboundary Marine Spatial Management
TSPZ	Torres Strait Protected Zone
TSRA	Torres Strait Regional Authority
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WG	Working Group
WMO	World Meteorological Organisation

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Foreword

With advances in technology and pressing demands for natural resources, the interests of States at sea have extended ever further from the shoreline. As a result, the potential for negative, unintended and unwanted outcomes arising from disjointed and uncoordinated policies, laws and practices has grown. Indeed, in the modern world, any unilateral pursuit of interests at sea will often raise the very real spectre of conflicts, which ultimately undermine the full potential benefit of ocean use for all concerned.

Moreover, as our knowledge of the marine environment has improved, we have increasingly come to realise that ecosystems need to be managed holistically with full consideration of the function and interaction of their component elements. However, ecosystems frequently do not lie conveniently within a single jurisdictional boundary.

Therefore, States and other discrete jurisdictional bodies have increasingly discovered that their interests are served best by cooperating in the management of certain areas of the ocean. Nevertheless, decision-makers and designated officials have discovered that the challenges of such transboundary marine spatial management (TSM) are many and varied. This TSM Guide has been developed to provide a systematic approach to help identify and overcome these challenges.

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1

Overview

Introduction

Throughout the APEC region and elsewhere, increasing demands on marine resources and the ever expanding nature of activities at sea are compromising options for future use of the ocean and the health of the marine environment. There is a need to pursue new approaches for the sustainable use of marine resources. Amongst these, Marine Spatial Planning (MSP) has become a widely accepted practice especially over the past fifteen years. Recently, the need for MSP to be applied across jurisdiction of administrative boundaries, i.e. Transboundary Marine Spatial Management (TMSM) has also been recognized.

APEC countries that rim the Pacific Ocean have coastal and marine responsibilities that extend to: their economies, people and the environment. However, the vast Pacific Ocean lies in two hemispheres and has climates ranging from tundra and sub-Arctic in Russia and the USA to tropical in South-East Asia. Along its coast also lie three of the most industrialized countries in the world and some developing countries

with high poverty levels. Habitats include coral reefs, seagrass beds, mangrove forests, mudflats, rocky reefs, open ocean and sand. All these habitats have fisheries and all APEC Economies have a fisheries component in their economies.

Activities at sea inevitably have the potential to impact on marine ecosystems, habitats and biodiversity. However, as noted in the Preamble to the *United Nations Convention on the Law of the Sea*, 1982, "... the problems of ocean space are closely interrelated and need to be considered as a whole". Accordingly, the management of marine spaces must often extend across administrative, jurisdictional and even sovereign State borders.

The need for an essential guide to TMSM emerged in view of the differences between APEC Economies (many of whom are near neighbours), whether political, cultural, economic or environmental.

There is no universal solution to TMSM. While this guide will help in the design and execution of Transboundary Marine Spatial Management, it

does not offer definitive solutions. Case-studies highlighted in this publication serve to illustrate the different parts of the Guide, and provide hints of possible solutions, suited to different Economies and specific issues.

Who are the targeted users of this guide?

This guide is primarily intended for public officials of APEC Economies who are responsible for TMSM at international, national and regional levels. However, stakeholders outside of APEC Economies who are responsible for, or who are looking to develop a TMSM area may also find this Guide a useful information resource.

Other users might include private-sector or NGO officials who are tasked to assist with, or take primary responsibility for marine management in a transboundary area under public-private partnership arrangements.

Finally, teaching staff for public servants, along with university lecturers may find the text and case studies useful as a guide to marine spatial planning and management in general.

Why should this guide be used?

The challenges in implementation of TMSM can be bewildering. They encompass: the complexity of the marine environment, much of which is hidden beneath the waves; possibly cultural and linguistic differences;

possibly differing political and legal systems; often an in adequate availability of data and scientific understanding; potentially different aspirations; and possibly unequal personnel, technology, financial and institutional capacity. Many decision-makers have found such challenges overly daunting and abandoned hope of effective transboundary cooperation and management for marine areas. Others have persevered to develop instruments and practices largely in isolation of experiences elsewhere, each of which has its own strengths and weaknesses.

This TMSM Guide draws on efforts that have been made by marine spatial managers from around the world to confront and overcome the challenges of managing marine activities across boundaries. In doing so, and presenting case studies on lessons learnt, the Guide endeavours to assist planners and managers to avoid past mistakes and improve the efficiency and effectiveness of their efforts.

If the step-by-step approach of this Guide is followed, the likelihood of a major consideration being overlooked will be reduced. However, no two marine spaces are the same and the framework outlined here recognises that there remains a need for flexibility and adaptation. Hopefully, wise consideration of the extent to which the approach described in this Guide can be applied in any particular instance will ease the tasks and improve the outcome for TMSM throughout the APEC region and elsewhere.

Methodology for the design of this guide

These guidelines draw upon the lessons learnt from TMSM initiatives across the globe. TMSM case-studies were carefully selected and analysed to extract the main steps of TMSM implementation. The case-studies do not always take place in the APEC region; however, they do reflect general practices and trends with regard to TMSM.

The initial draft of the Guide was circulated among several APEC Working Groups (WG) to elicit comments and feedback, identify gaps and needs, and refine the text to reflect the varying perspectives of APEC economies. A questionnaire was distributed to selected representatives to the WGs to help determine the needs within the APEC region for TMSM. In addition, three e-workshops or webinars were held, involving representation from a range of APEC Economies. The e-workshops were based on the following themes:

- Marine living resources - Fisheries and aquaculture, seaweed culture, seagrass, coral reefs, wetlands, mangroves, mudflats, rocky reefs, etc.; and,
- Shipping - ship-building, transport, ports and harbours, channel dredging, etc.,

This Guide was designed specifically for APEC economies; therefore, members of APEC Economies were included in the process of developing the guidelines as much as possible (given Project time and

resource constraints). Incorporation of their specific questions and concerns was essential to ensure that the Guide fulfils their needs, and addresses the actual issues faced by member Economies. Therefore, in line with the participatory approach to ecosystem management, these guidelines are a result of extensive consultation with experts and stakeholders from across APEC Economies.

2

Introduction to Transboundary Marine Spatial Management

Marine issues become global

Marine waters link populations of different countries and support the incomes and livelihoods of hundreds of millions of people worldwide. They create environmental, social and economic interdependencies between Economies. While there always remains the potential for conflict at sea, the oceans also provide opportunities for cooperation and promotion of regional peace, security and economic growth.

As natural resources become more depleted, and technology extends the interests of States further to sea, and especially noting the macro effect of climate change, the need for a transboundary approach to sea-use planning is now greater than ever. The impacts of marine activities often cross administrative and national boundaries, and decisions and actions taken at a local or regional level can have consequences on a wider scale.

Increased development pressures on the marine environment and the potential for multiple-use conflicts, arising as a result of activities such as

the expansion of offshore wind energy, fishing and aquaculture, coastal reclamation and dredging, minerals extraction, shipping activities, tourism and biodiversity conservation, etc. have led to increased interest in sea-use planning (marine spatial planning) and ocean zoning as new tools for management.

Climate change, in particular the rise of sea levels, acidification, increasing water temperatures, and the frequency of extreme weather events, is also likely to cause a shift in economic activities in some marine areas and to alter marine ecosystems. Therefore, innovative tools are required to manage the marine environment and its uses.

Marine Spatial Planning (MSP)

Marine spatial planning (MSP) is a promising tool for the effective management of marine areas, offering an integrated approach to managing multiple and potentially conflicting uses of the sea¹.

¹Blæsbyerget *et al.*, 2009

MSP uses spatial data² as a tool to assist in the understanding of human impacts on the marine environment. The marine environment is increasingly described, analysed, and managed via layers of information representing a wide range of spatial phenomena across a variety of scales. Geographic Information Systems (GIS) and other technologies have become important implements for assessment, planning, and decision-making with regard to competing uses of the marine environment. For example, ecosystem-based approaches for either fisheries management or MSP are frequently paired with GIS data to improve decision making. GIS is a useful tool that enables marine spatial data to be aggregated, planning options visualized, impact analyses enhanced, and regulatory zones mapped³.

MSP can play an important role in the mitigation of impacts on ecosystems by promoting the efficient use of marine space and the avoidance of harmful activities, including the unintentional cumulative impacts of discrete, single-sector actions. Climate change will affect ecosystems in many ways, for example in the redistribution of species, in the use of marine resources and in coastal development. Adaptive MSP systems will need to monitor such changes and revise management accordingly.

² Spatial data is data pertaining to geographical entities.

³St Martin and Arber, 2008.

MSP offers Economies an operational framework to maintain the value of marine biodiversity while at the same time allowing sustainable use of the oceans. Thus, MSP is an integral element of TMSM.



Case-Study 1: Benefits and challenges for TMSM — the TransMaSP project

The TransMaSP Project explores ‘the impact of legal and natural boundaries in the implementation of Marine Spatial Planning’ (MSP) in a transboundary area. This project studies the French-Belgian marine and coastal zone boundary. Both countries share important human activities and biodiversity in this area. The TransMaSP Project investigates opportunities to apply MSP consistently with Integrated Coastal Zone Management (ICZM) and the Ecosystem Approach, in a transboundary context.

The project analyses the impact of natural borders (land/sea) and the political border (French/Belgian) on the implementation of MSP through:

- exploration of the added value and **constraints of cooperation in MSP between the two States**;
- analysis of the **correct articulation between MSP and its potential link with ICZM in a transboundary context**;
- analysis of how MSP might facilitate **improved management of existing and new uses of the sea**, e.g. wind farms, aquaculture, coastal fisheries management; and
- understanding of how MSP can contribute to the **prevention or management of user conflicts**, analysing how public participation works in a transboundary MSP context.

Transboundary Marine Spatial Management (TMSM)

For the purpose of this Guide, Transboundary Marine Spatial Management (TMSM) is defined as: **a collaborative public process of harmonising the spatial and temporal distribution of human activities in marine areas that extend across an administrative or jurisdictional boundary to achieve agreed ecological, economic and**

social objectives that are usually specified through a negotiated, political process.

TMSM takes the MSP stage a step further **to recognise that planning and implementation of sea use in a transboundary context can only be effective if harmonised across borders.**

TMSM is applied across boundaries to monitor and control human activities that either have an impact on the environment, an impact on other users of the sea in the area, or impact beyond the area in which they take place. A key objective of TMSM is to balance sectoral interests and achieve sustainable use of marine resources⁴.

Human activities can be harmonised in a specific marine area by objectives, e.g. development or preservation areas, or by specific uses, e.g. wind farms, aquaculture, fishing, seaweed culture, sand and gravel mining, oil and gas, tourism and maritime transport etc. Ultimately, activities at sea are controlled through regulation and enforcement, incentives (positive and negative), education, and awareness building. Typically, a combination of all these tools is required, but in each instance the goal is to control the behaviour of humans, not to manage the environment *per se*. An exception might be argued with regard to habitat restoration / creation, or species replenishment programs to counter past depletion. However, even initiatives such as these involve the purposeful actions of humans at sea or on the coast, which need to be managed.

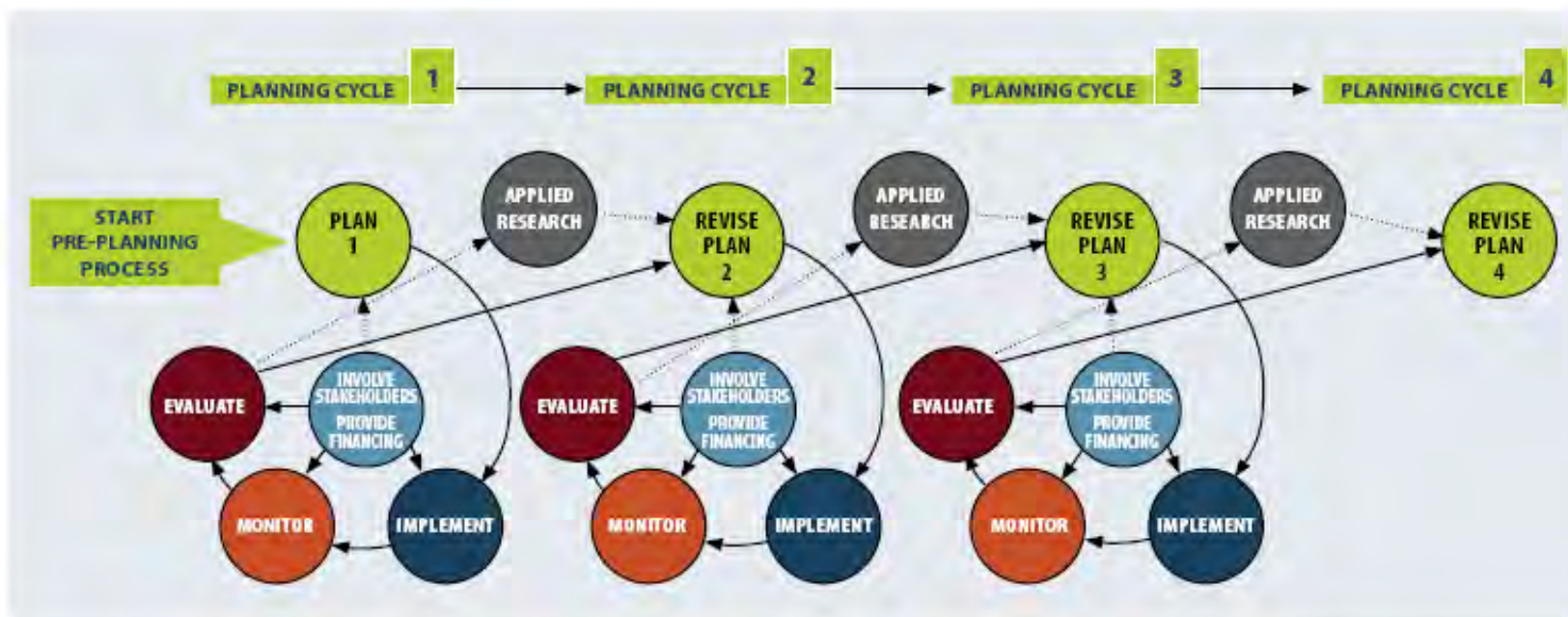
Effective TMSM entails **integrated management**, encompassing both *marine spatial planning* and *ecosystem-based management* (EBM) in a

practical way to achieve rational use of marine space.⁵ TMSM balances the need for development with a necessity to protect marine ecosystems, along with the desire to achieve social and economic objectives in an open and inclusive way.

Remember!

We can only plan and manage human activities, not marine ecosystems themselves nor components of ecosystems. We can allocate human activities to specific marine areas or times by objective and/or category of use.

⁵ Ecosystem-Based Management (EBM) entails a broad approach to the management of human activities that impact on living resources and the habitats on which they depend. EBM represents a shift from a focus on single-species to a more holistic perspective that considers interactions and linkages within an ecosystem, along with its structure and function. EBM recognises that humans and ecosystems are interdependent, and considers ecological, social and cultural aspirations.



