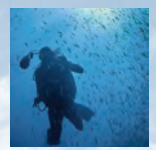
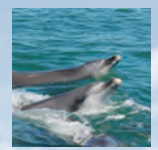
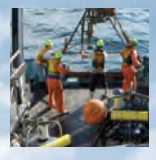
**Intergovernmental Oceanographic Commission**
IOC Manuals and Guides, N°. 70, ICAM Dossier N°. 8

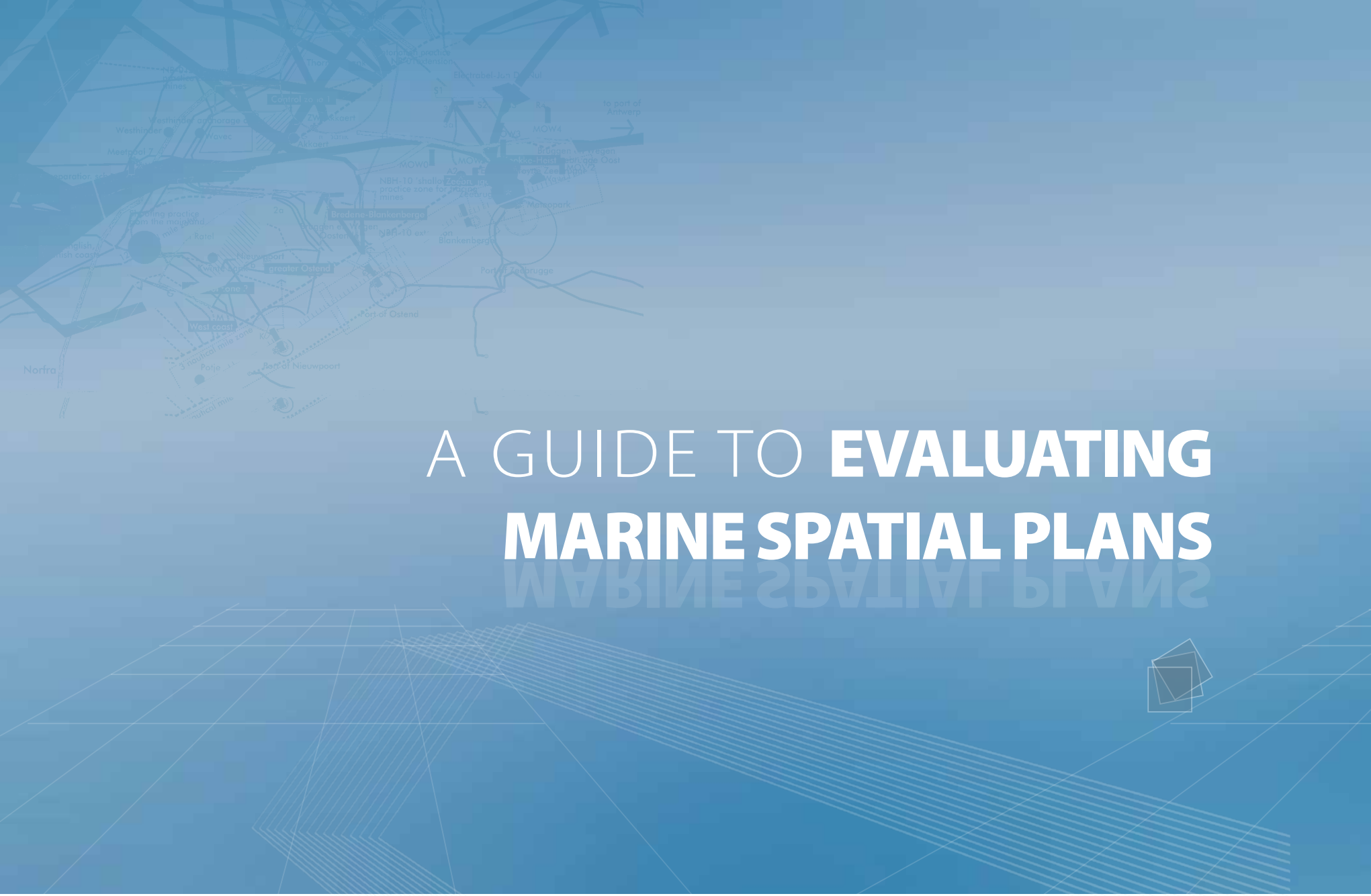
# A guide to
# EVALUATING MARINE SPATIAL PLANS

GORDON AND BETTY MOORE FOUNDATION

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

ICAM



# A GUIDE TO **EVALUATING MARINE SPATIAL PLANS**

Developed with the financial support of
GORDON AND BETTY MOORE FOUNDATION

United Nations Educational, Scientific and Cultural Organization
Intergovernmental Oceanographic Commission
ICAM

## Go to OpenChannels website:

**http://openchannels.org/msp-eval-guide, for the companion website to this guide.**



Designer: Eric Loddé
Written by Charles Ehler
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(IOC/2014/MG/70)

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# Foreword

Few people imagined in 2006, when UNESCO's Intergovernmental Oceanographic Commission held the first international workshop on marine spatial planning (MSP) in Paris, that a growing international ocean management community would start thinking about planning marine waters in a systematic and integrated way. While a number of countries had already undertaken MSP, an important recommendation of the IOC workshop was to develop a guide to marine spatial planning. The resulting guide*, published by UNESCO in 2009, has become an internationally recognized standard, now published in seven languages including Russian, Chinese, and Spanish.

MSP, originally developed in high-income countries in Western Europe, North America, and Australia, is rapidly developing in mid- and low-income countries such as China, Vietnam, Indonesia, South Africa, and island countries of the Caribbean and Coral Triangle.

The IOC promotes development of management procedures and policies leading to the sustainability of marine environments, as well as the capacity building necessary for the maintenance of healthy ocean ecosystems.

We hope this guide helps countries continue to foster the technical capacity building and institutional capacities to reduce biodiversity loss and manage their marine ecosystems sustainably.

Wendy Watson-Wright
Executive Secretary
Intergovernmental Oceanographic Commission
United Nations Educational, Scientific, and Cultural Organization

* Marine Spatial Planning : a step-by-step approach toward ecosystem-based management, 2009 IOC Manual and Guides, 53 (IOC/2009/MG/53)

# Introduction

While the marine community has often talked about the importance of "marine governance" or "marine ecosystem-based management", it is only during the past 10-12 years that these concepts have been turned into operational activities some of which have become known as "marine spatial planning" or MSP. Pioneered in Western Europe through the efforts of the United Kingdom, Belgium, the Netherlands, and Germany, MSP activities have spread to about 40 countries throughout the world. Nine countries now have government-approved marine spatial plans covering their exclusive economic zones or territorial seas, and several of these are in their second or third generation of plan development and implementation.

But how do we know if these plans are "successful"? And what does "success" mean? How do we measure it? Are the plans achieving their goals and objectives. Do the plans have political and public support? Have they achieved real results?

While the idea of MSP is still in its early life stage and many tangible results could take 5-15 years to be realized, it's not too early to think about evaluating the results of MSP.

This new guide from IOC's Marine Spatial Planning Initiative is an attempt to advance thinking within the international MSP community about undertaking this important step toward monitoring and evaluating the performance of marine spatial plans.

Charles N. Ehler, Consultant (Marine Spatial Planning)
Intergovernmental Oceanographic Commission
United Nations Educational, Scientific and Cultural Organization

# Acknowledgement

This report would not have been possible without the generous financial support of the Gordon and Betty Moore Foundation to UNESCO's IOC over the past eight years. Barry Gold, Program Director of the Moore Foundation's work on marine conservation, has consistently supported IOC's work on MSP. Kate Wing, Senior Program Officer, has overseen and provided invaluable guidance and comments throughout the development of this guide.

This guide builds on the work of many people who pioneered ideas about monitoring and evaluating the performance of planning and management of natural resources and influenced my thinking over the past 40 years of professional life, including C.S. (Buzz) Holling and Carl Walters on adaptive management, Robert Knecht, Biliana Cicin-Sain, Steve Olsen, and Blair T. Bower on integrated coastal and marine management, Richard Margoluis and Nick Salafsky on monitoring and evaluating development projects, Larry Crowder and Elliot Norse for ecological insights related to MSP, and many others.

It also builds on several other recent publications of the Intergovernmental Oceanographic Commission and the ideas of my co-authors (Stefano Belfiore, Julian Barbiere, Robert Bowen, Biliana Cicin-Sain, Camille Mageau, Dan McDougall, and Robert Siron) of the *Handbook on the Use of Indicators for Integrated Coastal Management* (2006), and especially my colleague in marine spatial planning, Fanny Douvere, co-author of two IOC publications, *Visions for a Sea Change* (2007), and *Marine Spatial Planning: a Step-by-Step Approach toward Ecosystem-based Management* (2009), IOC manuals and guides 48 and 53.

The learning process from discussions and interviews with marine planning professionals and scientists who are actually developing and implementing marine plans including Erik Olsen (Norway), Nico Nolte and Jochen Lamp (Germany), Paul Gilliland and Dan Lafolley (England), Leo de Vrees, Lodewijk Abspoel and Titiia Kalker (Netherlands), Richard Kenchington, Jon Day, and Stephen Oxley (Australia), Jacek Zaucha (Poland), Chu Hoi (Vietnam), Steve Diggon and Larry Hildebrand (Canada), Tomas Andersson (Sweden), and Deerin Babb-Brott, Stephanie Moura, Bruce Carlisle, John Weber, and Grover Fugate (USA).

A select group of international experts provided oversight and advice to the project from its inception including Robert Pomeroy, Professor of Resource Economics, University of Connecticut (USA), John Weber, Ocean Planning Director, Northeast Regional Ocean Council (USA), Paul Gilliland, Marine Planning Director, Marine Management Organization (England), and Ian Voparil, Lead, Ocean Issues, Shell International (Netherlands and USA).

UNESCO's IOC provided financial and technical support to the project. Wendy Watson-Wright, Executive Secretary of the IOC supported the project from its inception. Julian Barbière managed, helped guide and contributed to the project. Virginie Bonnet provided reliable and essential administrative support throughout the project. Eric Loddé designed the final report.

I take responsibility for any misinterpretation, misrepresentation of ideas, or factual errors in the report.

Charles N. Ehler
Paris, January 2014

# Acronyms

| | |
|---|---|
| ATBA | Area to Be Avoided |
| CBO | Community-based Organization |
| CMSP | Coastal and Marine Spatial Planning |
| EBM | Ecosystem-based Management |
| ECA | Emission Control Area |
| EEZ | Exclusive Economic Zone (200-nautical mile limit) |
| EIA | Environmental Impact Assessment |
| HELCOM | Helsinki Commission |
| IMO | International Maritime Organization |
| IMP | Integrated Management Plan |
| IOC | Intergovernmental Oceanographic Commission (UNESCO) |
| IOPTF | Interagency Ocean Policy Task Force (USA) |
| M&E | evaluation Monitoring and Evaluation |
| MPA | Marine Protected Area |
| MSP | Marine or Maritime Spatial Planning |
| NGO | Non-governmental Organization |
| NOAA | National Oceanic & Atmospheric Administration (USA) |
| OSPAR | Oslo-Paris Convention |
| PSIR | Pressure-State-Impact-Response |
| PSR | Pressure-State-Response |
| PSSA | Particularly Sensitive Sea Area |
| RBM | Results-based Management |
| SMART | Specific, Measurable, Attainable, Relevant, and Time-bound objectives |
| SEA | Strategic Environmental Assessment |
| TS | Territorial Sea (12-nautical mile limit) |
| UNESCO | United Nations Educational, Scientific, and Cultural Organization |

# Conversions

| | |
|---|---|
| $km^2$ | One square kilometer = 0.39 square mile |
| $mi^2$ | One square mile = 2.59 square kilometers |
| nmi | One nautical mile = 1.15 miles = 1.85 kilometers) |

# Glossary

**Adaptive Management**: the incorporation of a formal learning process into management actions. Specifically, it is the integration of planning, implementation, monitoring and evaluation to provide a framework to systematically test assumptions, promote learning, and provide timely information for management decisions.

**Baseline**: the situation before a marine spatial management plan is implemented; it is the starting point for performance monitoring and evaluation.

**Compliance monitoring**: collection and evaluation of data, including self-monitoring reports, and verification to show whether human activities are in compliance with the limits and conditions specified in permits and regulations; also called "surveillance monitoring".

**Content analysis**: a type of systematic analysis of qualitative data that identifies and notes through codes the presence of certain words, phrases, or concepts within text, speech, and/or other media.

**Effectiveness**: an evaluation criterion that asks the extent to which management actions actually achieve the desired goals, objectives, and outcomes of a management plan.

**Efficiency**: an evaluation criterion that asks the economic question, "Have goals, objectives, and outcomes been achieved at least cost?"

**Equity**: while effectiveness and efficiency are technical and economic criteria, equity is a social and political issue. It asks about the social allocation or distribution of the costs and benefits of management actions, i.e., "who pays" and "who benefits" from a particular management action.

**Evaluation**: a periodic management activity that assesses achievement against some predetermined criteria, usually a set of standards or management goals and objectives.

**Goal**: a statement of general direction or intent. Goals are high-level statements of the desired outcomes to be achieved. This guide makes a clear distinction between general goals and specific objectives.

**Governance**: the process through which diverse elements of a society wield power and authority and thereby influence and enact policies and decisions concerning public life and economic and social development. Governments as well as the private sector and civil society carry out governance.

**Indicator**: a measure, either quantitative or qualitative, of how close you are to achieving what you set out to achieve, i.e., your objectives or outcomes.

**Logical framework**: a logical framework analysis that is used to display a program's goals, objectives, and indicators in tabular form, showing the logical of the program. Often abbreviated as logframe.

**Management**: directing and controlling resources for the purpose of accomplishing specified goals and objectives. Management encompasses the allocation of human resources, financial resources, technological resources, and natural resources. It is a process made up of a set of functions or activities, including research, planning, implementation, monitoring, evaluation, and others, all of which must be carried out to achieve the specified goal(s) and objectives.

**Management action or measure**: a specific action taken to achieve a management objective; management actions should also identify the incentives (regulatory, economic, educational) that will be used to implement the management action and the institution or institutional arrangement that has the authority to implement the management action.

**Marine spatial planning (MSP):** a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, social, and economic objectives that are usually specified through a political process,

**Monitoring plan**: the plan for monitoring your MSP program. It should include information needs, indicators, and methods, spatial scale and locations, time frame, and roles and responsibilities for collecting data.

**Objective**: a specific statement of desired outcomes that represent the achievement of a goal. Objectives should be SMART—specific, measurable, achievable, relevant or realistic, and time-bound.

**Performance evaluation**: an assessment that examines the extent to which a marine spatial plan is working as intended by assessing ongoing program implementation and operations. A performance evaluation helps MSP managers identify what changes are needed in planning, strategies and operations to improve performance of the plan and its management actions.

**Performance monitoring**: the ongoing monitoring and reporting of program accomplishments, particularly progress toward pre-established goals and objectives. Program measures or indicators may address the type or level of program activities conducted (process), the direct products and services delivered by a program (outputs), and/or the results of those products and services (outcomes).

**Planning**: a management activity that generates information for decision-making. It is the process of deciding who gets what, when, and where, how, at what costs, and who pays the costs? Planning should be organized to generate information at various points in time. A continuous activity of planning should exist to generate information for management that responds to changing conditions, i.e., adaptive management

**Qualitative data**: data in non-numerical form; qualitative data deal with descriptions. They are data that can be observed, or self-reported, but not necessarily precisely measured. Examples of qualitative data are data on relationships and behavior.

**Qualitative data analysis**: methods used to analyze information gathered in nonnumeric form, such as narrative written or taped responses to semi-structured interviews and observations or other documents and media, to understand and interpret behavior and situations.

**Quantitative data**: data in numerical form; quantitative data are data that can be measured. Examples include data on cost, length, area, volume, weight, speed, time, temperature, employment, and income.

**State-of-the-system monitoring**: state-of-the-system monitoring focuses on assessing long-term trends, for example, the status of biodiversity in a marine area, the quality of water, or the overall health of a particular ecosystem.