This diagram was developed by Charles Ehler and Fanny Douvère, and is sourced from *Marine Spatial Planning—A step-by-step approach to EBM*. IOC Manual and Guides No.53 *op.cit.*

Therefore, TMSM necessarily takes a **cross-sectoral** perspective. Traditionally, sectoral approaches in the use of marine space and resources have resulted in fragmented policy and decision-making. Whilst different activities at sea, such as oil and gas, maritime transport and fisheries etc., are often controlled to take place in designated areas or at certain times, the rules governing the activities are usually made independently by single-sector decision-makers. In other words, the approach has been to conduct discrete activity management that has not adequately addressed the cumulative impact of many different types of

activity, nor the potential for these activities to work detrimentally at crossed purposes or even conflict.⁶ With TMSM, these factors are

⁶ —“These conflicts weaken the ability of the ocean to provide the necessary ecosystem services upon which humans and all other life on Earth depend. Ecosystem services include ‘provisioning services’ such as food, fresh water, fiber, biochemicals, genetic resources; ‘regulating services’ such as climate regulation, water purification, pollination; ‘cultural services’ such as recreation and tourism, as well as spiritual and religious, aesthetic, inspirational, and educational benefits; and ‘supporting services’ such as soil formation, nutrient cycling, and primary production.” Ehler, Charles, and Fanny Douvère. *Marine Spatial Planning: a step-by-step approach toward ecosystem-based management*. Intergovernmental Oceanographic Commission and Man and the Biosphere Programme. IOC Manual and Guides No. 53, ICAM Dossier No. 6. Paris: UNESCO, 2009 (English).

considered for effective management of a marine space rather than individual types of activity.

Transboundary issues are those that are common or shared across two or more administrative or jurisdictional areas, e.g. different countries, States or provinces. A *common* transboundary issue is one that two or more neighbouring Economies have but is not shared across a common boundary. A *shared* transboundary issue straddles a common boundary or has effects that are felt across any such boundary.

Effective marine spatial management needs to be **adaptive to changing conditions and interests**. Therefore, TMSM should be seen as a **continuous and adaptive process** that is carefully organized to generate information, assess interactions, the environmental state, and the effects of previously implemented measures, and make adaptations when needed.

TMSM is also **participative**. A key aspect is timely and direct stakeholder engagement. If issues and opportunities are to be identified and understood, broad stakeholder participation is essential. Such participation requires open information sharing and transparent, inclusive decision making.

TMSM provides a means for understanding trends, visualising future outcomes and demands, and developing a framework to respond to

these. A primary purpose of TMSM is to help envision and create a desirable future, and enable proactive decision-making to move in the desired direction. Consequently, TMSM planning is not limited to defining and analysing only existing conditions and maintaining the *status quo*, but reveals possible alternative futures of how the area could look, e.g. in another 10, 15 or 20 years.

Defining and analysing future conditions involve the following tasks:

- Projecting current trends in the spatial and temporal needs of existing human uses;
- Estimating the spatial and temporal requirements for new demands on ocean space;
- Identifying possible alternative future scenarios for the planning area; and
- Selecting the preferred spatial sea-use scenario.

Essential points about TMSM:

- TMSM entails an **integrated approach** to the management of marine resources and uses;
- TMSM **covers specified geographical areas**, defined regardless of international and national boundaries;
- TMSM entails a **cross-sectoral** approach;
- TMSM is **long-term** management, and pro-active rather than reactive; and
- TMSM is an **iterative** and adaptive process.

Developing alternative spatial sea-use scenarios is a crucial activity in the TMSM process because it sets the stage for choosing directions in which the area is to develop during the selected timeframe. There are various ways that spatial sea-use scenarios can be developed. For example, they may include scenarios for economic development or different types of technological innovation, but climate change is an essential consideration for all scenarios.

In line with its forward-looking nature, TMSM is a means of ensuring the continued availability of coastal and marine resources for future use. Conservation needs should be considered at par with other sea uses and given spatial priority where necessary, e.g. through the creation of a coherent network of protected sites at a national and international level.

TMSM can also be used actively to promote disadvantaged areas and ensure more equitable access to marine resources and the benefits arising from their use.

Expected benefits of TMSM

TMSM results in the harmonised use of marine space and resources across administrative or jurisdictional boundaries to maximise sustainable benefit from activities at sea whilst preserving ecosystem elements and services.

Transboundary Marine Spatial Management endeavours to:

- Provide better visibility of existing and proposed uses;
- Improve understanding of environmental impacts, thus enabling potential conflicts to be identified and avoided;
- Ensure best possible coexistence of use by taking into account direct and cumulative impacts, and synergies of uses;
- Facilitate equitable access to marine resources;
- Take into account the demands of new and as yet unplanned forms of use through the development of scenarios;
- Secure greater acceptance of resource allocations amongst stakeholders through transparency and education;
- Achieve conservation and sustainable growth;
- Provide greater security for investors by allocating acceptable locations for different types of development, and
- Minimise the risk of conflict.

3

Guidelines

Keeping in Mind the General Approach to TMSM

The approach to planning and implementation for any exercise in marine spatial management must fit the specific characteristics of the area, taking into consideration a range of environmental, political, economic, social and cultural circumstances. However, for TMSM, each of these elements potentially also has challenging differences on either side of the relevant borders.

The conception, planning and execution of TMSM are elements of a complex process, and there is no single solution. The step-by-step approach outlined in this Guide may be suitable for some areas but needs to be adapted into a different sequence for others. Nevertheless, regardless of the order in which the steps are taken, they are all essential to properly planned and executed TMSM.

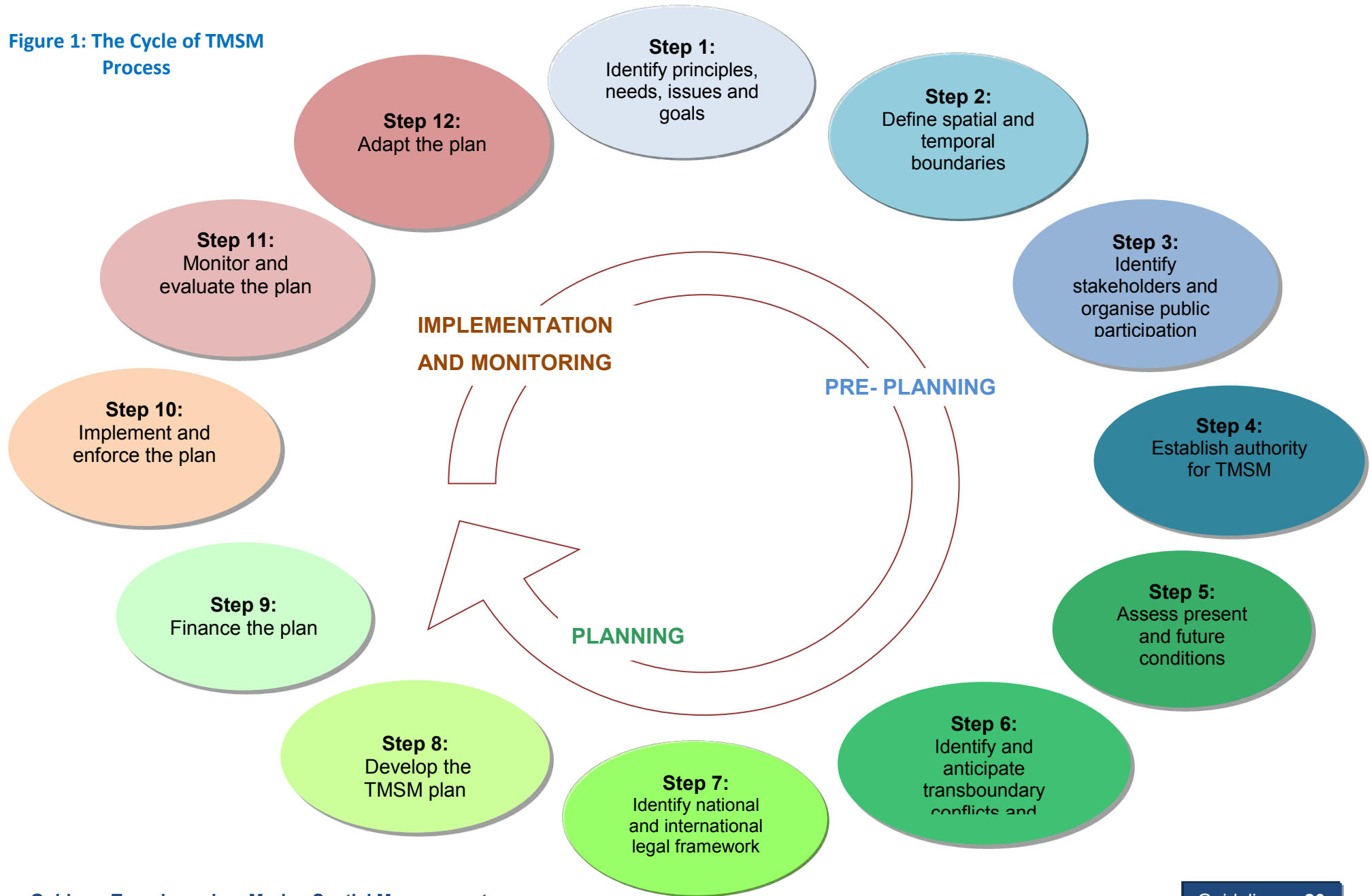
The TMSM process consists of the following steps:

- Identify the principles, needs, issues, and goals;
- Define the spatial and temporal boundaries;

- Identify stakeholders and organise public participation;
- Establish authority for TMSM;
- Assess present and future conditions;
- Identify and anticipate transboundary conflicts and opportunities;
- Identify national and international legal frameworks;
- Develop the management plan;
- Finance the plan;
- Implement and enforce the plan;
- Monitor and evaluate the plan; and
- Adapt the plan.

Although there is a logical sequence to the steps presented in this Guide, **TMSM is not necessarily a linear process**. Some stages may need to be done out of sequence or repeatedly, and different stages of TMSM may well occur in parallel. Do not expect a sleek and tidy process, and be prepared for TMSM to be time-consuming.

Figure 1: The Cycle of TMSM Process



Importantly, **TMSM should not be a top-down, theoretical process.** Future sea use is a matter of continuous choice and setting of priorities. This requires dialogue between all relevant stakeholders, including those who may indirectly impact on the marine space. It also requires participative means of decision-making, in particular in the context of equitable access to resources. For countries without a tradition of land-use planning, these challenges may be considerable and perhaps even daunting. However, stakeholder participation, involvement of the public, and the development of participative processes are particularly important and can lead to a whole new way of perceiving and using marine and coastal space.

Another important prerequisite for successful TMSM is genuine political will and commitment from all levels of government. Potential transboundary impacts and conflicting interests can best be solved by cooperation, adequate legal and institutional frameworks, joint approaches to planning and the sharing of benefits and related costs.

The policy foundation underpinning TMSM must also be coordinated with the policies for management of specific natural resources and sectoral uses. Many existing transboundary cooperation arrangements are sectoral, and address specific activities or use of marine resources. TMSM should aim to maximise an integrated approach through the explicit adoption of strategies such as Integrated Coastal Zone Management (ICZM), Ecosystem-based Management (EBM),

Ecosystem-Approach to Fisheries (EAF), etc. Sectoral bodies and stakeholders share the building blocks of this integrated approach. Discussions between sectors should achieve a consensus on targets and indicators⁷ to be used for TMSM. Moreover, a holistic approach to TMSM should endeavour to maximise economic contribution and social welfare, without compromising ecosystem sustainability.

Although there is no definitive process or set solutions for TMSM, the process will be influenced by the following drivers:

- TMSM is implemented as an equally legally-binding process throughout the designated marine space with the purpose of minimising conflict and inefficiencies in sustainable development;
- It improves international and cross-boundary coherence;
- It improves coherence between terrestrial and sea planning;
- TMSM plans for the long term and is a cross-sectoral approach;
- TMSM requires agreed criteria for measuring and evaluating the spatial impacts of uses (i.e. targets and indicators);

⁷ Indicators are quantitative/qualitative statements or measures/observed parameters that can be used to describe existing situations and measure changes or trends over time. Their three main functions are simplification, quantification and communication.

- It requires agreed criteria for the setting of priorities for future use, with flexibility to incorporate changes in technology and economics;
 - Public participation is integral to the TMSM process;
 - It provides for equitable distribution of benefits and cost-sharing;
 - TMSM requires appropriate tools and processes for impact and risk assessment, implementation, and monitoring.
- Allocate space in a rational manner to lessen the risk of conflicts of interest and, where possible, maximize synergy between sectors.

Effective TMSM will:

- Ensure that the environment throughout the designated marine space has the capacity to support social and economic benefits (including those benefits derived directly from ecosystems);
- Provide a strategic, integrated and forward-looking framework for all uses of the sea to help achieve sustainable development, taking into account the environmental, social and economic objectives of all parties;
- Identify, conserve, or where necessary and appropriate, restore coastal and marine ecosystems, including heritage and nature conservation resources; and

Step 1: Identify the principles, needs, issues and goals

The first step in development of TMSM is to identify the transboundary needs and issues to be addressed in the considered area. What factors suggest that a management area needs to cross an administrative or jurisdictional boundary? For example, has habitat mapping identified an ecosystem that extends into more than one administrative or jurisdictional area? Alternatively, perhaps the nature of a sectoral activity demands cross-boundary cooperation to achieve effective management, e.g. fishing from a shared species stock?

If no transboundary needs or issues are identified, there may not be a need for TMSM; rather, domestic marine spatial planning and management might be all that is required.

Determine the principles for TMSM

The *principles* represent the core values that underpin TMSM. As such, considerable discussion should take place with cross-border collaborators to ensure that all concerned agree on the philosophical foundations underlying the initiative. Failure to agree on the fundamental principles that will govern the TMSM program almost certainly will undermine complete success, and could even lead to conflicts and failure.

Example 1: Principles for TMSM

TMSM will usually recall the principles endorsed by the international community at the 1992 United Nations Conference on Environment and Development (UNCED), such as:

- the right to develop;
- intergenerational equity;
- environmental assessments;
- precautionary approach;
- polluter-pays principle; and
- openness and transparency in decision-making.

At a minimum, a TMSM program would be expected to reflect the following principles:

- **Sustainability:** marine and coastal resources will be used to meet present needs without compromising the ability of future generations to meet their own needs.

- **Equitable benefit:** The developmental and environmental needs of present and future generations will be met equitably, and poverty reduction will be supported.
- **Ecosystem Approach:** Management regimes that transcend political boundaries will be used to conserve ecosystems and natural habitats, and for the maintenance and recovery of viable populations of species in their natural surroundings. Appropriate scientific methodologies focused on levels of biological organisation, which encompass the essential structure, processes, functions and interactions among organisms and their environment will be used.
- **Conservation of Biological Diversity:** Measures will be undertaken to conserve and, where appropriate, restore biological diversity and the productivity of marine and coastal species and habitats, with particular recognition of the uniqueness, fragility and vulnerability of island ecosystems.
- **Informed Decision-making:** Decisions concerning marine and coastal management and environmental protection will be based

upon best available science. Continuous effort will be made to improve capacity to collect, analyse, assess and apply information for sustainable use of marine resources and conservation of biological diversity. Concrete, quantitative goals will be established that are measurable and linked to specific and realistic timetables for achievement. Specific milestones will be adopted to define progress toward achieving these goals.