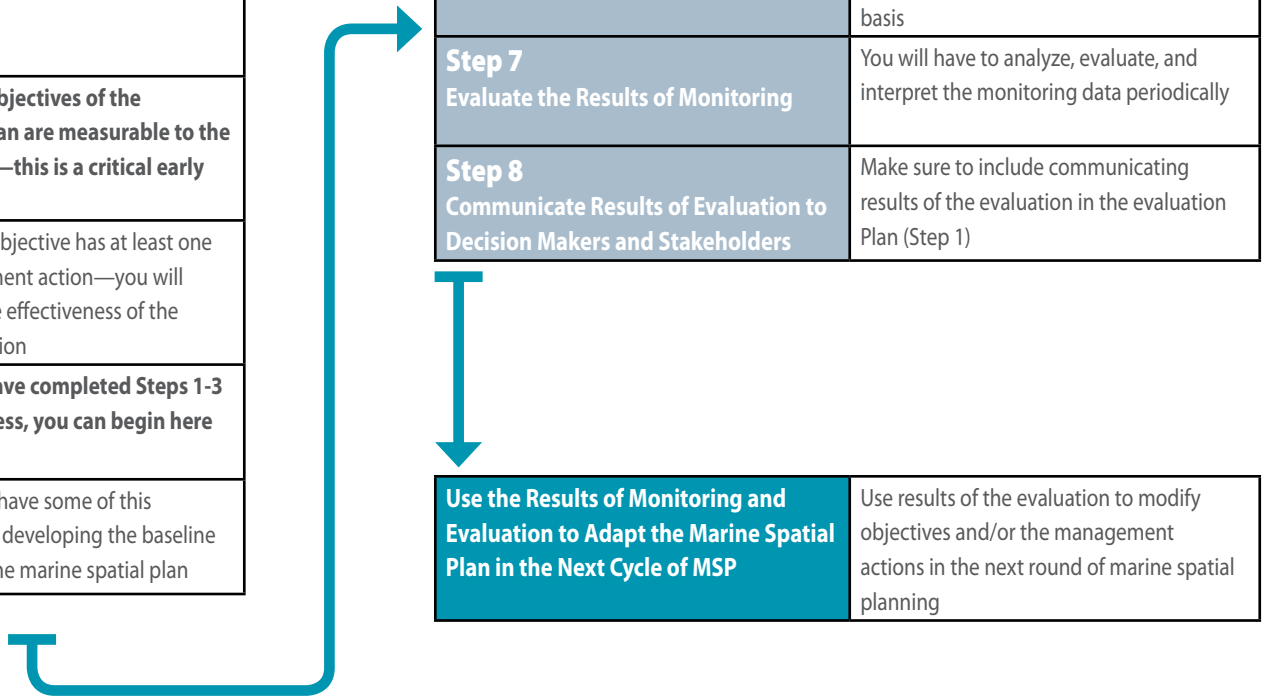
**Surveillance monitoring**: same as "compliance monitoring".

**Target**: an interim point on the way to an outcome and eventually to a long-term management goal. Targets are based on known resources plus a reasonable projection of the resource base over a fixed period of time.

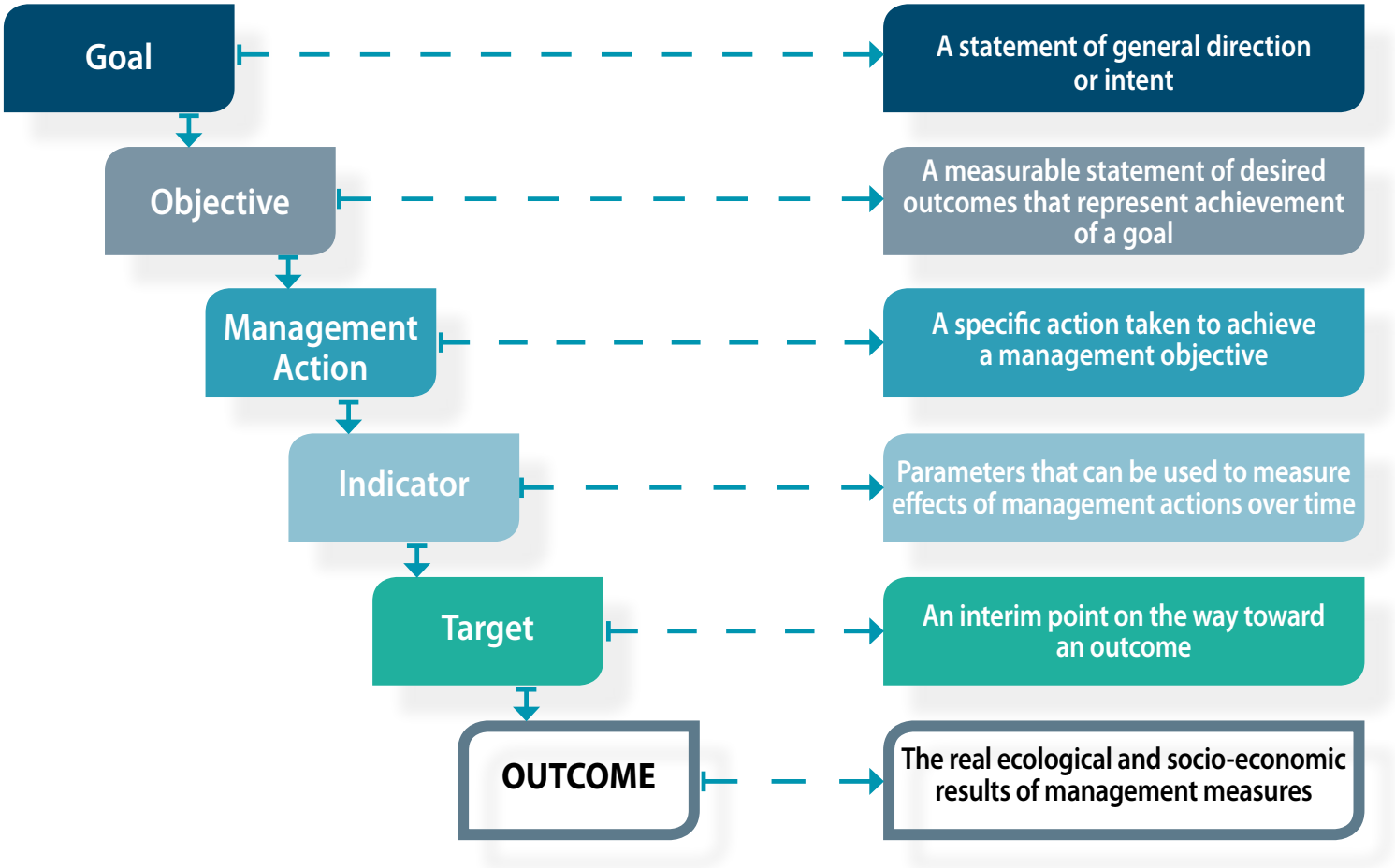
Graphic Guide

# Performance Monitoring and Evaluation of Marine Spatial Plans

| | |
|---|---|
| **Step 1**<br>**Identify the Need for Monitoring and Evaluation and Prepare a evaluation Plan** | If you already have an evaluation plan, you should go to Step 2 |
| **Step 2**<br>**Identify Objectives of the Marine Spatial Plan** | **Make sure the objectives of the Management Plan are measurable to the extent possible—this is a critical early step!** |
| **Step 3**<br>**Identify Management Action(s) for Each Objective** | Make sure each objective has at least one related management action—you will be evaluating the effectiveness of the management action |
| **Step 4**<br>**Identify Performance Indicators and Targets** | **If you already have completed Steps 1-3 in the MSP process, you can begin here with Step 4** |
| **Step 5**<br>**Establish a Baseline for Selected Indicators** | You may already have some of this information after developing the baseline information for the marine spatial plan |
| **Step 6**<br>**Monitor the Selected Indicators** | Ensure that the selected indicators are monitored on a regular and continuing basis |
| **Step 7**<br>**Evaluate the Results of Monitoring** | You will have to analyze, evaluate, and interpret the monitoring data periodically |
| **Step 8**<br>**Communicate Results of Evaluation to Decision Makers and Stakeholders** | Make sure to include communicating results of the evaluation in the evaluation Plan (Step 1) |
| **Use the Results of Monitoring and Evaluation to Adapt the Marine Spatial Plan in the Next Cycle of MSP** | Use results of the evaluation to modify objectives and/or the management actions in the next round of marine spatial planning |



# Relationships Among the Elements of a Marine Spatial Management Plan




PART I

# BACKGROUND

# ABOUT this Guide

*"I never said it would be easy. I only said it would be worth it."*

Mae West (1893-1980)
American actress,
singer and playwright

### Tip! Need Some Background Reading?

Several "classic" and comprehensive introductions to performance monitoring & evaluation already have been written including *Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects* (Margoluis & Salafsky 1998), *Ten Steps to a Results-based Monitoring and Evaluation System* (Kusek & Rist 2004), and *Performance Measurement* (Hatry 2006). If you are just beginning to think about or develop a MSP performance evaluation system, you should have a look at these important references for basic ideas, definitions, and detailed discussions of methods before you begin or when you get stuck.

Another more recent document you should have on your reference shelf is *Open Standards for the Practice of Conservation* (Conservation Measures Partnership 2013) available at: www.conservationmeasures.org. The Conservation Measures Partnership is a consortium of conservation organizations whose mission is to advance the practice of conservation by developing, testing, and promoting principles and tools to credibly assess and improve the effectiveness of conservation actions.

## What is the purpose of this guide?

Over the past decade marine spatial planning (MSP) has been recognized as a way to meet multiple objectives – ecological, economic, and social – within an increasingly crowded ocean. It can provide legal certainty and predictability for public and private investment while protecting natural resources like fish and fisheries. At least six countries (Belgium, The Netherlands, Germany, Norway, Australia, and China, and three American states (Massachusetts, Rhode Island, and Oregon) have implemented spatial plans for their marine jurisdictions. In two cases, Norway and The Netherlands, MSP is already in its second or third generation. Three other countries (England, Portugal, and Sweden) will implement marine spatial plans for their marine waters over the next few years. Over the next decade over 40 countries will have produced about 60-70 marine spatial plans at the national (EEZ), sub-national (territorial sea), and state or provincial levels.

For example, Australia has completed five marine plans covering its entire exclusive economic zone (EEZ), Belgium has just approved its revised maritime spatial plan for its EEZ (Fig. 1), Germany has completed five plans covering its two EEZs in the Baltic and North seas and three länder (coastal States that have jurisdiction over the German territorial sea), China has completed nine provincial-level plans covering its entire territorial sea, in the United States three coastal states have completed and implemented spatial plans for three coastal States, and so on (Table 1).

But how do you know if these planning processes are working? Considerable resources are being allocated to marine planning, implementation, and enforcement throughout the world, but will the results of these plans be effective, will the benefits of these new marine management programs be worth the costs? Who will bear the costs of the plans? Who will benefit? How will you know what works and what doesn't?

### Tip! A Reasonable Question to Consider

Without knowing what it is that existing marine spatial plans are achieving (or not achieving), how will it be possible to improve them the second time around?

**Table 1.** The Status of Examples of Marine Spatial Planning in 2013.

| Country | Region | Planning Status |
|---|---|---|
| Belgium | North Sea EEZ | Approved/Implemented |
| Netherlands | North Sea EEZ | Approved/Implemented |
| Germany | North Sea EEZ | Approved/Implemented |
| Germany | Baltic Sea EEZ | Approved/Implemented |
| Germany | Mecklenburg-Vorpommern Länd | Approved/Implemented |
| Germany | Schleswig-Holstein Länd | Approved/Implemented |
| Germany | Lower Saxony Länd | Approved/Implemented |
| England | East Planning Regions | Completed/Approved |
| England | South Planning Regions | Underway |
| Scotland | EEZ | National Plan Drafted |
| Scotland | Pentland Firth & Orkney Waters | Pilot Plan Completed |
| Wales | EEZ | Underway |
| Northern Ireland | EEZ | Underway |
| Ireland | EEZ | Underway |
| Poland | Baltic Sea | Underway |
| Lithuania | Baltic Sea | Completed |
| Estonia | Baltic Sea | Underway |
| Latvia | Baltic Sea | Pilot MSP Plan Completed |
| Finland | Baltic Sea | Underway |
| Sweden | Baltic Sea/North Sea | Underway |
| Norway | Barents Sea | Approved/Implemented |
| Norway | Norwegian Sea | Approved/Implemented |
| Norway | North Sea | Approved/Implemented |
| Portugal | Continental EEZ | Underway |
| Denmark | Baltic Sea/North Sea | Underway |
| Israel | EEZ/Territorial Sea | Underway |
| United Arab Emirates | Abu Dubhai Emirate Waters | Underway |
| Australia | Southeast Bioregion | Completed, under revision |
| Australia | Southwest Bioregion | Completed/Approved |
| Australia | Northwest Bioregion | Completed/Approved |
| Australia | North Bioregion | Completed/Approved |
| Australia | East Bioregion | Completed/Approved |
| Australia | Coral Sea Reserve | Underway |
| Australia | Great Barrier Reef | Approved/Implemented |
| New Zealand | Hauraki Gulf | Underway |
| China | Lisoning Province | Approved/Implemented |
| China | Hebei Province | Approved/Implemented |
| China | Shandong Province | Approved/Implemented |
| China | Shanghai Municipality | Approved/Implemented |
| China | Zhejiang Province | Approved/Implemented |
| China | Fujian Province | Approved/Implemented |
| China | Guandong Province | Approved/Implemented |
| China | Guangxi Province | Approved/Implemented |
| China | Hainan Province | Approved/Implemented |
| Vietnam | Territorial Sea | Underway |
| Indonesia | Territorial Sea | Underway |
| Thailand | Territorial Sea | Underway |
| Cambodia | Territorial Sea | Underway |
| Philippines | Territorial Sea | Underway |
| USA | Massachusetts State | Approved/Implemented |
| USA | Rhode Island State | Approved/Implemented |
| USA | Oregon State | Approved |
| USA | Washington State | Underway |
| USA | Northeast Region | Underway |
| USA | Mid-Atlantic | Underway |
| Canada | East Coast (ESSIM) | Plan Completed, not Approved |
| Canada | Beaufort Sea | Completed and approved, but not implemented |
| Canada | Pacific Coast & EEZ (Federal) | Completed |
| Canada | Pacific Coast & EEZ (MaPP) | Underway |
| Mexico | EEZ (Pacific & Gulf of Mexico) | Underway |
| Bermuda | EEZ | Underway |
| St Kitts & Nevis | EEZ | Pilot Plan Completed |
| St Vincent & Grenadines | EEZ | Underway |
| Grenada | EEZ | Underway |
| Belize | Territorial Sea | Plan Drafted |
| Costa Rica | Territorial Sea | Pilot Projects Underway |

**Figure 1.** **The Integrated Map from Belgium's New Maritime Spatial Plan, 2014.**
*Source: Federal Public Service: Health, Food Chain Safety and Environment*


In March 2014 the King of Belgium approved by Royal Decree a new maritime spatial plan for the Belgian Part of the North Sea, replacing its "MasterPlan" developed in 2003. Over the past 10 years, marine spatial planning in Belgium has evolved from a "Master Plan" (actually a zoning plan, based primarily on sectoral interests and with no legal authority) to an integrated, multiple use plan with strong legal authority."

## Who should use this guide?

This guide on performance monitoring and evaluation (evaluation) is intended for practitioners responsible for planning and managing marine areas. Practitioners are the managers and stakeholders who are responsible for designing, planning, implementing, monitoring, and evaluating marine management plans. While its focus is on the performance monitoring and evaluation of MSP, planners and managers should know how to incorporate monitoring and evaluation considerations into the MSP process from its very beginning, and not wait until a plan is completed before thinking about how to measure "success". Effective performance monitoring and evaluation is only possible when management objectives and expected outcomes are written in a way that is measurable, either quantitatively or qualitatively.

## Who are "marine spatial planners and managers"?

In addition to planning professional responsible for integrated marine plans, many sectoral managers and institutions with sectoral values and interests manage marine and coastal areas including:

- Fishery managers
- Marine and coastal aquaculture managers
- Marine transport managers
- Offshore oil and gas managers
- Offshore renewable energy managers
- Coastal land use managers
- Water quality managers
- Marine tourism and recreation managers
- Marine and coastal protected area managers

Since a single "marine manager" or integrated management institution rarely exists in a marine region, it's important to involve these sectoral managers and their interests in the MSP process.

## What should you know after using and reading this guide to performance monitoring and evaluation?

- The importance of considering monitoring and evaluation at the beginning of the MSP process and not as an afterthought;
- The importance of setting clear objectives;
- That outcomes represent the most important result of planning. You should stay focused on what ultimately matters—the effects of management actions in the plan on people and the marine environment;
- The significance of developing a limited number of sound indicators with targets as these are the keys to knowing when you are making measurable progress towards desired results;
- The need to collect baseline values for the indicators. It is difficult to determine what has been accomplished in 3-10 years if you don't know where you were when you began; and
- That the results framework with indicators, targets and baselines should be linked to a monitoring and evaluation plan. Make sure reporting and evaluation requirements are aligned with the monitoring and evaluation system.