- **Precautionary approach:** When there are reasonable grounds for concern that any activity may increase the potential hazards to human health, harm living resources or ecosystems, damage amenities, or interfere with other legitimate uses of the region, measures shall be taken even when there is no conclusive evidence of a causal relationship between the activity and the effects; and by virtue of which, greater caution is required when information, including scientific information, is uncertain, unreliable or inadequate.
- **Respect for Culture and Indigenous Heritage:** Indigenous people and their communities and other local communities have a vital role to play in marine and coastal management and development because of their knowledge and traditional

practices. The identity, culture and interests of indigenous people and other local communities will be respected, and they will be afforded opportunities for effective participation in the achievement of sustainable marine and coastal development.

- **Polluter-pays/Beneficiary Pays:** Full consideration of resource use and environmental costs will be promoted, taking into account the approach that:
 - ✓ the polluter should, in principle, bear the cost of the pollution, and
 - ✓ the beneficiary should pay for the use of natural resources, with due regard to the public interest.
- **Openness and transparency in decision-making:** All stakeholders, including communities, individuals and concerned organisations shall be given the opportunity to participate, at the appropriate level, in decision-making and management processes that affect the region. This includes providing access to information concerning the environment that is held by public authorities, together with effective access to judicial and administrative proceedings to enable all stakeholders to exercise

their rights effectively. Public authorities shall widely disseminate information on the work proposed and undertaken to monitor, protect and improve the state of the region.

- **Avoidance:** Avoid activities that cause irreparable or excessive harm to the environment.
- **Translocation:** Translocate activities that are harmful to the area of interest to areas where they will cause less environmental impact.
- **Compensation:** Where possible, compensation will be sought for displacement of activities that cannot be avoided and for activities that have harmed the marine or coastal environment using the economic goods and services value of the damage as a datum for compensation.

Determine the needs

Needs are not problems, they relate to desirable properties that characterise the marine space; i.e. they can be economic, social, environmental, organisational, technological, processes, capacity, etc. Generally, needs relate to perceived gaps that need to be filled, i.e. improvements in the marine space, new developments that are required for these improvements, the creation of new opportunities to sustain economic development in the region or increase of the well-being of communities, improvement in the conservation of marine resources, etc.

Example 2: Needs identified for cooperation in the Black Sea

- Regional cooperation towards oil pollution prevention, preparedness and response;
- Prevention of the transfer of invasive species through ballast water;
- A regional strategy for port reception facilities to cater to ship-generated wastes;
- Ship surveillance and monitoring for oil spill detection and prevention (and for improving navigation safety);
- Guidelines for the Use of Dispersants;
- A Contingency Plan for Response to Harmful Substances other than Oil.

Once each party has identified the needs to be met through TMSM on either side of the boundary or boundaries, specific dialogue is necessary

to ensure that these are understood by all who will be involved in TMSM planning and execution. Such dialogue will also enable the parties to find common aspirations that will help to synergise effort.

Identify issues

Issues relate to problems and difficulties that are encountered in the marine and coastal space. Issues may relate to safety, degradation of environmental conditions, unsatisfactory economic development in the region, organisational or institutional conflicts, etc.

Examples of Issues:

- Illegal, unregulated and unreported fishing;
- Overfishing;
- Pollution of marine waters;
- Disturbance of bird migration routes or resting and breeding grounds;
- Activities negatively impacting already endangered or threatened species;
- Degradation of marine habitats, including from outside influences such as transboundary pollution;

- Over-exploitation of marine resources;
- Ecosystem imbalance as evidenced by phenomena such as red tides, jellyfish blooms, invasive species, etc.;
- Coastal erosion or accretion; and
- Conflicts between single-sector users.

Before discussing the issues with transboundary partners, effort should be made to understand and describe each issue fully and correctly. A useful tool in this regard is the ‘Drivers-Pressures-State-Impact-Response’ (DPSIR) model that helps to develop deeper understanding of the nature, causes and consequences of the issue, along with the possible interventions to overcome or at least mitigate its negative impacts (see Box Example in Step 3).

Transboundary partners should also be encouraged to identify and analyse issues affecting the marine space from their perspective, and all parties share this information in documented form. Please note that in certain jurisdictions there might be reluctance to reveal too much detail about negative issues in the marine space. In such cases, benchmarking study of similar phenomena elsewhere could help to improve understanding of the likely causes and impacts of perceived issues.

Face-to-face dialogue sessions with transboundary partners are important to tease out and agree on the final description of the issues

and identify shared concerns and opinions. Such discussion also helps to lay a foundation of trust and understanding.

Define goals and objectives

TMSM goals are derived from the needs and issues. Goals are generally broad and not measurable; they describe the general intention of TMSM. Goals are defined in objectives, which are mostly measurable (quantitative) and more focused.

The goals and objectives may each have a different timeline, e.g. some may be realised within five years, whereas others are to be achieved in ten or twenty years.

Examples of goals:

- Provide economically effective use of marine resources;
- Prevent fragmentation and promote the efficient use of space, while giving private parties the scope to develop their own initiatives;
- Balance conservation, energy and resource needs;
- Reduce pollution;
- Improve safety of navigation;

- Conserve marine and coastal habitats;
- Reduce overfishing, and prevent fish stock depletion;
- Conserve biodiversity, ecosystem services, and natural and cultural values across boundaries;
- Build peace and lay the foundations for collaboration (trust, reconciliation and cooperation);
- Increase the benefits of conservation to communities on both sides of the borders;
- Develop the local and national economies;
- Achieve effective cross-border cooperation to control natural disasters, introduced plants and animals, and illegal activities, e.g. poaching, pollution and smuggling etc.; and
- Recover and rehabilitate coastal and marine environments that have been degraded and still have the potential for such a recovery.

Once the goals have been determined, they are best **organised by themes, and priority areas**. All transboundary partners should then meet to share and discuss their respective goals with a view to defining and prioritising common goals and agreeing on supporting objectives.

Do not set objectives that are too ambitious. Overly ambitious objectives may be subdivided into smaller objectives that are easier to achieve, and that will, in the end, contribute to realisation of the final goals.

Case-Study 2: Action plan for the European Union Strategy for the Baltic Sea Region; example of TMSM goals and objectives

The European strategy for the Baltic Sea Region has been defined as –An integrated framework that allows the European Union and Member States to identify needs and match them to the available resources through co-ordination of appropriate policies, thus enabling the Baltic Sea Region to enjoy a sustainable environment and optimal economic and social development”.

The EU Strategy was accompanied by an Action Plan officially published in June 2009. This Action Plan comprises 15 priority areas (or goals) that represent the main areas where the EU Strategy for the Baltic Sea Region can achieve improvements. The coordination of each priority area is allocated to a Member State which, in close contact with the Commission, will work with all stakeholders on implementation (especially other Member States, Regional and Local Authorities, Inter-Governmental and Non-Governmental Bodies). Four main themes have been defined for the region, and priority areas identified for those themes as described below:

Protecting the environment

- To reduce nutrient inputs to the sea to acceptable levels;
- To preserve natural zones and biodiversity, including fisheries;
- To reduce the use and impact of hazardous substances;
- To become a model region for clean shipping; and
- To mitigate and adapt to climate change.

Enhancing the region's prosperity

- To remove hindrances to the internal market in the Baltic Sea Region including to improve cooperation in the customs and tax area;
- To exploit the full potential of the region in research and innovation;
- Implementing the Small Business Act: to promote entrepreneurship, strengthen SMEs and increase the efficient use of human resources; and
- To reinforce sustainability of agriculture, forestry and fisheries.

Increasing its accessibility and attractiveness

- To improve the access to, and the efficiency and security of the energy markets;
- To improve internal and external transport links; and
- To maintain and reinforce attractiveness of the Baltic Sea Region in particular through education, youth, tourism, culture and health .

Ensuring safety and security

- To become a leading region in maritime safety and security;
- To reinforce protection from major emergencies at sea and on land; and
- To decrease the volume of, and harm done by, cross border crime.

Case-Study 3: Goals and issues for management of the Barents Sea management

The Barents Sea is covered by several agreements and cooperation strategies.

Norway/Russia Joint Statement

The Joint Statement on maritime delimitation and cooperation in the Barents Sea and the Arctic Ocean, which was signed by the Russian Federation and Norway in 2010, defined a delimitation line for the Parties in the Barents Sea and the Arctic Ocean. It also affirmed the importance of cooperation with regard to fisheries and management of hydrocarbon resources. The Statement acknowledged that Norway and the Russian Federation bear a responsibility for the conservation and rational management of the living resources of the Barents Sea. Moreover, that they need to adopt detailed rules and procedures to ensure efficient and responsible management of hydrocarbon resources in cases where any single oil or gas deposit should extend across the delimitation line.

The Barents Euro-Arctic Region

A program of cooperation in the Barents Euro-Arctic Region was launched in 1993 on two levels: intergovernmental (Barents Euro-Arctic Council, BEAC); and interregional (Barents Regional Council, BRC). The region was an area of military confrontation during the Cold War. It is rich in natural resources (fish, timber, minerals, oil and gas), and has important processing and engineering industries, as well as high-quality universities, research institutions and science centres. The primary goal of BEAC is to promote sustainable economic and social development, and increase the region's competitiveness in Europe. Cohesion, good governance and sustainable growth of the region are issues regularly discussed at the political level and they are promoted through sectoral projects and activities usually conducted under specific working groups.

The goals of the Barents Euro-Arctic region cooperation are to:

- ensure a peaceful and stable development of the region;
- consolidate and further develop cultural ties between the peoples of the region;
- encourage the establishment of new (and expansion of existing) bilateral and multilateral relations in the region;
- lay the foundation for environmentally sustainable economic and social development with emphasis on an active and goal-oriented management of natural resources;
- contribute to development that takes into consideration the interests of the indigenous peoples with their participation; and
- define the joint vision and objectives on how cooperation should take place.

Step 2: Define the spatial and temporal boundaries

The next step in the TMSM cycle will most likely be to define the spatial and temporal boundaries. Complementary to the identification of issues, challenges and opportunities, the questions of “where and when?” must be answered.

Marine areas are diverse and encompass issues of different nature, i.e. ecological, economic, and/or social. An area of ecological importance is an area where habitats sustain biological diversity; where breeding, feeding or nursery areas exist that maintains natural populations and may provide sustainable livelihood to humans. An area of economic importance is an area where marine activities can generate economic benefits, such as areas with natural resources that support the oil and gas industry, sand and gravel mining, fishing etc. An area of social importance is an area that contributes to the livelihood or culture of local communities. For example, areas where fishing represents the main occupation and earnings of local populations, and their primary source of food has a social value; coral reefs (apart from their ecological value) also have a social value as they provide opportunities for recreation, and may even hold cultural value for nearby communities. Thus, the development of tourism in such areas should directly benefit local communities and avoid harming existing value. Nevertheless, the ecological, economic and social importance of an area may vary with time, and this should be taken into consideration.

Define spatial boundaries

While initially the idea of marine spatial planning and ocean zoning was stimulated by international and national interests in developing marine protected areas, e.g. the Great Barrier Reef Marine Park, more recent attention has been placed on managing the multiple use of marine space, particularly in areas where use conflicts are already clear.

Therefore, sensible boundaries for a designated marine space will encompass logical groupings of activities, e.g. the fishing activities of a particular local stock or by identified communities, or non-living resource extraction of a certain nature. Poorly considered boundaries risk creation of a marine space that leaves relevant stakeholders or influences out of consideration and management. Of equal importance is the need to preserve ecosystem integrity as much as possible. Instead, the realisation that marine ecosystems often straddle jurisdictional or administrative boundaries has been an important impetus to TMSM. The need to consider ecosystem integrity as well as the activities of any particular marine space will probably require some effort at improving knowledge and understanding of the area, e.g. through habitat mapping or stock tracking, etc. Such efforts are iterative and may well give rise to information that suggests an amendment to the initial boundaries of the designated area over time.

When defining the spatial boundaries for TMSM, it is important to differentiate:

- **Management boundaries:** management boundaries define the geographic zone over which the management will be undertaken. It can gather several ecosystems, economic activities, communities, etc.
- **Assessment boundaries:** they define the zones where natural and economic processes occur, and within which they will be analysed and assessed. Assessment boundaries may be partly overlapped by the management boundaries, without coinciding with them. The assessment boundaries can be very wide, and encompass both the zone where an issue is studied, and the zone(s) of influence of the issue.

Define spatial boundaries

Spatial zoning for TMSM must be completed within a timeframe that defines the time to access the current situation, and the temporal span for which the TMSM plan will be developed. Indeed, in some circumstances, TMSM may be employed primarily to manage and minimise undesirable impacts of a particular activity. When such is the case, the timeframe for TMSM will likely reflect the expected duration of the activity.

Step 3: Identify the stakeholders and organise public participation

Identify the stakeholders

The identification and involvement of stakeholders⁸ is an essential step in the design of TMSM. Public officials assume responsibility for the formulation of plans and rules that will guide TMSM but they are not the only stakeholders involved in implementation.

Private sector entities make investments and undertake operations that are essentials to the achievement of TMSM goals; community groups articulate local expectations and can influence the degree of local support or opposition to TMSM initiatives; NGOs can undertake research, provide information, help to raise awareness of issue and promote acceptance of TMSM; and universities and institutes provide data, analysis and expert human capacity, all of which are essentials to effective TMSM.

Stakeholders of relevant to TMSM have one or more of the following characteristics:

- They rely on marine resources for their living;
- They are affected by TMSM decisions;

⁸In this case, the stakeholders are the people and their activities that use natural marine resources, or who will be affected by TMSM decisions.

- They are involved in marine activities or undertake research that may impact on management of the designated space;
- They have specific interests in the area (NGOs, environmental/cultural groups and associations); and
- They contribute funds, prepare human resource or otherwise contribute indirectly to management of the area.

Not all stakeholders have the same importance or relevance to execution of the TMSM plan.

The priority stakeholders' group will likely include representatives of economic, political, environmental, and sociological interests, to ensure that the plan is fair to everyone and well-balanced.

Stakeholders:

- rely on marine resources for their living;
- are affected by TMSM decisions;
- are involved in marine activities or research that may impact management of the area;
- have specific interests in the area; and
- contribute indirectly to TMSM management.