## How is this guide organized?

This guide builds on the general approach and structure of the previous UNESCO's IOC guide, *Marine Spatial Planning: a step-by-step approach toward ecosystem-based management* (Ehler & Douvere 2009) available at: www.unesco-ioc-marinesp.be. Similar in organization to the first MSP guide, this one presents a logical sequence of eight steps to monitoring and evaluating the performance of management plans (and their related management actions) that are important outputs of any MSP process.

**Table 2.** What this guide is—and is not.

| What this guide is | What this guide is not |
|---|---|
| A basic and generic introduction to evaluation of marine spatial plans | A source of advanced evaluation techniques |
| Written primarily for MSP planners and managers | Written for professional evaluators and researchers |
| A document that should be used with other MSP guides and manuals | A "one-size-fits-all" approach that can be used for all applications |
| Should be used with contributions from natural and social scientists | Requires high level of statistical expertise from the user |
| A short introduction to analysis, interpretation and communication | A technical guide to data analysis and interpretation |

**Box 1.**
**The Ten Steps of the MSP Process**

The development and implementation of MSP involves a number of steps, including:

1. Identifying need and establishing authority;
2. Obtaining financial support;
3. Organizing the process through pre-planning;
4. Organizing stakeholder participation;
5. Defining and analyzing existing conditions;
6. Defining and analyzing future conditions;
7. Preparing and approving the spatial management plan;
8. Implementing and enforcing the spatial management plan;
9. Monitoring and evaluating performance; and
10. Adapting the marine spatial management process

Ehler & Douvere 2009

## What will you learn from this guide?

Some additional ideas that the user should take away from this guide include:

- The importance of good planning for effective implementation, monitoring and evaluation;
- The importance of writing clear measurable objectives at the beginning of the MSP process;
- Why the identification of indicators and targets are critical for effective performance monitoring and evaluation;
- The critical role of monitoring in demonstrating the performance of management actions and in steering the implementation process toward intended results (outcomes);
- How monitoring lays the groundwork for evaluation;
- The role of monitoring and evaluation in strengthening MSP effectiveness and managing for results; and
- Where to look for references and materials for additional information and guidance.

## A fundamental principle behind this guide

Marine spatial planning (MSP) is a continuing, adaptive process that should include performance monitoring and evaluation as essential elements of the overall management process (Ehler and Douvere, 2009).

Rather than waiting until a spatial management plan has been developed to begin thinking about monitoring and evaluation should be considered at the very beginning of the planning process—not the end.

Most marine planning efforts throughout the world claim to endorse adaptive management—simply defined as "learning by doing". Which management actions work, which do not, and why?

An adaptive approach to marine spatial planning and management is indispensable to deal with uncertainty about the future and to incorporate various types of change, including global change (climate change), as well as technological, economic, and political change. For example, the 2010 Final Recommendations of the [US] Interagency Ocean Policy Task Force stated that… "CMSP objectives and progress toward those objectives would be evaluated in a regular and systematic manner, with public input, and adapted to ensure that the desired environmental, economic, and societal outcomes are achieved."

Climate change will certainly influence the location of important biological and ecological areas and species over the next 30–100 years, while technological change (and climate change) will considerably alter the exploitation of previously inaccessible marine areas such as the Arctic or the high seas. Goals and objectives of MSP, and management plans and actions will inevitably have to be modified to respond to those changes—or plans quickly become ineffective, uneconomic, infeasible, and ultimately—irrelevant.

The need for an adaptive approach to MSP has been recognized in various national and international policy documents. The United States draft framework for coastal and marine spatial planning refers to the need for MSP to be "…adaptive and flexible to accommodate changing environmental conditions and impacts, including those associated with global climate change, sea-level rise, and ocean acidification, and new and emerging uses, advances in science and technology, and policy changes" (IOPTF, 2009).

One of the 10 principles for MSP, as defined in the European Union "Roadmap for MSP", for example, includes the "incorporation of monitoring and evaluation in the planning process" and recognizes that "… planning needs to evolve with knowledge" (European Commission,

2008). Consistent with these MSP policy requirements, each of the marine spatial plans in the USA (Massachusetts), Germany, and Norway—often held up as models of good practice—include references to either an adaptive approach or to monitoring and evaluation as essential elements of an adaptive approach.

However, despite the importance of an adaptive approach to MSP, few efforts have been made to define what such an approach really entails (Douvere & Ehler, 2010). An adaptive approach requires monitoring and evaluation of the performance of marine spatial plans, but little research has been conducted on how such performance monitoring and evaluation can lead to meaningful results and whether current MSP initiatives have the essential features, e.g., measurable objectives, to allow it. The latter, however, is crucial as more and more countries attempt to learn from existing MSP practice and some countries recently began their "second- or third- generation" marine spatial plans.

## Sources and Additional Reading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# INTRODUCING Performance Monitoring and Evaluation of Marine Spatial Plans

*"The illiterate of the future will not be the people who cannot read; it will be the people who cannot learn."*

Alvin Toffler (1928- )
American futurist

## Learning to Plan and Planning as Learning

Planning is often described as a learning process, and learning to plan is one of the intangible benefits of starting a MSP process.

Performance Evaluation is not simply a matter of measuring outcomes. Often a more subtle evaluation is needed. The type of evaluation needed depends on our assumptions about planning, its function, or purpose. Therefore, MSP plans should be evaluated, not only by their outcomes, but for how they improve the understanding of decision makers and stakeholders about present and future problems they face and the opportunities that planning presents to deal with problems in the present to avoid them in the future. When planning increases this understanding, it may be said to perform its role, irrespective of outcomes. Plans perform their role if and when they help decision makers make sense of their situations, and so they need to be evaluated in this light, as well as final outcomes.


**Figure 2:** The Steps of the Management Cycle (Conservation Management Partnership).
Source: Conservation Management Partnership

## Learning as Part of the Management Cycle

The Open Standards for the Practice of Conservation (Conservation Measures Partnership 2013) brings together the principles and best practices of results-based program planning and adaptive management and organizes them into five steps of a management cycle: (1) conceptualize the program vision and context; (2) plan actions and monitoring; (3) implement actions and monitoring; (4) analyze data, use the results, and adapt; and (5) capture and share learning (Fig. 2).

No single generic evaluation framework fits all purposes. For example, the International Red Cross and Red Crescent Societies have recently published a Project/Programme Monitoring and Evaluation Guide that uses a management cycle framework that has many of the same steps.

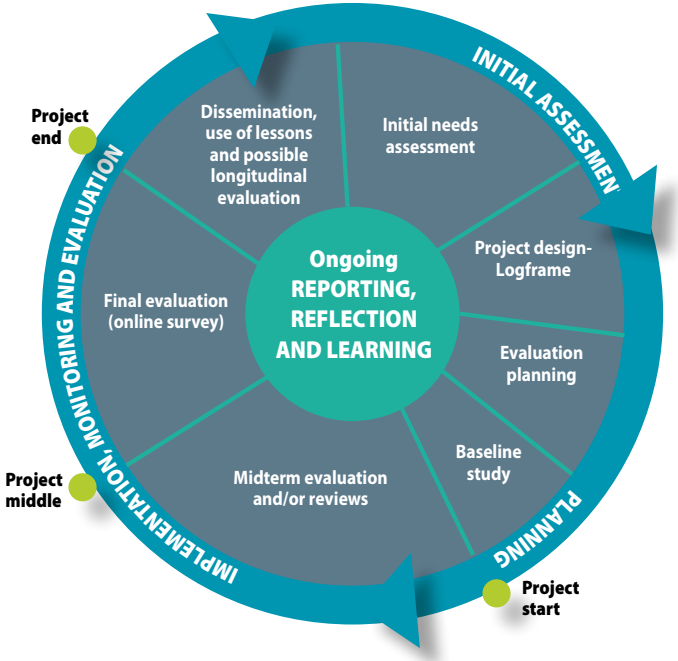


**Figure 3:** Key Evaluation Activities in the Project/Programme Cycle.
Source: Federation of Red Cross and Red Crescent Societies

This guide uses many of these same steps in an evaluation process that is consistent with the 10 steps of marine spatial planning identified in the UNESCO guide to MSP (Ehler & Douvere 2009)

## How Will You Recognize "Success"?

"Successful" MSP has often been defined in practice as simply the adoption of a management plan (an output) or the implementation of new spatial management actions (also outputs). Occasionally meeting the objectives and targets of the management plan is the definition of success. According to a recent analysis of 16 marine spatial planning examples in practice (Collie et al, 2012) undertaken by an Ecosystem Science and Management Working Group for the National Oceanic and Atmospheric Administration (NOAA), successful MSP is defined along a continuum. Most American plans, e.g., Massachusetts and Rhode Island, consider success to be the adoption of the plan, while meeting the objectives of the management plan denotes success in many European marine plans i.e., the plan is not an end in itself but a process to meet objectives and produce results.

The report for NOAA found that most marine planning efforts incorporate some level of monitoring. Several plans stated that they would use existing monitoring programs, but only a few plans have tied objectives to specific performance indicators. Of the plans that had performance indicators, only a few had pre-identified background or reference levels.

Adaptive management is often stated as a principle of MSP, but the report for NOAA found that only a few of the 16 plans have made the principle operational.

Performance monitoring and evaluation will be successful if progress is being made toward achieving management objectives through the MSP process. A few additional criteria are relevant:

- Stakeholders are actively involved and committed to the MSP process. Stakeholder involvement in problem identification, specification of MSP goals and objectives, selection of management actions, and monitoring and evaluation build support for the process;
- Progress is being made toward the achievement of management goals and objectives. Since MSP is a multi-objective planning process, achieving the outcome of one objective may involve trade-offs with the outcomes of other objectives. In the absence of at least some indication of progress over a reasonable period of time, then there is little justification for continuing the MSP process;
- Results from performance monitoring and evaluation are used to adjust and improve management actions; and
- Implementation of the marine spatial plan is consistent with applicable authorities. If not, disruptions in the planning and implementation process are inevitable. A breakdown of trust among stakeholders is likely, and possibly a withdrawal of stakeholder support, loss of funding, and possibly litigation.

If stakeholders do not endorse the MSP process and its outputs, the process has not been successful. If performance monitoring and evaluation results are not used to modify revisions to plans, then the process has not been successful.

## What are the different types and purposes of monitoring?

The general term "monitoring" encompasses many types of monitoring, including:

- **Trend or state-of-the-system (or state-of-the-environment) monitoring:** State-of-the-system monitoring focuses on assessing, for example, the status of biodiversity in the marine area, the quality of marine waters, or the overall health of a particular marine ecosystem. Monitoring has often focused on measuring the state-of-the environment—the results of which are documented in numerous local, national, or international reports such as the State of World Fisheries and Aquaculture of

the United Nations Food and Aquaculture Organization or the Quality Status Reports published by the OSPAR Commission, among many others. Importantly, new management approaches, including MSP, are brought forward as ways to deal with the deteriorating conditions of the marine environment as documented by state-of-the-system reporting.

State-of-the-system indicators, when tracked over time at the national or regional level can offer insights into the effects of policies or plans. They provide a rough barometer of where a country or marine region is at a particular point in time (Stem et al. 2005).

Some countries have developed national "report cards" (see Step 8 of this report) as a tool to present data from state-of-the-system monitoring. These report cards serve as communication and advocacy tools in an easily understood format for encouraging the public and policy makers to take action.

- **Compliance monitoring**: Collection and evaluation of data, including self-monitoring reports, and verification to show whether human activities are in compliance with the limits and conditions specified in permits; compliance monitoring is sometimes call "surveillance monitoring"; and

Other types of monitoring include: (1) financial monitoring (accounting for the costs by input and activity of the MSP process); (2) stakeholder monitoring (tracking the perceptions of stakeholders of the marine spatial plan, including their treatment, particpation, access to information, and overall experience in the MSP process); and (3) context (or situation) monitoring (tracking the context in which the MSP process or plan operates, especially as the context affects identified threats, risks and assumptions, e.g., changes in the economy or policy context).

**Performance monitoring and evaluation** is the focus of this guide. Performance or results monitoring is an integral activity of the marine management process. It is the ongoing activity for assessing program accomplishments, particularly progress toward pre-established goals and objectives and outcomes. While data from other monitoring programs may be able to be repurposed for performace monitoring, they must be able to show the impact of the marine spatial plan. You'll find more about this in the monitoring plan & indicators sections of this guide.

**Box 2.**
**What 'SUCCESS' might look like**

In twenty years your marine environment will be very different. You will have achieved your vision of clean, safe, healthy, productive and biologically diverse oceans and seas, the "Good Environmental Status" required by the European Marine Strategy Framework Directive and the "Good Status" required by the European Water Framework Directive.

Effective, integrated and strategic management of human activities in the marine environment will result in society getting more benefit from the use of the marine environment than previously, whilst its rich natural and cultural heritage are better protected – sustainable development in the marine area and the wider context will be achieved.

Climate change will have driven change both in relation to the environment itself and the way in which people use it. Renewable energy developments will be commonplace and carbon capture and storage will be underway. The environmental impacts of using the marine environment will be managed in this context and account will be taken of the changing acidity and temperature that will already be affecting our oceans and seas. You will be responding to this in our actions so that the integrity of marine and coastal ecosystems and marine cultural heritage is conserved.

You will be using the sea for a variety of reasons, delivering greater economic and social benefits. However, marine planning means that activities in the marine environment will co-exist and that the impacts of different activities on each other and on the environment will be properly taken into account and managed consistently. Marine industries as a whole will be generating wealth for the nation.

People will respect the marine environment for its own sake, for the resources it delivers and for the role it has played in shaping our culture.

Consumers of marine products, for example offshore renewable energy or seafood, will expect these to have been obtained sustainably, and producers will therefore ensure that the environmental and social impacts of their operations are assessed with this in mind. Those who use the marine environment will behave responsibly. Underwater noise will be restricted to levels that do not significantly affect the marine environment and litter will be disposed of in ways that do not harm the marine environment. Regulation of the seas will facilitate safe navigation, and management for the coastal zone will support sustainable development and the cultural heritage of coastal areas. There will be appropriate protection for, and access to, our marine heritage assets and important recreational sites. The diversity of seascape character around our coastline will be maintained.

Our seas will be cleaner and healthier than they are now and they will be ecologically diverse and dynamic. Pollutants, contaminants and toxins will be at levels that do not significantly affect human or ecosystem health. Ecosystems will be resilient to environmental change so that they deliver the goods and services needed for present and future generations. Representative, rare, vulnerable and valued species and habitats will be protected.

Management actions will be in place to make sure that there is no net loss of biodiversity as a result of human activity and that non-indigenous species introduced by humans do not adversely affect the ecosystem. Management actions such as an ecologically coherent network of well-managed marine protected areas will help deliver this and in some cases enable ecosystems to recover from previous damage.

Fish stocks will be abundant and harvested sustainably, with access to them shared appropriately between commercial and recreational fishermen.

In the long term, management of human activities in the marine environment will be such as to secure long-term benefits for the whole of society, therefore delivering sustainable development in the marine area and the wider context.

*Our Seas—A Shared Resource*
Department for Environment, Food and Rural Affairs 2009

# WHY FOCUS on performance monitoring and evaluation of MSP?

**Tip! The Power of Measuring Results**

If you do not measure results, you cannot tell success from failure.
If you cannot see success, you cannot reward it.
If you cannot reward success, you are probably rewarding failure.
If you cannot see success, you cannot learn from it.
If you cannot recognize failure, you cannot correct it.
If you can demonstrate results, you can win public support.

Osborne & Gaebler 1992
American management consultants

Performance monitoring and evaluation moves beyond the traditional input–output focused evaluation, and, when used effectively, helps policymakers and decision makers focus on and analyze outcomes or results. Inputs and outputs tell little about the effectiveness or efficiency of a marine spatial plan. While traditional evaluation remains an important part of the chain of performance evaluation, it is the outcomes that are of most interest and importance to governments and stakeholders.

Building and sustaining performance evaluation systems is not an easy task. It requires continuous commitment, champions, time, effort, and resources. There may be many organizational and technical challenges to overcome in building these systems. Political challenges are usually the most difficult. And it may take several attempts before the system can be tailored to evaluate a marine spatial plan effectively. But it is doable. And it is certainly worthwhile in light of the increasing demands for, and conditions attached to, demonstrating good performance.