Table 1: Examples of stakeholders

Main categories of stakeholders	Examples
Governmental/national/regional authorities	Government officials
	Local government officials
	Marine strategy developers
	Customs officials
	Regulation enforcement officials
	Navy/ Coast Guards/ Marine Police
Industry/ Private Sector	Marine yacht sailors
	Maritime transport operators
	Cruise liner operators
	Marine strategy developers
	Tourism and recreation industry operators
	Oil and gas companies
	Seabed cable layers
	Industry representatives: councils, associations
Academics/Scientists	Research scientists
	Education teachers
General Public	Coastal communities; Indigenous populations
NGOs	Conservation and human welfare NGOs; Heritage Groups
International treaty operators	IMO ballast water, dumping, navigation safety
	CITES Convention on International Trade in Endangered Species
	MARPOL Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter
	CBD Convention on Biological Diversity
	GPA Global Plan of Action for land based pollution sources. OPRC International Convention on Oil Pollution Preparedness, Response and Cooperation

Organise public participation

Stakeholder involvement is also linked with the 'fair and equitable sharing of benefits', the social pillar of sustainable development that seeks to ensure that those who live within an area are able to share in the benefits (economic, social and environmental) that result from the use of its resources⁹.

The earlier that stakeholders are involved in the design of TMSM, the more likely that any TMSM plan will be successful and accepted. Public participation is fundamental to maximise agreement, enhance the transparency of decision-making, create a sense of ownership and facilitate the acceptance and enforcement of decisions. Public participation also improves dialogue and understanding between stakeholders, thus helping to prevent conflicts.

Some important questions to consider include:

- Which stakeholders are to be involved?
- At which stage are they to be involved?
- What aspects of TMSM will be relevant to them?
- How will they be involved?

⁹ Principle 10 of the Rio Declaration on Environment and Development (United Nations Conference on Environment and Development, Rio de Janeiro, 1992) notes the need for public involvement by stating that environmental issues are best handled with the participation of all concerned citizens, at the relevant level.

When to involve stakeholders?

In general, stakeholders are best involved from the pre-planning and planning stage of TMSM. Indeed, their contribution will help to ensure that all needs and issues have been identified at the initial stage, and that the TMSM design takes into account the largest number of interests that are represented in the area.

Stakeholders may also be involved in the following:

- Implementation of TMSM, especially when they see advantages in the plan. Their participation in the implementation phase may also ease the task of enforcement.
- Evaluation of TMSM, which allows them to prepare better for the re-planning and adaptation phases.
- Re-planning and adaptation strategies.

Public participation procedures

Public participation procedures must be transparent, and involve all relevant groups (e.g. local residents, government representatives, the research community, fisherfolk, industries, the private sector, women and minority groups, transboundary communities, local and regional authorities, NGOs).

Public participation may take several forms:

- **Communication:** communication allows the TMSM proponents to explain TMSM to the general public, and listen to criticism and suggestion. TMSM officials should describe the goals and anticipated outcomes. Importantly, communication needs to be a two-way flow of information with mechanism in place for stakeholders to provide feedback.
- **Information:** information is provided to targeted groups, to improve their involvement in the process, and explain the goals and objectives pursued,
- **Consultation:** The consultation phase allows gathering opinions and reactions from stakeholders that will help to improve the TMSM design. The collected opinions may not always be accepted and acted upon, but at least will be known to the TMSM planners. To the extent possible, a

consensus should be sought from stakeholder groups, some of which may have divergent interests.

Example 3: Public participation in the Arctic Governance Project

The Arctic Governance Project (AGP) is an interesting case of the participatory approach to TMSM, used to define the best approaches to governance in the Arctic.

This unofficial initiative gathers researchers, indigenous leaders, and members of the policy community, to discuss, propose and evaluate innovative governance systems for the Arctic region, to 'ensure a sustainable and just future for the region'.

The AGP has set-up an electronic Arctic Governance Compendium, through which it assembles and evaluates proposals from the Indigenous peoples from the eight nations bordering the Arctic region. It consists of a website, where questions from the project leaders are posted, and where anyone can post their contributions.

- Dialogue: dialogue is instigated between stakeholder groups to reach a better understanding of mutual concerns, issues, needs and expectations from TMSM.
- Negotiation: negotiation is held between TMSM authorities and stakeholders to further reach a consensus on specified topics.

There are numerous challenges to effective TMSM public participation; for instance, differing legislation and public participation systems, as well as priorities in neighbouring countries. Jurisdictional frontiers frequently also represent a linguistic, cultural and socio-economic boundary. In addition, mechanisms of public participation are not well developed in many Economies, and the public can be insufficiently aware of how to take part in decision-making processes.

Case-Study 4: Consultative Mechanism for the Torres Strait Agreement

There are a number of consultative mechanisms in place to progress implementation of the Torres Strait Treaty between Papua New Guinea and Australia. These are the:

Traditional Inhabitants' Meeting (TIM): As part of the liaison arrangements under the Torres Strait Treaty, Article 18: 2(a), 3(a)+(b), and the Government's obligation to keep Traditional Inhabitants informed of relevant developments in (and in the vicinity of) the Protected Zone, the Traditional Inhabitants Meeting (TIM) was formed. This is a forum for traditional inhabitants from both countries to discuss issues and activity in the region, and report concerns to government through their Treaty Liaison Officer.

Treaty Liaison Meeting (TLM): Treaty Liaison Meetings, chaired by the Torres Strait Treaty Liaison Officer and PNG Border Liaison Officer, are also conducted and attended by Australian agencies involved in implementation of the Treaty (Commonwealth, State and Local) represented in the region, together with a PNG delegation. Meetings are held alternately in Australia and PNG and their main purpose is to address issues raised at the TIM and other Treaty related matters such as 'free movement' implementation, illegal activity, customs and police matters, health, environment, quarantine and fisheries.

Joint Advisory Council (JAC): The JAC was established under Article 19 of the Treaty as an advisory body of Australian and PNG officials, together with traditional inhabitant representatives. Meetings are held alternately in Australia and PNG. The functions of the JAC are to:

- seek solutions to problems arising at the local level that are not resolved by the Torres Strait Treaty Liaison Officer and the Papua New Guinea Border Officer located on Thursday Island and Daru respectively;
- consider and make recommendations to the Parties on any developments or proposals which might affect the protection of the traditional way of life and livelihood of the traditional inhabitants, their free movement, performance of traditional activities and exercise of traditional customary rights; and
- review from time to time as necessary, and report and make recommendations to the Parties on any matters relevant to the effective implementation of this Treaty, including the provisions relating to the protection and preservation of the marine environment, and fauna and flora in and in the vicinity of the Protected Zone.

In the exercise of its functions, the Council is required to ensure that the traditional inhabitants are consulted and given full and timely opportunity to comment on matters of concern to them, and that their views are conveyed in the Council's reports and recommendations. The Council is required to transmit its report and recommendations to the Foreign Ministers of Australia and Papua New Guinea.

Step 4: Establish authority for TMSM

The transboundary dimension of TMSM means that there is the possibility for parties not to understand the locus and extent of authority for implementation with regard to the cross-border partner. Therefore, all parties must **clearly define the authority** or authorities which will be **in charge of**:

- **Planning** TMSM;
- **Implementing** TMSM.

and share this information in documented form with each other.

Effective international TMSM starts at the national level. Coordination and cooperation between different government agencies and other marine-related institutions is essential, as are sufficient financing and political commitment. Common obstacles, such as conflicting mandates, fragmented authority and limited capacity of national institutions, may be overcome by a **strong political will to develop and implement the laws and agreements** needed to coordinate marine uses within the various sectors and manage resources in an integrated manner.

Care must be taken to ensure that communication with cross-border partners is actually conducted with the correct parties. An important

aspect of preparation for TMSM is to ensure that transboundary partners share a commitment to TMSM.

Who, on the other side of the boundary, has the jurisdiction, authority and mandate to enter into an agreement and lead implementation? The answer to this question is often very complex and relates to administrative structures, the system of law, the political system, informal power structures, and the culture of the people. Language can also be a problem in understanding the aspirations and intentions of a TMSM partner. Therefore, an early action for TMSM is the need for systematic, thorough and prosaic analysis of the strengths and weaknesses of all parties involved in the TMSM planning exercise in order to evaluate the likelihood of success for the exercise. If commitment and capacity are insufficient, there is little to be gained from attempting to proceed with the initiative.

Leadership and Authority

An important aspect of preparation for TMSM is to ensure that transboundary partners share a commitment to TMSM. Often, bureaucratic organisations (including government agencies, corporations, community committees, political parties, unions, NGOs etc.) may be reluctant to embrace new or different TMSM commitments

with necessary vigour to affect good outcomes. There are many causes of institutional inertia and conservatism, such as: organisational rigidity and strong sectoral segmentation; lack of legislative flexibility and mandate; lack of knowledge and understanding; inadequate capacity; poorly developed communication channels; vested interests, including of powerful individuals or agencies; corruption; a lack of incentives for innovation or additional effort; and more. With so many potential institutional obstacles to overcome, marine spatial planning and management will often be efficient only if the initiative is supported by one or more powerful individuals (e.g. politician, senior public servant, influential industry leader, high-profile public figure.) or agency. Such a champion needs genuinely to be committed to the beneficial outcomes of the initiative, and have good knowledge of relevant issues and strategies. For TMSM, such decisive leadership must exist in all participating administrative or jurisdictional areas. Important questions to ask in the early planning phase include whether transboundary partners have been successful in identifying a guiding champion or champions, and if not, whether they will be able to fulfill their responsibilities in executing the plan.

Legal Context

Within domestic jurisdictions, the legislative framework must be able to accommodate the degree of inter-agency coordination and cooperation necessary for marine spatial management. For example, wide disparity in penalties for infringements of a similar scale or nature, unclear

jurisdictional boundaries or ambiguous wording of the law may confuse or even confound enforcement efforts. Such issues are challenging enough within a single jurisdiction, but become even more so when considered in a transboundary context.

The relative importance of a harmonised legal system may be considered differently by cross-boundary proponents or interested parties. For example, a country that has signed the International Convention for the Control and Management of Ships Ballast Water and Sediments may wish to introduce aspects of control over ballast water discharge that would apply equally to ships from countries that are not parties to the Convention. In such an instance, there may be resistance and confusion over the necessity for consistent regulations throughout the managed marine space by transboundary collaborators who are not Parties to the Convention.

An early activity that might help to bring together cross-boundary parties would be to identify common obligations under treaties that already have been ratified by relevant parties. This activity is done formally in more depth at Step 7 but such an initial review can be a good starting point and remind all concerned that they have already agreed and made commitments that need to be applied in the area in question.

Importantly, gaps and incompatibilities between transboundary legal arrangements need to be identified and if possible mechanisms developed to overcome them. Aspects that may warrant attention

include: extradition laws; cultural differences in legal frameworks; and disparity in the ability of countries to uphold and enforce the necessary laws.

A Cautionary Note

Potentially, there are many challenges to overcome in order to succeed in TMSM. Some have been discussed above, such as finding hidden agendas or not having a champion. As much as possible, conflicts of interest and management problems should be resolved at the earlier stages of transboundary discussions. A useful exercise to encourage mutual accommodation of **concerns is to describe in writing the likely negative consequences for all parties of a failure to succeed in TMSM.**

Establish specific authority for TMSM planning

New forms of governance are required. Appropriate rules of procedure and terms of reference for TMSM organisations that take into account specific local conditions are also crucial.

Marine spatial planning over a transboundary area needs to be led and coordinated by a duly authorised body or committee representing the interests of all participating administrative zones and jurisdictions. The terms of reference for this planning body must empower it to develop a plan that will be binding on all parties, with clear commitments given by

the parties to develop necessary regulations and incentives to control undesired activities, minimise harmful impacts and fulfil agreed programs to meet specified goals.

The formation of a joint body with strong enforcement capacity, such as a Commission, is often relevant and fundamental to ensuring cooperation between the various governmental entities and good management of shared resources. Enforcement of TMSM can only be achieved if bodies possess strong mandates and political support from the various governments. When other authorities operate in the same area but with different scopes of work, institutional and administrative structures should be developed to facilitate cooperation. Cooperation between joint bodies with similar TMSM responsibilities but in different areas will also open opportunities for more effective implementation of TMSM.

Providing the TMSM authority (ies) with appropriate human resource capacity is also essential. The authority should gather staff with broad competence and skills that bridge disciplines. The capacity of managers, especially at the local level, should be strengthened to raise understanding of the complexities of managing shared water resources and to derive the benefits possible through cooperation.

Finally, appropriate rules of procedure and terms of reference for TMSM organisations that take into account specific local conditions are also crucial. These rules should recommend the structure, responsibilities,

rights, and financial status of such organisations, and ways and means to ensure public participation.

Establish a specific authority for TMSM implementation

To manage transboundary issues, one (or more) authorities must be designated clearly to bear the following responsibilities:

- Develop the management plan;
- Monitor the processes for TMSM;
- Coordinate and advise in support of TMSM, e.g. collect and exchange hydrological data and forecasts, identify pollution sources and hot spots, serve as a forum for the exchange of information on emerging issues, existing and planned uses of water and related installations, and conduct studies on climate change impacts;
- Develop joint monitoring programmes;
- Establish warning and alarm procedures; and
- Settle differences and disputes.

A clear mandate for the different national and transboundary organisations is an important prerequisite for the formation of strong governing bodies.

A common practice is to draw upon existing organisations to form a new authority for TMSM planning and implementation. The rationale for such

an approach is that, although the planning for TMSM is an integrated and cross-sectoral activity in practice, implementation of the plan through specialist sectoral nodes will be inevitable to a certain extent. Existing authorities may already have a sectoral portfolio and responsibilities over a defined area and sector. Therefore, they may be best placed to implement the plan. Such authorities are likely to know stakeholders well; have an appreciation of the background, issues and practices of their sector; and have in place established governance structures.

However, the use of single-sector implementation bodies leaves open the risk of inadequate integration. Mechanisms might need to be developed to avoid this. Also, presumably, the identified issues came about under the current management bodies and there may well be merit in restructuring management arrangements in order to achieve TMSM goals. Furthermore, existing agencies may resist change or simply lack the capacity to manage the marine space well enough. Care must be taken in deciding on the best institutional approach for TMSM implementation. If single-sector agencies are to remain responsible for TMSM implementation, a multi-sectoral coordinating authority will probably be necessary to oversee the program. Such an authority must be given a clear mandate and powers to access information and make interventions compulsory.

Example 4: The North Sea Commission

The North Sea Commission was founded in 1989 to facilitate and enhance partnerships between regions that manage the challenges and opportunities presented by the North Sea. The NSC consists of eight countries (Sweden, Denmark, Germany, The Netherlands, France, England, Scotland, Norway), representing 35 Member regions.

The NSC also promotes the North Sea Basin as a major economic entity within Europe, by encouraging joint development initiatives and through political lobbying at the level of the European Union.

The NSC has determined that its activities must be action-orientated, and involve co-operation programmes, research activities, funding applications, and joint policy statements aimed at delivering positive benefits to the people of the North Sea Basin.