Good performance evaluation systems also build knowledge by enabling governments and organizations to develop a knowledge base of the types of plans and their management actions that are successful—and more generally, what works, what does not, and why. Performance evaluation systems also help promote greater transparency and accountability, and may have beneficial spill-over effects in other parts of a government or organization. In short, there is tremendous power in measuring performance (Kusek & Rist 2004).

## What is the relationship between performance monitoring and evaluation?

Performance monitoring and evaluation are intimately related. Both are necessary management tools to inform decision-making and demonstrate accountability. Evaluation is not a substitute for monitoring, nor is monitoring a substitute for evaluation. Both use the same steps; however, they produce different kinds of information. Systematically generated monitoring data (see table 3 or 4) are essential for successful MSP evaluations.

## What are some of the benefits of performance monitoring and evaluation?

**Transparency and Accountability**: Performance evaluation can help in promoting greater transparency and accountability within organizations and governments. Beneficial spillover effects can occur from shining a light on results. External and internal stakeholders will have a clearer sense of the status of plans and management actions.

**The ability to demonstrate positive results can help build political and public support**. There are organizational and political costs and risks associated with implementing performance evaluation. However, there are also crucial costs and risks involved in not implementing such systems.

**Information and Knowledge**: Monitoring and evaluation can be a source of knowledge. They enable governments and organizations to develop a knowledge base of the types of management actions are successful, and, more generally, what works, what does not, and why?

**Table 3.** Characteristics of MSP Monitoring and Evaluation

| Monitoring | Evaluation |
|---|---|
| Continuing | Periodic: at important milestones such as the mid-term of MSP implementation; at the end or a substantial period, |
| Assumes appropriateness of plan, its objectives and indicators | Can question the relevance of the plan, its objectives and indictors |
| Tracks progress on a small number of indictors | Can identify unintended as well as planned impacts and effects |
| Keeps track; analyses and documents progress toward achieving MSP objectives | In-depth analysis; compares planned with actual outputs and outcomes |
| Focuses on inputs, activities, outputs, implementation processes, continued relevance, likely results at outcome level | Focuses on outputs and outcomes in relation to inputs; results in relation to cost; processes used to achieve results; overall relevance; impact; and sustainability |
| Answers what MSP management strategies were implemented and results achieved | Answers why and how results were achieved; contributes to building more effective and efficient MSP management strategies |
| Alerts managers to problems and provides options for corrective actions | Provides managers with MSP management strategy and alternatives |

*Source: Adapted from World Food Programme and other sources*

Performance evaluation can also provide continuous feedback in the management process of monitoring and evaluating progress toward a given goal. In this context, they promote an adaptive management approach.

**Learning**: Evaluation is not simply a matter of measuring outcomes. Often a more subtle evaluation is needed. The type of evaluation needed depends on our assumptions about planning, its function, or purpose. Therefore, MSP plans should be evaluated, not only by their outcomes, but also for how they improve the understanding of decision makers about present and future problems they face. Where having such plans increases this understanding, they may be said to perform their role, irrespective of outcomes. Plans perform their role if and when they help decision makers make sense of their situations, and so they need to be evaluated in this light, as well as final outcomes.

**Table 4.** Complementary Roles of Monitoring and Evaluation

| Monitoring | Evaluation |
|---|---|
| Clarifies program objectives | Analyzes why intended results were not achieved |
| Links activities and their resources to objectives | Analyses specific causal contributions of activities to results |
| Translates objectives into performance indicators and set targets | Examines implementation process |
| Routinely collects data on these indicators, compares actual results with targets | Provides lessons, highlights significant accomplishment or program potential, and offers recommendations for improvement |
| Reports progress to managers and alerts them to problems | Provides lessons, highlights significant accomplishment or program potential, and offers recommendations for improvement |

*Source: US AID*

## Do you have the institutional capacity to carry out effective performance monitoring and evaluation of MSP?

Designing and building a monitoring and evaluation reporting system that can produce reliable, timely, and relevant information on the performance of MSP plans and management actions requires experience, skill, and institutional capacity. This capacity for a performance-based reporting system has to include, at minimum, the ability to successfully construct indicators; the means to collect, aggregate,

analyze, and report on the performance data in relation to the indicators and their baselines; and managers with the skill and understanding to know what to do with the information once it arrives. Building such capacity in government for performance evaluation is a long-term effort.

Many organizations would prefer to operate in the shadows. They do not want to publish data about their performance and outcomes. Instituting performance evaluation sheds light on issues of organizational performance. Not all stakeholders will be pleased to have such public exposure. This is just one of the ways in which performance evaluation pose a political—more than a technical—challenge.

## What has been learned already from previous evaluation experience in other types of planning?

While MSP is a relatively new field, several lessons have already been learned from previous experience in monitoring and evaluating other types of planning:

- **Different evaluation needs require different evaluation approaches—no one approach fits all needs**. The appeal of approaches for measuring effectiveness in a broad context is that they offer a means to determine, under varying conditions, which management actions are effective and which should be avoided. This is critical information for practitioners who must decide how to allocate scarce resources. The main challenge to these approaches is that they are time consuming. In some cases, organizations focus exclusively on results and performance, with little or no attention to management processes or other variables that may affect the ability of a management action to achieve the desired effect;

- **Prevailing approaches for evaluation share conceptual similarities**. Specific approaches, terminology, and sequencing of steps and the fundamental principles underlying the various approaches to performance evaluation are basically the same;

- **Inconsistent use of terminology in evaluation approaches impedes communication and understanding among organizations**, e.g., what one may call a "goal", another may call an "objective", what one may call a "result", another may call an "outcome", and another may call an "impact" or "effect". While these differences may sound trivial, they can seriously hinder the ability of organizations to understand one another's performance evaluation system and to communicate in a unified fashion;

- **Confusion among components of evaluation systems hinders the ability of practitioners to choose the components appropriate for their needs**. For example, some institutions have used the pressure-state-response (PSR) framework as their approach to evaluation, when PSR is really a conceptual framework that provides a template for understanding generic cause and effect relationships. When carrying out performance evaluation, it's important to know if an approach that provides specific steps and guidance is needed. The approach might include tools such as a scorecard, but it is the approach—not the tool—that explicitly specifies the steps to carry out the evaluation process; and

- **Monitoring only quantitative ecological or biological information is insufficient**—social, political, and cultural information, and qualitative data help provide a more complete understanding of what is happening in a marine region. The recognition that monitoring should go beyond quantitative biological or ecological information reflects the fact that MSP takes place in a complex context influenced by human populations. It is important to understand the strengths and weaknesses of quantitative and qualitative methods and measures and to know when it is appropriate to use either of them. Practitioners should be clear about their information needs and gather the minimum amount of information required to meet those needs and given the available resources (Stem et al., 2005).

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PART 2

# EIGHT STEPS OF MONITORING AND EVALUATING THE PERFORMANCE OF MARINE SPATIAL PLANS

"Before beginning, plan carefully."
*Marcus Tulius Cicero (106-43 BC), Roman statesman*

STEP 1

# IDENTIFY THE **NEED** FOR **MONITORING** AND **EVALUATION** AND **PREPARE AN EVALUATION PLAN**

**What are the outputs of this step?**

☞Formation of the Performance Monitoring and Evaluation team

☞A draft work plan of the evaluation process for your Marine Spatial Plan

[Note: If you already have a Performance Monitoring and Evaluation team in place and have developed a evaluation work plan, you can skip to Step 2.]

## TASK 1: IDENTIFY THE NEED FOR PERFORMANCE MONITORING AND EVALUATION

Before designing and implementing a performance monitoring and evaluation process, it's important to determine who wants the results that evaluation can provide. What is driving the need for evaluation—is it required by legislation, is it a requirement for funding, do high-level executives and administrators want the information upon which to base future decisions? Is there a champion in the executive or legislative branches of government who wants to use evaluation information? Who will benefit from evaluation—administrators, legislators, auditors, and the public, non-governmental organizations? Who will not benefit from evaluation?

## TASK 2: IDENTIFY WHO SHOULD BE ON THE PERFORMANCE MONITORING AND EVALUATION TEAM

An early step is to form the Performance Monitoring and Evaluation Team. The overall manager of the MSP process or a senior professional evaluator should lead the team. In addition the team could consist of :

- Members of the MSP professional staff, including both natural and social scientists;
- Representatives of agencies responsible for MSP;
- A measurement expert, either from one of the agencies responsible for MSP, or an outside contractor (preferably familiar with the MSP process; and
- An information-processing expert.