Case-Study 5: Specific governance for the Baltic Sea

The Baltic Sea region is heterogeneous in economic, environmental and cultural terms, yet its bordering countries share many common resources and demonstrate considerable interdependence. The Baltic Sea region includes numerous administrative zones, but with sufficient issues in common to justify a single strategic approach. It also has an established history of networking and cooperation in many policy areas. Therefore, the Baltic Sea region was chosen as a pilot site to explore regional co-operation and develop best-practice examples.

On 26th October 2009, the EU countries adopted a common strategy for the Baltic Sea region that aims particularly at better coordination of resources and funds. This strategy was the first attempt in Europe to create a complex common development strategy for a cross-border 'macro-region' with common development goals and problems. Due to the existence of a number of cooperative structures in the Baltic Sea, no new management institution was created. The consensus opinion was that such a body would add administrative burden with no likelihood of greater efficiency.

The following governance structure was proposed by the Strategy:

- Policy development is left as a responsibility of the Member States, which come together to cooperate on concrete measures. The European Commission acts as an overseer, and makes recommendations to the European Council;
- The European Commission is responsible for co-ordinating, monitoring, reporting and facilitating implementation and follow-up of the Strategy, proposing adaptations whenever needed;
- The European Commission will work with other institutions, Member States and regions, international financing institutions, transnational programming bodies and governmental organisations such as HELCOM to identify co-ordinating bodies at the level of priority areas and lead partners for flagship projects; and
- Stakeholders are to be brought together in a yearly forum to review and discuss progress of the strategy and recommend implementation actions.

Case-Study 6: Two-level governance for the Barents Sea

Implementation of the Barents Euro-Arctic Council (BEAC) and Barents Regional Council (BRC) policies is supported by 16 working groups and task-forces, with national and/or regional representation. The working groups are categorised along four main themes: economic development, environmental protection, human and social resources and parliamentary cooperation. BEAC is also encouraged to collaborate with three neighbouring multilateral councils: the Arctic Council (AC), the Council of Baltic Sea States (CBSS) and the Nordic Council of Ministers (NCM).

A number of sectoral programmes take place in the Barents Euro-Arctic Region (BEAR). The Operative Sector Programmes are Tourism, Oil and Gas, and East-West logistics-Barents Link. Planned Sector Programmes include Mining and Minerals, Education and ICT.

The **Barents Euro-Arctic Council (BEAC)** was established in 1993 and its members are Denmark, Finland, Iceland, Norway, Russia, Sweden, the European Commission, and a representative of the indigenous peoples in the northernmost parts of Finland, Norway and Sweden and north-west Russia. The BEAC is the forum for *intergovernmental cooperation* in the Barents Region, and all its decisions are made by consensus.

The **Barents Regional Council (BRC)**, responsible for *interregional cooperation*, gathers together thirteen countries or similar sub-national entities (Finnmark, Nordland, Troms, Norrbotten, Västerbotten, Arkhangelsk, Republics of Karelia and Komi, Murmansk, Nenets, Autonomous Okrug, Kainuu, Lapland and Oulu). The BRC was created to acknowledge the importance of local knowledge, along with the ability of local populations to identify the most urgent priorities and their capacity to carry out implementation in the Region. It adds political guidance to multilateral cooperation, by defining joint visions and views on how cooperation should be carried out. The Barents Regional Committee has overall responsibility for implementation of decisions taken by the Regional Council.

Step 5: Assess present and future conditions

TMSM calls for **well-informed decision-making processes**, and requires assessment, analysis and interpretation of various sets of data covering the area(s) of interest. A tangible TMSM plan must rely on accurate data and information. Information based on well-organised measurement networks and monitoring programmes is a prerequisite for accurate assessments of marine resources, related issues and problems.

Assessment is essential for making informed decisions and formulating policy at the local, national and transboundary levels.

In the marine context, data are difficult and expensive to obtain. Marine data and information can be collated to form a comprehensive database and information management system to serve as a repository of relevant data, and serve as a source of information and education for specialists, administrators, and others throughout the region.

Assessment is essential for making informed decisions and formulating policy at the local, national and transboundary levels.

The assessment of environmental, economic and social conditions relies on accurate and reliable data and information. The assessment of current conditions allows a better understanding of the ecological and

socio-economic state of the area, and of the interactions between human activities and the marine environment (pressures, impacts, etc.). The assessment of future conditions is based in-part on the possible uses of the marine space, and will therefore necessitate consideration of economic and technology trends. Likely changes in the physical environment, especially from climate change, will also be relevant.

The data and information on current and proposed marine environmental and economic conditions, including development, are used to report on the state of the environment, the use of marine and coastal resources and to assist in preparing scenarios for future sustainable use and spatial management. These data are also used to plan monitoring and evaluation activities for resource use.

Assessment processes involve the collection, evaluation, and synthesis of information from scientific and engineering research to address policy-relevant questions. They may be conducted by panels of scientists, engineers, socio-economists, and diverse groups of stakeholders as in the use of citizen advisory panels. The integration of science in decision-making processes is crucial for effective TMSM. Assessment processes should provide clear, understandable information about marine interactions to planners and managers, for them to make well-informed decisions. Technology and science may also influence TMSM by

developing solutions to TMSM problems, and improving the efficiency and effectiveness of environmental assessment.

Collect data and information

Decide on the type of data needed.

Not all of the information available may be necessary for TMSM. Therefore, an initial step is to decide which data will be needed. The nature of data needed can be:

- Hydrographic;
- Ecological;
- Oceanographic (chemical and physical);
- Economic (activities at sea and their revenue);
- Demographic (e.g. number of fishermen, population groups.)
- Socio-economic (e.g. livelihoods, dependency on marine resources.)

Identify the data holders.

In most cases, the data and information required to assess conditions in the area already exist, but a lack of clear and systematic cataloguing and poor communication between agencies hinders its access. The exercise of identifying the data holders and sources may be difficult and time-consuming.

Data can be collected from many sources including: (1) scientific literature; (2) expert scientific opinion or advice; (3) government sources; (4) local knowledge; and (5) direct field measurement¹⁰.

Usually, a substantial portion of the time and budget in a TMSM effort is spent on gathering and managing existing data and information. Thus the successful and timely delivery of a management plan is highly affected by decisions on data collection, storage and management. Project managers are well advised to focus on this commitment from the outset, and should make clear and consistent decisions about what kinds of data will be needed and accepted. At national and transboundary levels, the early creation of a system for the storage, access, and management of data for TMSM could dramatically improve efficiency, and cut costs.

[Establish an independent panel of scientific experts to develop and approve TMSM scientific practices and to adjudicate questions on data, methods, and findings.](#)

TMSM requires complex analysis grounded in high-quality science. Throughout the TMSM process, many decisions must be made about scientific practices and findings. The creation of an independent science advisory panel that informs decision-makers on issues of data and

¹⁰UNESCO, Marine Spatial Planning- A Step-by-Step Approach Towards Ecosystem-Based Management, p50.

science can speed decisions and ensure that planning outcomes are scientifically valid, credible, and unbiased.

Manage the data.

Ocean data management covers the aspects of data collection, storage, archival, access, sharing, exchange and dissemination. Data management must be carefully planned and controlled at different levels of government, and by public and private bodies, in order to ensure the quality, comparability and sustainability of relevant datasets.

Data can be used analytically or illustratively in planning. Recognition of the different uses and an increased use of data can also enhance stakeholder participation. Therefore, the managers of a TMSM database need to establish firm criteria for accepting datasets for analysis, such as minimum geographic coverage, and communicate these criteria to partners and stakeholders early in the process.

For example, if the issue is a loss of marine habitat, the scale of the topographical map on which the habitat is to be mapped should be one that allows the outlines of the habitat to be shown rather than small lines or dots. These outlines can then be used as an overlay on bathymetry maps, e.g. to show seagrass depth limits or areas of coral bleaching, mangrove nursery areas.

The archival of data is also an important issue. The development of catalogues that gather information on existing datasets (called metadata) is important for efficient data archival.

Record Metadata

Metadata are data about data; they contain information on all aspects of the data except the data itself. Metadata are useful because they tell people where data are, by whom and when they were collected, frequency, quality and availability. Then, if the data itself are required, the interested party can buy or obtain the data. All data should have metadata attached as part of the production process.

[Peer-review the quality of all datasets \(even large and commonly used datasets\) and accept only reliable data.](#)

The data suitable for assessment must be up-to-date, objective, reliable, relevant and comparable.

[To accomplish ecological objectives for TMSM, focus primarily on obtaining explicit, observed habitat data. However, marine data can be difficult and expensive to obtain.](#)

Sometimes, there will be a need to model habitat proxies and to augment data with expert and/or traditional knowledge. Importantly,

managers should keep a strong focus on the data set itself, independent of tools and technology.

Authoritative databases are needed for certain data types.

Data on jurisdictional boundaries, other management boundaries, and human uses of the ocean are essential for TMSM. Data describing these

features are often available from multiple sources; however, these are not always authoritative or consistent. In such circumstances, care must be exercised to ensure that only accurate data produced by authoritative sources are used.

Table 2: Example of socio-economic data that may be relevant for TMSM

DATA/GIS Layers	Possible Use
Protected Areas, Reserve Areas with restricted use	Fishery restrictions, safety zones, conservation of biodiversity
Military Areas	Closed areas for exercises, prohibited access areas
Cultural/Natural heritage sites	Sensitive use areas, zones with restricted visitor numbers or times
Shipping lanes and boating routes	Important areas for navigational activities, areas with potential disturbance by traffic
Harbours, marinas, piers and jetties	Identifying the positions for shoreline use
Shoreline buildings, including detailed attribute data	Identifying exploitation and the positions for shoreline use
Categorised data on local enterprises	Socio-economic value of marine areas, identification of possible environmental impact
Demographic data, Population density	Analyse geographical referenced population abundance and structure data. Define pressure indicators of urban and settlement sprawl
Abundance of leisure boats	Identify areas of potential disturbance, access adequacy of support facilities
Tourism density	Disturbance and value of marine areas
Fishing grounds including real trawl lines Areas important for commercial fishing	Catch rate of effort in a certain area, access adequacy of enforcement infrastructure
Fishing activity	Amount of fishing in a certain area
Mariculture (fish farms, mussel cultivation) pollution	Space demand harvesting activities, Habitat disturbance

DATA/GIS Layers	Possible Use
Sand and gravel extraction	Habitat disturbance, resource availability
Oil and gas extraction	Space demand, safety areas, socio-economic value, habitat disturbance, risk planning
Cables and pipelines, dredging, dumping, drilling/exploration activities	Identify threats and status quo, space demand, habitat disturbance
Wind farm sites	Space demand, safety areas, socio-economic value
Research and reference sites	Important areas for science, reference baseline

Exchange data and information

As the collection and maintenance of data are expensive, the cooperation between parties may allow the sharing of costs, increased efficiency of monitoring networks, the avoidance of redundancies, and the filling of data gaps.

TMSM by two or more countries calls for the exchange of comparable information across jurisdictional boundaries. A common basis for decision-making requires harmonised (if not standardised), compatible assessment methods and data management systems and uniform reporting procedures. However, there may be some nationalistic sensitivity to the release of data to foreigners. Should such prove to be the case, a compromise that allows partial access to data might be possible.

The exchange of information (e.g. pollution caused by accidents, extreme events (floods and droughts) and operations such as mining or navigation) is vital to building trust and a shared vision among coastal countries. This has been recognized internationally and WMO and UNESCO are currently promoting a number of key policies on the 'free and unrestricted' exchange of hydrological data and products.

Moreover, many Economies are developing National Oceanography Data Centres and their role in fostering an exchange of data on the marine environment is recognized by the Inter-governmental Oceanography Commission (IOC).

Use and develop appropriate assessment tools

The growing complexity of environmental problems requires the use of integrated spatial information systems and models cutting across

application fields and across the gap between environmental and social sciences. The joint efforts of computer scientists, ecologists, marine biologists, oceanographers, hydrologists, planners and transport engineers are needed to develop intelligent, highly integrated spatial information and modelling systems to answer questions and help to educate and inform politicians, administrators and the general public.

Geospatial Databases

Geospatial databases are used for the storage and access of geographic information and spatial data.

Use Geographic information Systems

There is a need for **information sharing, enhanced mapping of marine areas and human activities**, and the development of common tools to use this information in spatial management. User-friendly tools are needed to relate habitat and species distribution to human uses to support priority-setting and decision-making. Poorly designed maps can convey misinformation.

Geographic information systems (GIS) are hardware and software systems that allow the manipulation and display of geographically referenced data and information. GIS allow users to view, understand, question, interpret, and visualize data in many ways that reveal relationships, patterns, and trends in the form of maps, reports, and charts.

GIS is a very useful tool to draw maps, and superimpose layers of geospatial information¹¹.

Build inventories

The creation of the following two inventories will be helpful to TMSM decision-makers:

- an inventory of the main ecological, environmental and oceanographic conditions; and
- an inventory of human activities and socio-economic conditions.

Build maps

The data gathered in the inventories will help prepare useful maps and efficient tools to evaluate the situation in the area of interest. GIS can be used under different considerations to compare scenarios for future planning. The following maps will complement the inventories:

- Maps of the main ecological, environmental and oceanographic conditions;
- Maps of human activities and socio-economic parameters.

Moreover, maps are an efficient way to convey clear and understandable information to decision-makers. Decision makers may be discouraged by endless tables of data, but maps and graphic representations of

¹¹ Geospatial information: Information about objects or phenomena that are associated with a location relative to the surface of the Earth.

information, e.g. diagrams, may help them quickly understand the data. The use of risk indicators is also an efficient tool to improve understanding of the criticality of a situation.

Example 5: The European Atlas of the Seas

The European Commission has launched a European Atlas of the Seas, based on available spatial information and building on the work of a European Marine Observation and Data Network. It is a comprehensive atlas of marine spaces in Europe, and covers the themes of: geography, environment, economy, society, transport, fisheries, fishing quotas, aquaculture, and fishing fleets.

This atlas highlights the holistic nature of maritime environment and heritage, and should improve awareness of the need for an integrated approach to maritime policy. The European Commission has stated that “The development of an EU Atlas of the Seas will demonstrate the relevance of setting up an integrated data network, and the importance of the cross-sectoral accessibility of such data”.

The atlas is available at:http://ec.europa.eu/maritimeaffairs/atlas/maritime_atlas/

Models

The development and use of models, such as the Drivers-Pressures-State-Impact-Response (DPSIR) modelling framework, can help to reveal the interactions between human activities and the environment. They also assist in understanding all aspects of the problem rather than focusing overly on the current physical conditions of an area. By highlighting causal relationships and consequences, the full range of potential responses becomes clearer.

Also, the incorporation of constructive ideas into ecological analysis¹² such as the physical–ecological–social system (PHES) concept tested in a catchment and fjord in Chile can elucidate management options.¹³

Managing Conflict and Competition with Participatory–GIS (P-GIS)

Participatory GIS (P-GIS) endeavours to capture the input of stakeholders and the outcome of decision and negotiation between potentially conflicting users of marine space and resources. The outputs are applied to delineating boundaries (not necessarily clean lines) between competing groups, or, initiating negotiation efforts between competing groups through mutually acceptable ‘mapping’ of actual or dormant spatial conflicts (competition) over resources. There is also

¹²Marin and Delgado, 2005

¹³Marin *et al.*, 2008

potential to reduce conflicts through mediation or negotiation by using GIS. In this way, P-GIS becomes real-time, interactive P-GIS¹⁴.

Assess present conditions

An important activity for good TMSM decision-making is to define and analyse the initial situations, i.e. existing conditions. An assessment of present conditions provides knowledge on environmental and biological resources, the uses of the sea and distribution of ecological and economic assets.

A distinction needs to be made between the following with regard to the TMSM designated space:

- The Core Area: the Core Area for marine and coastal ecosystems.
- The Immediate Impact Area: The Immediate Impact Area is the area, potentially inside and outside the core area, where human or natural activities are likely to impact directly or be impacted on by activities in the Core Area
- The Area of Influence: The Area of Influence includes all areas likely to have indirect relationships and impacts with the core area.

¹²McCall, 2003

The assessment of current conditions should allow TMSM designers and planners to:

- Better understand the interactions between ecological phenomena and human activities;
- Identify compatible or incompatible uses of the sea; and
- Identify conflicts between ecological conditions and human activities.

TMSM calls for a better understanding of the interactions between marine habitats, environment, species and human activities taking place at sea or along the coast.

Case-Study 7: The modelling causal framework DPSIR

DPSIR is a modelling causal framework adopted by the European Environment Agency (EEA), used to describe the interactions between society and the environment. It relies on the following components:

Driving Forces

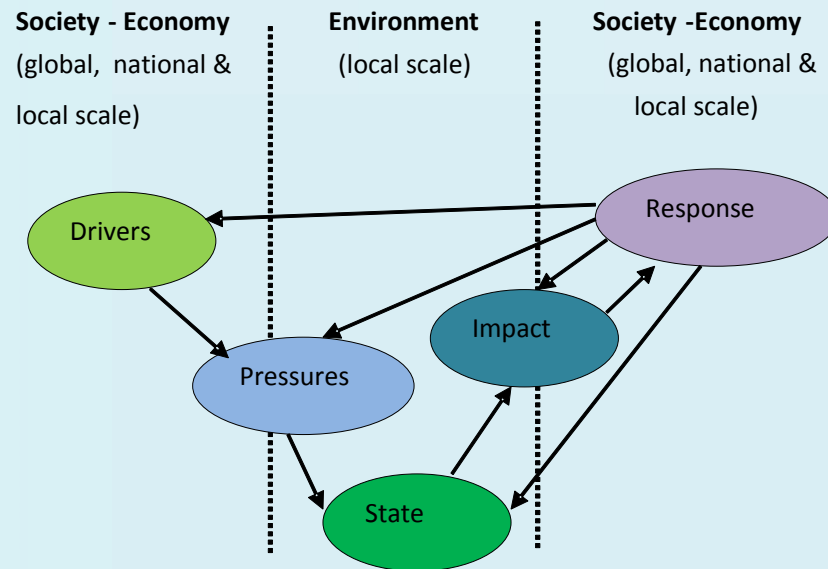
Pressures

State

Impact

Response

DPSIR is an extension of the PSR model developed by OECD.



Case-Study 8: The Arafura and Timor Seas Expert Forum (ATSEF)

The Arafura and Timor Seas Expert Forum (ATSEF) is a non-binding forum, established by a Memorandum of Understanding (MOU) between Australia, Indonesia and Timor Leste. It promotes collaborative research and information-sharing between government, non-government organisations and experts from the littoral nations of the Arafura and Timor Seas (ATS). The purpose of the initiative is to assist those who depend upon the ATS to improve their livelihood through sustainable development.

ATSEF remains primarily an informal, non-government forum; however, the governments of Indonesia, Timor Leste and Australia take a leading role in direction setting and decision-making to ensure alignment with existing agreements and government policy. The ATSEF Regional Secretariat has been supported by each participating country.

An ATSEF Regional Steering bid-for-funding under the United Nations Global Environment Facility (GEF) was approved in April 2008. This funding will go some way to supporting the operations of ATSEF, but is primarily for the Arafura and Timor Seas Ecosystem Action (ATSEA) Project, which has been allocated approximately US\$3 million over a four year period. Co-contributions of cash and in-kind resources from other project participants have also been committed.

The objective of the ATSEA Project is to develop a framework for integrated, cooperative, sustainable and ecosystem-based management and use of the living coastal and marine resources of the ATS. A Transboundary Diagnostic Analysis (TDA) will be undertaken to assess the current state of the environment and resources in the ATS, including pressures and threats. The TDA will lay the basis for the development of a multi-lateral Regional Strategic Action Program (SAP) and its implementation through pilot projects. Importantly, the SAP is likely to focus on complementary national-scale management actions, rather than attempting transboundary management *per se*.

The Timor Leste Ministry of Agriculture and Fisheries (MAF) and the Indonesian Agency of Marine and Fisheries Research (AMFR) are partners with United Nations Development Programme (UNDP) in implementing the ATSEA project. Australia participates and supports the project, but is not a recipient of GEF funding.

Identify areas of conflict

An important step is to identify areas of possible conflict, including within each discrete area of jurisdiction (i.e. not only transboundary conflict), and whether identified activities use resources sustainably (see also Step 4).

By superposing GIS maps (or layers) of important ecological areas with the maps of human activities, identification of the following zones is possible:

- Incompatible zones: zones where current human activities are in conflict or that have a negative impact on the ecological condition of the zone;
- Potential incompatible zones: zones where the current human activities may be in conflict or that may have a negative impact on the ecological condition of the zone;
- Compatible zones: zones where human activities may impact on each other or impact the ecological condition of the marine space, but where no major issue is observed.

Assess future conditions

The assessment of future conditions is necessary to evaluate the impact of various possible sea uses that may be defined in the TMSM plan. The assessment of future conditions relies on an initial assessment of the area, and builds on possible scenarios that are applied to the area.

The assessment of future conditions can be divided in two main steps:

- Assess future conditions if the current marine and coastal activities do not change;
- Assess future conditions when applying different scenarios of marine resources and space uses, depending on the envisaged planning measures and controls.

The assessment of future conditions in the context of unchanged sea uses allows a forecast of the marine space over periods of five, 10, 15 or 20 years. This assessment defines a trend for the marine area.

The assessment of future conditions, when applying different scenarios, allows a forecast of consequences and impact of changing sea uses in the marine space. From the assessment, the evolution of the socio-economic and ecological situation in the area is forecast. One scenario can be run successively with different forecasting timelines. In any case, different scenarios should be compared on the same forecasting timeline.

How to define the possible scenarios?

The scenarios used to assess future conditions rely upon:

- An evaluation of whether there are likely to be changes in future demands for sea use, e.g. a policy that fosters the development

of offshore renewable energy; or fish stock depletion that is likely to induce a decrease in fishing activities; and

- An assessment of the impact of marine-space management as reflected in the TMSM plan, e.g. creation of MPAs, ecological networks, etc.

The spatial sea-use scenarios will primarily indicate:

- Places of concentration in the management area resulting from the choice of objectives;
- Areas for special protection;
- Areas for development;
- Spatial relations between different areas; and

- Spatial networks, e.g., maritime transport routes or networks of marine protected areas.

Define the best scenario

After applying the different scenarios in the management area, there will be many results. These should be compared with the objectives of the TMSM plan.

The scenario that gives the closest results to the TMSM objectives will be judged as the best scenario'. This scenario can be built on to refine the planning measures for TMSM. There is no universal best case' scenario. The closest to best scenario will depend on perceptions of the relative importance of the social, economic and ecological criteria in the TMSM objectives.

Step 6: Identify and anticipate transboundary conflicts and opportunities

One of the major challenges of TMSM in APEC Economies is that Member Economies are at different stages of development; therefore, priorities in shared marine spaces vary from one economy to the other. Less importance is accorded to marine and coastal environments in some Economies than in others where special-interest groups and conservationists have a larger influence on environmental issues.

Conflicts may also arise between TMSM partners over sea boundary delimitation and sovereignty.

Identify existing transboundary conflicts

Existing *transboundary* conflicts need to be identified in particular at the earliest stage, so that TMSM may take them into account, and be adapted to resolve them as much as possible.

Highly mobile marine resources and pollutants, e.g. fish and oil spills, cannot be confined within administrative or jurisdictional boundaries. Therefore, these resources and impacts often have a transboundary dimension. Also, multiple interests in the use of a designated marine space may give rise to conflicts, which may be political, economic, environmental, social, or related to sovereignty protection. Differences

Example 6: Conflicts in the Caspian Sea

The demarcation of sea boundaries in the Caspian Sea has been the subject of disputes for nearly a decade among neighbouring States (i.e. Azerbaijan, Russia, Kazakhstan, Turkmenistan and Iran).

The status of the Caspian Sea itself is a key problem: is it a sea or a lake? If it is considered to be a sea, there are precedents and international treaty law obliging respect for a right of navigation by foreign vessels. If it is considered as a lake, there are no such obligations. Environmental concerns are also somewhat connected to the status and border questions. There are three major issues influenced by the defined status of the Caspian Sea: access to mineral resources (oil and natural gas); access for fishing; and access to international waters. Russia has adopted a median line of delineation and signed treaties accordingly with Kazakhstan and Azerbaijan. The Kazakhstan sector, although not fully defined, is not disputed. However, the sectors of Azerbaijan, Turkmenistan and Iran are not fully defined. Unresolved disputes mostly relate to use rights and exploitation of oil and gas resources.

between coastal APEC Economies in terms of socio-economic development, capacity to manage marine resources, infrastructure, political orientation, institutional and legal contexts represent challenges to coordinated development and joint management of transboundary marine and coastal resources.

Identify potential transboundary conflicts and opportunities

An important exercise is to foresee conflicts and opportunities that may arise during implementation of TMSM. Good anticipation of these issues will allow faster future adaptation of the TMSM plan, and the development of contingency plans and measures to mitigate any conflicts or problems.

Another inconsistency among APEC economies is in the application of internationally agreed standards, conventions and agreements. This can lead to discrepancies, especially during the implementation phase, when some countries may already be acquainted with such instruments and have integrated them into national laws and practices, while others might not be a Party to certain instruments or are still encountering obstacles in meeting their obligations.

Of the many conflicting uses of coastal and marine resources in the APEC region, perhaps the most difficult issue is over fishing and fishing down the food chain. Sustainable fisheries require regulations that permit fish to be caught in quantities that take into account yearly and natural

variation in recruitment, and allow breeding stock and juveniles to sustain the populations. The conservation of fish habitats is also difficult because of damage done by pollution, removal and climate change. The most damaging form of marine pollution, affecting widespread areas, is land-based nutrient discharge causing blooms of phytoplankton, epiphytes on seagrass, excess macro algae on coral reefs and nuisance seaweed in coastal areas. Other negative outcomes from nutrient additions include: red tides, jellyfish blooms, fish kills, seagrass degradation and anaerobic sediments causing bottom-dwelling fauna to die.

However, differences in circumstances and capacities between Economies might also offer a tremendous source of opportunity for capacity development and technical, social, legal and economic cooperation. When addressing transboundary conflicts, such advantages must be kept in mind and turned into strengths. Opportunities may balance conflicts, helping to smooth dialogue and relations between economies. **Good levels of cooperation, and technology and knowledge transfer help to improve bilateral relations.**

Evaluate benefits and cost-sharing

An important focus of TMSM must be to optimise the benefits of marine resource use, and to share those benefits in a manner that is agreed as fair. The *use* of marine resources, rather than an allocation of marine

resources ownership, provides by far the best scope for the identification of mutually beneficial cooperative actions.

Cooperation will be motivated and sustained if all TMSM parties agree that the plan maximizes overall benefits, and is “fair”. Therefore, the need to achieve consensus over basic entitlements and costs is important. In some cases, such consensus may involve very difficult trade-offs and choices.

An interesting example of how conflict can be overcome by TMSM is the ‘Arctic Cooperation Agreement’ that was signed between Canada and the USA (please refer to case-study 6).

Possible areas of cooperation may offset conflicts and maximize synergies. **Cooperation, technology transfer, and the pursuit of common goals may help to overcome and manage conflicts** that initially appeared as obstacles to TMSM.

Transboundary Marine Biodiversity Conservation and Management Zones

Transboundary parks (TBPs) describe wildlife conservation areas with common international boundaries managed as a single unit by a joint authority comprising the representatives of participating countries. This version of transboundary management has been criticised for alienating local communities. It often appeals to traditional park managers and the urban middle classes who use protected areas for recreation and relate to 'parks' as a tool for conservation, without understanding the socio-economic implications.

Transboundary conservation areas (TBCAs) are cross-border regions where the different component areas have varying forms of conservation status, e.g. national parks; reserves allowing limited sustainable use, like recreational fishing and traditional gathering; and community-based natural resource management areas. Collaboration between these areas is not based on the creation of a single entity and is more cooperative than unitary in organisational structure. This type of transboundary collaboration emphasizes the linkage between public-sector managed protected areas and community managed multiple-use areas in a spatial approach that blends conservation and development objectives. The TBCA approach is more appealing to a constituency that feels that conservation and development goals must blend.

Transboundary Marine Protected Areas (MPAs) and MPA Networks

This is another common form of ecosystem-based transboundary cooperation although more frequently, transboundary MPAs have become incorporated as tools into larger, complex frameworks for marine management. MPAs tend to adopt a hard ecosystem-based management approach and usually require previous national or sub-national MPA legislation in order to be implemented (although this is not always the case).

Case-Study 9: The Arctic Cooperation Agreement: Overcoming legal disputes

The Northwest Passage in the Arctic has been the subject of disputes between Canada and other countries, including the United States of America. Canada recognises a section of the Northwest Passage as part of its internal waters, but other countries argue that these waters constitute an international strait.

The Arctic Cooperation Agreement, which was signed between USA and Canada in 1988, does not settle this issue, but acknowledges that such a dispute should not prevent cooperation to advance their shared interests in Arctic development and security. They agree that navigation and resource development in the Arctic should not negatively impact on the unique environment of the region or the well-being of its inhabitants. This agreement shows that operational considerations can overcome legal claims over marine waters, and that the recognition of mutual interests and responsibility may lead to practical cooperation and marine spatial management.

For example, USA and Canada agree to:

- Advance their shared interests in Arctic development and security;
- Promote safe, effective icebreaker navigation off their Arctic coasts; and
- Develop and share research information, in accordance with generally accepted principles of international law, in order to advance their understanding of the marine environment of the area.

Clause 4 of the agreement does not take any position regarding the dispute over Canadian sovereignty in Arctic waters, and calls for “cooperation endeavour”, even though the dispute is not settled:

“Nothing in this agreement of cooperative endeavour between Arctic neighbours and friends nor any practice thereunder affects the respective positions of the Governments of the United States and of Canada on the Law of the Sea in this or other maritime areas or their respective positions regarding third parties”.

Step 7: Identify national and international legal frameworks

International experience shows that although much can be achieved in the absence of a specific legal framework for marine spatial planning, a sound legal framework is essential for stable and reliable transnational cooperation. A comprehensive, harmonised legal basis for TMSM provides a more strategic, integrated and forward-looking foundation for all sea uses. Therefore, the identification of national and international laws, declarations, and agreements that are relevant to the TMSM initiative, is important.

Identify the existing national legislative framework

A good awareness of the existing national legislation for all parties that apply to the management of marine resources, environmental quality and economic activities at sea helps to provide a solid basis for TMSM development and implementation.

When assessing the national legislative framework the following questions should be answered:

- Are all areas of TMSM covered by national legislation?
- Are there any gaps in the national legislation that need to be filled to support TMSM?

- Does the national legislation integrate all principles of international treaties and conventions to which the economy is a Party?
- Are there conflicts between the national legislation of the transboundary parties?

The assessment of national legislation will **identify legislative amendments, changes or adaptations required to support TMSM.**

Identify the existing international legislative framework

At the international level, an extensive legal foundation relevant to marine resources management and sea use is already in place. International treaties and instruments that need to be taken into account for marine spatial planning include:

- United Nations Convention on the Law of the Sea (UNCLOS), 1982;
- Chapter 17 of Agenda 21;
- 1995 Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities;
- The FAO Code of Conduct for Responsible Fisheries;

- The United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks;
- World Summit for Sustainable Development 2002;
- Convention on Biological Diversity (CBD) 1994;
- Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, 1986;
- Convention for the Protection of the Marine Environment and Coastal Area of the South-east Pacific 1981;
- Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR), 1980;
- Agreed Measures for the Conservation of Antarctic Fauna and Flora;
- Convention for the Conservation of Antarctic Seals 1972;
- Protocol on Environmental Protection to the Antarctic Treaty
- International Convention for the Regulation of Whaling (ICRW), 1946;
- Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention), London, 1972, and Protocol;
- International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), 1973 and 1978;
- International Convention on Civil Liability for Oil Pollution Damage 1969 (1969 CLC), 1969, 1976 and 1984;
- International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 1971 Fund Convention, 1971;
- International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS), 1996;
- International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC), 1990;
- International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties Intervention Convention, 1969;
- Convention on Import of Threatened or Endangered Species, 1963
- Convention of Ballast Water and Sediment, 2004

International requirements, i.e. treaties, to which each Economy is a Party and customary international law, influence national policies, and the legislative framework to be established for TMSM. **International treaties and soft-law instruments, conventions and treaties set a**

grounding for TMSM. However, specific transboundary management agreements need to be concrete and set out institutional arrangements for cooperation, measures for resources and activity management, protection of related ecosystems and enforcement. They should also incorporate dispute resolution mechanisms and identify clear yet flexible means to share the benefits of marine resources. Provision for joint monitoring, and information exchange can also be considered.

Establish a specific legislative framework for TMSM

Ideally, TMSM will be supported by binding legislation, whether existing or newly created, to ensure that management goals are clearly defined, expectations made explicit, responsibilities identified, and specific commitments backed by legal requirements. Should new, specific legislation be needed, the following should be taken into account:

- The national legislative requirements of the transboundary parties;
- The relevant international treaties; and
- The need to fill gaps in legislation to support TMSM.

The legal authority TMSM can be established in several ways:

- Create new legislation;
- Re-interpret existing legislation;
- Create new-provisions for TMSM, i.e. legislative amendment.

The creation of new dedicated legislation provides an opportunity to define a clear management authority and may avoid problems of application through the establishment of new institutional arrangements designated for TMSM. However, the creation of a new legislation can take time, is often inflexible, and may not take advantage of initial political support because of the extended time needed to bring it into force.

A re-interpretation of existing legislation, e.g. provisions for integrated coastal zone management or ecosystem-based management; laws for environmental protection, biodiversity; is less time-consuming as it does not require new legislative process and adoption. Existing laws related to marine use may be combined to provide a foundation for TMSM.

Finally, a TMSM legislative framework might be defined by proposing amendments to legislation currently underway, or legislation that will be considered in the near future. Such provisions must not conflict with existing legislation, nor detrimentally affect sectors and authorities covered by the initial laws.

Specific treaties can be made to effect transboundary management, such as the Torres Strait Treaty, between Australia and Papua New Guinea.

Complementary to legislative instruments, “voluntary implementation of **cooperative agreements**” are programs that usually take the form of

“declarations” or “agreements of intent” between governments. Such instruments are not legally binding and are not enforced, but rely upon political and moral commitment to keep cooperative momentum going. This model is often better fitted for programs where there are significant differences in the policy and legal structures of the cooperating jurisdictions. The success of these cooperation agreements also tends to depend on nurturing a shared sense of an international marine community. Voluntary agreements are more common among newer cooperative programs.

In the APEC Economies existing regional agreements and conventions (such as Regional Seas Programmes—NOWPAP, COBSEA), GEF Large Marine Ecosystem (LME) projects or NGO-driven management projects advance cross-sectoral TSM, emphasising a closer dialogue between sectors¹⁶. However, an important challenge is to address larger-scale transboundary planning issues.

¹⁶Bensted-Smith and Kirkman, 2010

Case-Study 10: The Torres Strait Treaty: a specific legal instrument to manage a transboundary area

The Treaty between Australia and Papua New Guinea (PNG) concerning matters of sovereignty and maritime boundaries in the area known as the Torres Strait, and related matters, is commonly known as the 'Torres Strait Treaty'. The Treaty was signed in December 1978 and entered into force in February 1985. It defines the border between Australia and Papua New Guinea and provides a framework for the management of the common border area. Both Australia and Papua New Guinea have liaison officers, based respectively at Thursday Island and Daru, who consult regularly on implementation of the Treaty at the local level.

As well as defining the maritime boundaries between Papua New Guinea and Australia, the Treaty protects the ways of life of traditional inhabitants in the Torres Strait Protected Zone (TSPZ). Subsidiary management arrangements for commercial fisheries in the Zone have also been put in place under the Treaty. The Treaty is recognised as one of the most creative solutions in international law to a boundary problem touching on the lives of traditional inhabitants.

Traditional inhabitants from Australia and Papua New Guinea, in consultation with their governments, have agreed on the names of 13 PNG villages to have Free Movement privileges under the Treaty. A formal note from Australia acknowledging the full list of PNG villages, which have traditional ties with the Torres Strait Islands in the Protected Zone was exchanged with Papua New Guinea on 28 June 2000. Papua New Guinea exchanged its note with Australia on 25 July 2000, thereby confirming the understanding with effect from that date.

The Treaty also has an environmental protection dimension and was one of the earliest international agreements to reflect a greater environmental awareness. The environmental provisions of the Treaty are important for the well-being of the traditional inhabitants; for the preservation of traditional and commercial fisheries; and for protection of the fragile Torres Strait environment for its own sake. A ten-year prohibition on mining and drilling in the Torres Strait Protected Zone was agreed in the Torres Strait Treaty which entered into force on 15 February 1985. In 2008, Australia and Papua New Guinea Ministers agreed to an indefinite moratorium on mining and drilling in the Protected Zone.

Case-Study 11: The Agreement on Fishery Cooperation in the Tonkin Gulf between the Government of the People's Republic of China and the Government of the Socialist Republic of Vietnam

The Sino-Vietnamese Fisheries Agreement is the first in East Asia that establishes a cooperative fisheries management program within demarcated and permanent maritime zones. The agreement on fishery cooperation was signed in June 2004 between the Government of the People's Republic of China and the Government of the Socialist Republic of Vietnam. This agreement ends years of negotiation and debate over the rights of the respective states to resources in the Gulf. The agreement respects sovereignty within 12 nautical miles of the two parties.

A **Common Fishery Zone** created by the Agreement is located in the area 30.5 nautical miles in the exclusive economic zones either side of the demarcation line. It commits to the 'preservation, management and sustainable use of the living resources in the Common Fishery Zone', acknowledging 'the need for sustainable development and environmental protection, and the impact on the respective fishery activities of the two parties.'

Acknowledging the principle of equality and mutual benefit, the Parties commit to determine annually the number of operating fishing vessels for each party in the Common Fishery Zone, and to apply a permits scheme, determined by the Sino-Vietnamese Joint Committee for Fishery in the Tonkin Gulf. This **Joint Fishery Committee (JFC) for Tonkin Gulf** is the only body entitled to make rules and regulations for the Common Fishery Zone. It is a permanent body with full operational authority, including a dispute settlement mechanism. The competent national authorities are in charge of monitoring and inspecting the fishing vessels of both parties, in accordance with their domestic laws on the preservation and management of fishery resources. Enforcement is carried out by each coastal state within its EEZ boundary delimitation.

The agreement also includes a **buffer zone** for small-sized fishing boats. Many small-sized fishing boats near the China-Vietnam shoreline have limited communications and navigation equipment. Some are not even motorized. Illegal entry by mistake is inevitable and understandable. Hence, Chinese and Vietnamese negotiators decided to establish this buffer zone to avoid unnecessary disputes over unintentional illegal entry.

The agreement by China and Vietnam diminished the traditional fishing grounds for each country and reduced their fishing industry. Consequently, China embarked a program to scrap 30,000 fishing boats and relocate 300,000 fishermen by 2010. Each country has taken the painful steps necessary to shrink fishing grounds, cut back fishing fleets, and recycle redundant labour in order to conserve and manage a vital resource. Similar agreements have been signed between China, Korea and Japan.

Case-Study 12: The Northern Dimension (ND) Policy Framework

The Northern Dimension Policy Framework (NDPF) is a general framework that encompasses the regions of the Baltic Sea, North Sea, Barents Sea, and Arctic. It promotes dialogue and cooperation; strengthens stability and wellbeing; and promotes **economic integration, competitiveness and sustainable development** in Northern Europe. The NDPF also provides a **frame of reference for transatlantic cooperation** of the Northern Dimension partners in matters concerning the northern regions of the world, through the observer status of USA and Canada. It aims at enhancing **regional cooperation and improving synergies** between regional organisations in the North of Europe, maximising the use of available human and financial resources in the region. The NDPF focuses on areas of cooperation where a regional and sub-regional emphasis brings added value.

The **ND Principles are**: good governance, transparency and participation, sustainable development, gender equality, the rights of persons belonging to minorities, cultural diversity, social cohesion, fair working conditions and corporate social responsibility, non-discrimination, the protection of indigenous peoples and support the further strengthening of civil society and democratic institutions.

Cross-border cooperation is the cross-cutting theme of the ND, **Municipal and regional authorities** on both sides of land and sea borders are encouraged to engage in concrete **co-operation projects of mutual benefit**, to produce added value at the sub-regional and transnational level, and ensure sustainable regional development.

The **priority sectors** are: economic cooperation, freedom, security and justice, external security, research, education and culture, environment, nuclear safety, natural resources, social welfare.

The **institutional arrangements** are as follows: Northern Dimension **Ministerial meetings** gather the four partners at the level of Foreign Minister or equivalent every two years. Ministerial meetings provide policy guidance and monitoring to ND implementation. ND **Senior Officials Meetings** are held whenever necessary and may have a special theme for discussion on the agenda. Partners, observers and participants are invited to attend both types of meeting. Finally, a **Steering Group**, composed of representatives of the European Union, Iceland, Norway and the Russian Federation, was established at expert level and meets three times a year.

Step 8: Develop the TMSM plan

Develop the plan

As a precursor to development of a TMSM plan, the parties will need to agree on a vision, goals, objectives and principles for the designated marine space. These elements can be promulgated as a Policy document to guide subsequent planning. The development of such an initial policy articulation is very important as it classifies the outcomes that are sought and the standards that are to be met in pursuit of these outcomes.

A TMSM plan moves beyond the level of policy to outline: who the implementers will be, what they are expected to do, by when any identified milestones are to be achieved, how they will be measured, how much the activities will cost, and the anticipated challenges and obstacles to implementation. These six elements of the plan are the maximum required and maybe augmented with discussion on the proposed methodology for execution, avenues for cooperation, technology application and much more.

Another element to be described in a comprehensive TMSM plan is the **institutional arrangements** for communication between the parties, and monitoring and control of implementation. Moreover, as part of the implementation plan, the mechanism and procedures for enforcement,

particularly across jurisdictional boundaries, are best outlined clearly in writing to avoid later misunderstandings.

The TMSM plan provides guidance for authorities on potential development possibilities and their sustainability. This is achieved especially through scenarios and models that demonstrate sustainable development and resource use. An important complementary instrument to the TMSM Plan is a Marine Space Use Zonation Plan that outlines where activities can or cannot occur and stipulates conditions and prerequisites for activities in the various zones. The MSUZP will also document any temporal restrictions to apply in the use zones. The purpose of the MSUZP is to minimise conflict from competitive use of the marine space and to ensure that activities are compatible with the environment in which they are to take place. The MSUZP will clearly designate any Marine Protected Areas and ecologically sensitive sites.

A marine spatial planning system will need to consider the following aspects:

- Biological and physical characteristics of the sea;
- Ecosystems and other natural systems and processes;
- Coastal and marine historical heritage;
- Community and cultural values;

- Current uses, activities and pressures for change;
- Future uses and opportunities for all interests and sectors;
- The nature, potential use and value of marine resources;
- Threats to the natural systems;
- Shared economic, cultural, social and environmental values;
- Existing monitoring management and enforcement arrangements and the extent that they will need to be adapted;
- Methods of assessing performance and consistency with the plan.

Develop incentives to support the plan

In order to support the TSM plan, and ensure that the measures proposed are widely accepted and implemented, the use of incentives is recommended.

Incentives are of different nature:

- Economic incentives: can be positive, i.e. grants offered to develop certain activities or to finance research projects in a specific area; or negative, i.e. application of fees to enter marine parks, fines for not respecting regulations, permit fees, etc.
- Regulations: e.g. quotas for fishing licenses, permits to conduct diving operations in special areas, access rights to heritage sites.

- Education: e.g. implementation of new education programmes, sponsorship for degrees and training to develop skills and capacities in a priority sector, e.g. renewable energy, ecotourism.

Identify the authorities for implementation

The plan must also specify which authority or groups of authorities will be in charge of the different measures for the implementation of the plan. Some authorities may work jointly on some measures, others will work independently, but in any case, those authorities must be carefully coordinated, to ensure that their actions are coherent with the management plan.

Evaluate the plan

The evaluation mechanisms for a TSM plan vary from one instance to another. Environmental Impact Assessment (EIA) studies may be required to validate the plan, and ensure that it will achieve the intended objectives without further deteriorating existing economic and environmental conditions. These types of studies help to ensure that environmental considerations are taken into account in the planning process, and are not subordinated to economic considerations, which often have the highest priority.

Approve the plan

Finally, once the plan has been drawn and evaluated, it has to be approved. Ideally, approval will require a formal adoption process, i.e. the approval of:

- The plan, its vision, goals, objectives and principles;

- The related institutional arrangement(s);
- The allocated staff and expertise;
- The budgetary allocations.

Upon formal approval of the plan, the implementation phase can begin.

Step 9: Finance the plan

Effective development and management of transboundary marine resources, increasingly widely understood as an international and common public good, require appropriate financing.

The costs of developing a legal framework and non-binding agreements, establishing institutions, developing capacity, monitoring, data-sharing, and (most costly of all) long-term investment programs that optimise sustainable equitable use of designated area are substantial.

In most cases, investment needs exceed the resources available to the transboundary Economies; therefore, various financing mechanisms need to be considered.

A mixture of financing mechanisms and various sources of financial resources are typically used for TMSM cooperation. These include funds from: national budgets; inter-governmental organisations; international development banks, e.g. World Bank, Asian Development Bank; the United Nations; multilateral funds, e.g. Global Environment Facility); NGOs; and the private-sector, often through public-private partnership.

Other innovative financing schemes, e.g. regional revolving funds, environmental management levies, marine-park access fees, could be considered as options for sustainable financing of transboundary marine space management institutions. However, these require strong political support, good governance and appropriate institutional structures.

Step 10: Implement and enforce the plan

Implement the TMSM plan

The implementation phase turns the measures of the plan into actions and reality. Implementation is undertaken by the relevant participants and authorities designated in the plan.

Although a TMSM plan will provide for an integrated management plan, the existing institutions, and governance model will dictate a continuation of sectoral management to a certain extent. Therefore, coordination mechanisms across boundaries and between institutions are of crucial importance. In this regard, the zoning plan is useful to ensure that sectoral measures and activities are consistent with the overall TMSM Plan.

Enforce the TMSM plan

Enforcement actions can include:

- Field inspections to check that regulations and initiatives defined in the plan are respected, and that planning assumptions actually describe the real situation.

- Legal action, i.e. legal pursuit of parties who do not respect the regulations, with appropriate punishment, including compensation for violations;
- Negotiations with those responsible for the activities to encourage them to comply with laws and regulations, explaining the possible consequences if they do not comply.

The private sector may also participate in enforcement efforts by defining sectoral rules or corporate policies and regulations that are in accordance with the TMSM plan.

Enforcement is an important aspect of successful implementation. TMSM will often require cultural, organisational, and sectoral changes in behaviour and management practices. There is likely to be resistance to change; therefore the good will of parties alone cannot be relied upon to ensure success of implementation.

Step 11: Monitor and evaluate implementation

Throughout the implementation process, the TSM efforts should be monitored, for compliance with the plan, i.e. collect data and information that will allow assessment of the outcomes and management interventions. Monitoring is a continuous process.

Effective monitoring and evaluation require the following actions:

- **Select indicators that are flexible to conditions in the area** and that match the goals and targets of the management plan. The relationship between indicators needs to be known and they should cover the essential aspects of the plan;
- **Evaluation:** Evaluation reports should be a written document to ensure transparency and allow for future historical benchmarking. The evaluation should include financial accounting calculated in comparison with the approved budget for resources, time and funds. Evaluation reports should state clearly who is responsible for conduct of the evaluation, and who has access to the report. In a transboundary context, there may be reluctance by parties to reveal inadequacies or under performance to foreign or cross-border partners. Extra effort will possibly be needed to assure all participants that the purpose of evaluation is not to pass judgment but to identify areas for improvement and possibly additional resources. Nevertheless,

TSM partners should be aware that there may still be a tendency to exaggerate results or omit potentially embarrassing shortcomings.

- **Assess the management plan:** How well has practical implementation been achieved? Are any deficiencies the result of incorrect planning assumptions or overly ambitious targets? This assessment is conducted so that the results can inform future adaptation planning.

Re-establish the goals of the plan

The assessment of the plan should be made against its vision, goals and objectives. Importantly, the goals used for the evaluation of the outcomes of the TSM plan must be those outlined in the plan. Should these goals appear dated or no longer relevant, steps must be taken to amend the plan formally rather than allowing an informal consensus on some non-documented goals to drive TSM activities.

Example 7: ICOM indicators

In the UNESCO “*Handbook for measuring the progress and outcome of integrated coastal and ocean management*” (ICOM), three types of indicators have been defined:

Governance indicators: measure the performance of programme components, e.g., status of ICOM planning and implementation, and the progress and quality of interventions and of the ICOM governance process itself;

Ecological indicators: reflect trends in the state of the environment. They are descriptive in nature if they describe the state of the environment in relation to a particular issue, e.g., eutrophication, loss of biodiversity or over-fishing. They become performance indicators if they compare actual conditions with targeted ecological conditions;

Socio-economic indicators: reflect the state of the human component of coastal and marine ecosystems, e.g., economic activity. They help measure the extent to which ICOM is successful in managing human pressures in a way that results in an improved natural environment, in improved quality of life in coastal areas, and in sustainable socio-economic benefits.

Select the outcomes to evaluate

Evaluation of the outcomes enables identification of those measures in the plans that were successful and unsuccessful. A clear record of success and failure is important to **build transparency and accountability into the management process.**

Develop Key Performance Indicators (KPI)

Indicators are quantitative or qualitative measures of observed parameters that can be used to describe existing situations and measure changes or trends over time. Their three main functions are simplification, quantification and communication¹⁷.

Indicators generally simplify complex phenomena that can be shown to represent the total system being managed. Preferably, they can be used to quantify parameters for monitoring and assessment. Indicators can also be used as simplified means of communicating information to policy-makers and other interested parties, including the general public. They are powerful tools in the feedback loop to an action plan.

Key Performance Indicators (KPI), measure the effectiveness of planning measures against the goals and objectives of the plan. KPI enable monitoring of progress of the plan, the areas where objectives

¹⁷UNESCO, 2006, *A Handbook for measuring the progress and outcomes of integrated coastal and ocean management*, p88.

are fulfilled, and those where modifications of management measures will be necessary, because the initial measures have failed.

The KPI should be linked explicitly to the goals and objectives identified for TMSM.

The following **characteristics** for TMSM indicators should be considered:

- Readily measurable: On time-scales needed to support management, using existing instruments, monitoring programmes and available analytical tools;
- Cost effective: Indicators should be cost-effective since monitoring resources are usually limited;
- Concrete: Indicators that are directly observable and measurable (rather than those reflecting abstract properties) are desirable because they are more readily interpretable and accepted by diverse stakeholder groups;
- Interpretable: Indicators should reflect properties of concern to stakeholders; their meaning should be understood by as wide a range of stakeholders as possible;
- Objective: The interpretation and measurement of the indicators should follow accepted theories of scientific method;

- Sensitive: Indicators should be sensitive to changes in the properties being monitored, e.g., able to detect trends in properties or impacts;
- Responsive: Indicators should be able to measure the effects of management actions so as to provide rapid and reliable feedback on the consequences of interventions;
- Specific: Indicators should respond to the properties they are intended to measure rather than to other factors;¹⁸

Determine the current situation: baseline

Good indicators have the following **characteristics**:

- Readily measurable;
- Cost effective;
- Concrete;
- Objective;
- Sensitive;
- Responsive;
- Specific.

The baseline corresponds to the initial state, i.e. the status against which subsequent evaluation of the TMSM plan will be made. The first measurements will provide a baseline from which performance can be assessed as future KPI results are known.

¹⁸*Ibid.*, p11.

Example 8: Governance indicators for ICOM

Goals	Objectives	Code	Indicators
Ensuring adequate, institutional, policy and legal arrangements	Ensuring the coordination and coherence of administration and policies	G1	Existence and functioning of a representative coordinating mechanism for ICZM
	Supporting integrated management through adequate legislation and regulations	G2	Existence and adequacy of legislation enabling ICZM
	Assessing the environmental impacts of policies, plans, programmes and projects	G3	EIA, SEA and CCA procedures for plans, programmes and projects affecting coastal zones
	Resolving conflicts over coastal space and resources	G4	Existence and function of a conflict resolution mechanism
Ensuring adequate management processes and implementation	Managing the coastline through integrated plans	G5	Existence, status and coverage of ICOM plans
	Implementing and enforcing ICOM plans and actions	G6	Active management in areas covered by ICOM plans
	Routinely monitoring, evaluating and adjusting ICOM efforts	G7	Routine monitoring, evaluation and adjustment of ICOM initiatives
	Supporting ICOM through sustained administrative structures.	G8	Sustained availability and allocation of human, technical and financial resources for ICOM, including the leverage of additional resources
Enhancing information, knowledge, awareness and participation	Ensuring that management decisions are better informed by science	G9	Existence, dissemination and application of ICOM-related scientific research and information
	Ensuring sustained support from engaged stakeholders	G10	Level of stakeholder participation in, and satisfaction with, ICOM decision-making processes
	Ensuring non-governmental organisation (NGO) and community-based organisation (CBO) involvement	G11	Existence and activity level of NGOs and CBOs supportive of ICOM
	Ensuring adequate levels of higher education and professional preparation for ICOM	G12	Incorporation of ICOM into educational and training curricula and formation of ICOM cadres
Mainstreaming ICOM into sustainable development; Economic instruments mainstreaming	Enabling and supporting ICOM through technology, including environmentally friendly technology	G13	Use of technology, including environmentally-friendly technology, to enable and support ICOM
	Incorporating economic instruments into coastal management policies	G14	Use of economic instruments in support of ICOM
	Mainstreaming coastal and ocean management into sustainable development	G15	Incorporation of ICOM into sustainable development strategy

Source: UNFSCO-IOC. Handbook for Measuring the progress and outcome of the Integrated Coastal and Ocean Management' n18

Example 9: Ecological indicators for ICOM

Goals	Objectives	Code	Indicator
Organization: Conserve the ecosystem structure — at all levels of biological organization — so as to maintain the biodiversity and natural resilience of the ecosystem	Maintaining biodiversity	E1	Biological diversity
	Maintaining species distribution	E2	Distribution of species
	Maintaining species abundance	E3	Abundance
Vigour: Conserve the function of each component of the ecosystem so that its role in the food web and its contribution to overall productivity are maintained	Maintaining primary production and reproduction	E4	Production and reproduction
	Maintaining trophic interactions	E5	Trophic interactions
	Maintaining mortalities below thresholds	E6	Mortality
Quality: Conserve the geological, physical and chemical properties of the ecosystem so as to maintain the overall environmental quality	Maintaining species health	E7	Species health
	Maintaining water and sediment quality	E8	Water quality
	Maintaining habitat quality	E9	Habitat quality

Source: UNESCO-IOC, 2006, 'Handbook for measuring the progress and outcome of the Integrated Coastal and Ocean Management', p30.

Example 10: Socio-economic indicators for ICOM

Goals	Objectives	Code	Indicators
A healthy and productive economy	Maximise economic development	SE1	Total economic value
		SE2	Direct investment
	Increase employment	SE3	Total employment
	Foster economic diversification	SE4	Sectoral diversification
A healthy and productive environment	Minimise habitat destruction and alteration from human pressures	SE5	Human pressures on habitats
	Reduce the volume of introduction of all types of pollutants	SE6	Pollutants and introductions
Public health and safety	Protect human life, and public and private property	SE7	Disease and illness
		SE8	Weather and disaster
Social cohesion	Maintain equitable population dynamics	SE9	Population dynamics
		SE10	Marine dependency
		SE11	Public access
Cultural Integrity	Maintain cultural integrity	SE12	Traditional knowledge, innovations and practices / Cultural integrity
		SE13	Protection of cultural heritage resources

Source: UNESCO-IOC 'Handbook for Measuring the progress and outcome of the Integrated Coastal and Ocean Management', p39.

Evaluating the progress of TMSM

The evaluation process is a periodic activity that can be conducted at regular intervals using the KPI to assess progress of TMSM implementation against the stipulated goals and objectives.

The KPI may be used to perform three **types of evaluation**:

- **Performance evaluation**, focusing on achievements and efficiency in relation to stated goals and objectives;
- **Management capacity evaluation**, focusing on the adequacy of institutional structures and arrangements; and
- **Outcome evaluation**, focusing on implementation results and effectiveness against planned outcomes.

The evaluation of results will help to answer the following questions:

- **Context:** what is the general position towards the TMSM goals?
- **Planning:** What are the specific objectives to be achieved, and which measures would be the most appropriate?
- **Inputs:** What are the resources (financial, human resources, time) that actually will be needed for TMSM implementation?
- **Process:** Which means are likely to be effective to reach the objectives?
- **Outputs:** What are the most realistic estimates of results of TMSM implementation?

Table 2: Examples of measurements that might be used to assess TMSM performance

Measure	Example
Amount	Number of habitats, species, individuals or complaints over a decision
Area, size	Coverage of habitat or uses in an area, species distribution
Depth	Depth distribution of macro-algae, photic layer
Distance, location	Distance, location of a sensitive feature to MPA, from source of pressure
Duration	Period when a feature is most sensitive, e.g. reproduction, spawning period
Frequency	Frequency of vessels per unit time in an area
Length	Length of developed coastline, of erosion-sensitive shoreline in an area
Magnitude	How much of a given pressure
Overlap	Assessing the vulnerability of a sensitive feature, proportion of target features that are inside a specific zone (protection status)
Volume	Volume of water suitable for aquaculture

Report the results

A TMSM Evaluation Report should contain:

- The results of the evaluation;
- Areas of failure;
- Areas of success;
- Management measures that failed;
- Management measures that succeeded.

The evaluation report will be used for the re-planning process that is described in the next section.

The results of the evaluation should also be communicated, to explain any modifications in the plan.

Step 12: Adapt the plan

The TMSM process is a continuous and adaptive process.

TMSM involves, numerous challenges, such as continuous changes in people's demands and values, structural transformation in society and environment, abnormal climatic events and other exogenous shifts.

As the implementation of an initial TMSM plan will induce positive and negative outcomes (positive outcomes achieve or get closer to the stated objectives; negative outcomes do not reach or achieve the objectives) and will generate changes in the conditions of the marine space, the TMSM plan must be constantly evaluated and adapted.

An agreed time should be stipulated for formal adaptation of the original TMSM plan with a view to engendering acceptance and understanding that TMSM is never completed. There are always new challenges and opportunities to overcome or pursue respectively. Nevertheless, with iteration of planning and implementation, the relevant institutions, governance structures and foundation, data should become more mature, which will enable gains in efficiency and effectiveness.

Conclusion

As the world shrinks in response to increased demands on marine natural resources, technology advances and global climate change impacts, the need for effective TMSM will grow. Such will especially be the case in the APEC region, which is linked by ocean.

This Guide to TMSM outlines a range of considerations for transboundary marine space managers in the form of twelve Steps. Nevertheless, each area and instance of TMSM will vary; therefore the sequence and emphasis of the identified measures may differ from that outlined in this Guide. Planners and managers need to remain flexible in their approach and draw upon the examples and advice offered with an open mind and creative disposition.

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