The team should be no larger than 10-12 members. Team members should commit to the process for about one to two years, working both frequently and regularly. You should be flexible about adding members and expertise to the team, as needed.

## TASK 3: DEVELOP A PERFORMANCE MONITORING & EVALUATION PLAN

Once you have assembled your team, begin an initial planning or scoping phase to clarify the nature and scope of the performance monitoring and evaluation process. During this task, the main purpose of the monitoring and evaluation, the stakeholders to be consulted, and the time frame for the results should be established.

This is an exploratory period. Key issues are identified from the perspective of management partners and other stakeholders, a review of existing documentation, and related management actions that may influence the program. The assumptions underlying the evaluation should be identified.

At the end of the initial scoping, there should be enough knowledge of the context for the evaluation that a general approach may be decided. The heart of the evaluation planning is the evaluation design phase, which culminates in the evaluation plan. It is generally a good practice to present and discuss the overall design with the management partners and other key stakeholders before completing the monitoring and evaluation plan. There should be no surprises, and it should build buy-in and support of the evaluation. An advisory group and peer reviewers can be good sounding boards to ensure the quality of the plan.

The design of a performance monitoring and evaluation plan should be based on responses to the following questions:

**What are the prerequisites for performance monitoring and evaluation?** Effective performance monitoring and evaluation can only be carried out if the desired outcomes of the MSP process are clearly identified through well-specified objectives.

**Implementing performance monitoring and assessment: eight key questions**

1. ***What pressures are stimulating the demand for performance evaluation?*** The demand for performance evaluation can come from pressure to be accountable and transparent. Or it can come from funding organizations that want to see results from their investment. Or, importantly, it can come from a desire to learn what is working and what is not, to adapt and improve the overall management system.
2. ***Do you have a champion for performance evaluation?*** A champion or advocate of evaluation is critical to the sustainability and success of results-based evaluation. A strong champion can be an advocate for better-informed decision-making and can help counter the arguments by groups that are opposed to implementing evaluation.
3. ***What motivates your champion to support performance evaluation?***
4. ***Who will benefit from performance evaluation?***
5. ***How much information do they really want?***
6. ***Will performance evaluation directly support resource allocation and the achievement of MSP goals and objectives?***
7. ***Do you have the capacity to undertake performance evaluation?***
8. ***How will the institutions, champion, staff and stakeholders react to negative information from evaluation?***

**Where to begin?**
Before you begin to think about evaluation, and certainly before any data are collected, you should think about a plan for the design and use of the results that should be put into place from the inception of evaluation, to ensure that the time, effort and money invested are not wasted.

Bowen and Riley (2003) summarize five general steps that should be incorporated into the performance monitoring and evaluation system:

- ***Articulate an indicator framework driving the selection of specific indicators.*** With agreement on a context and questions, alternative frameworks should be assessed to determine their applicability in selecting an indicator set of greatest value. The

needs of and value to the user community should sit at the core of these deliberations;

- Determine an efficient and effective data acquisition (monitoring) strategy. Cost, compatibility and sustainability of effort should be considered as should the value of existing data sources;

- ***Create and maintain a sustained information management system.*** Making data broadly and openly available through an established quality assurance/quality control system is essential;

**"When choosing outcomes, do not travel the road alone."**
***Jody Kusek and Ray Rist 2004***

- ***Agree to protocols for data analysis.*** One of the historic difficulties in monitoring has been too strong a focus on data acquisition and too little a focus on data analysis and interpretation; and

- ***Develop reporting products to ensure information reaches and is understood by the broad stakeholder community.*** The number and nature of marine stakeholders reaches well beyond the scientific or regulatory communities. Traditional forms of reporting (i.e. printed reports) are increasingly limited in terms of their ability to inform those whose interests are at stake. New graphic display, information management technologies, and social media need to be more fully embraced (See Step 8).

## TASK 4: ENGAGE STAKEHOLDERS

All stages of marine spatial planning should involve stakeholders. Broad-based involvement of stakeholders will enhance not only the ownership of and accountability for results, but also the credibility and transparency of performance evaluation.

All parties concerned should be consulted and take part in decision-making at every critical step of the process. Stakeholders of the results of monitoring and evaluation should be consulted and engaged, when appropriate, in developing the monitoring and evaluation plans, drafting the terms of reference for the evaluation, appraising the selection of evaluators, providing the evaluators with information and guidance, reviewing the evaluation draft, preparing and implementing the management response, and disseminating and internalizing knowledge generated from the evaluation.

In conflict settings, conducting an evaluation in an inclusive manner is critical for bringing different factions together to hear each other's viewpoints, while being transparent and ensuring that a balance of views is represented between the different groups. It is important that one group does not feel (rightly or mistakenly) excluded or discriminated against, which may heighten tensions or vulnerabilities (UNDP, 2002).

The Commonwealth of Massachusetts established a "gold standard" in its process of stakeholder involvement in its MSP process. A variety of approaches for involving stakeholders in planning were used in various stages of the MSP planning process in Massachusetts:

- Using existing boards or other governing bodies to provide stakeholder perspectives or as a means for collecting information about stakeholder priorities;

- Establishing and maintaining an informal network of opinion leaders periodically consulted on community priorities and goals;

- Communicating often through websites, press releases, and other channels to keep the broad stakeholder community informed about the MSP process and decisions;

- Holding public meetings to inform stakeholders about key milestones in the MSP process and solicit feedback on key decisions;

- Using focus groups, surveys, or related strategies for soliciting information about stakeholder goals, priorities, values, and ideas; and

- Using a stakeholder steering committee to advise throughout the process on key planning decisions, such as setting long-range goals and establishing selection criteria and/or weighting schemes for evaluating management actions.

## Sources and Additional Reading

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"Management by objectives works if you first think through your objectives. Ninety percent of the time you haven't."
*Peter Drucker (1909-2005) American Management Consultant*

STEP 2

# IDENTIFYING **MEASURABLE OBJECTIVES** OF THE MARINE SPATIAL **MANAGEMENT PLAN**

**What is the output of this step?**

☞A list of measurable objectives of your Marine Spatial Plan

**Why are measurable objectives important?**
Measurable objectives play a critical role in evaluating performance, reducing uncertainty, and improving MSP over time. Because management objectives are used to guide decisions in managing human activities in marine areas, they should be more specific than "broad brush" statements or overall management purposes. For example, generic statements such as "maintain marine biodiversity" or "improve water quality" are general statements (goals) about why management has been undertaken, not measurable objectives that can help guide decision-making.

Objectives are derived from goals. Goals can have more than one objective. For example, a goal of maintaining biodiversity, could have objectives related to both species and habitats.

## TASK 1: IDENTIFY MEASURABLE OBJECTIVES IN THE MARINE SPATIAL MANAGEMENT PLAN

**What is a management objective?**

**DEFINITION OF OBJECTIVE**
**An objective is a specific statement of desired outcomes that represent the achievement of a management goal. Objectives should be linked to an appropriate indicator(s) and an associated target(s)**

**How are MSP objectives different from goals?**
As already discussed in the section on the MSP process, goals are different from objectives. Objectives should flow from goals. Goals are aspirational; objectives are operational. Goals are qualitative; objectives should be quantitative to the extent possible. Every management goal should have at least one objective, if not several.

**Where did SMART objectives come from?**
Management by objectives has been a well-known concept in management since the early 1950s when the first book to depict management as a distinct function and to recognize managing as

a separate responsibility was published (Drucker 1954). The idea of specific and measurable objectives can be traced at least a decade earlier in business and educational publications. One of the first references to actually use the acronym "SMART" (specific, measurable, attainable, relevant, and trackable) was published in 1985 (Blanchard 1985).

**What are the characteristics of SMART objectives?**
Some of the characteristics of SMART objectives include:

1. **Specific**: objectives should be concrete, detailed, focused, and well defined in terms of defining desirable outcomes of the MSP process (have you specified what you want to achieve?);

2. **Measurable**: objectives should allow measurement of the outcomes and progress toward their achievement—preferable in quantitative terms (can you measure what you want to achieve?);

3. **Achievable**: objectives should be attainable within a reasonable amount of effort and resources (are the resources required to achieve the objective available?);

4. **Relevant or Realistic**: objectives should lead to a desired goal, either on its own or in combination with other objectives; and

5. **Time-bound**: objectives should indicate a start and finish date in relation to what is to be accomplished (when to you want to achieve the specific objective or objectives?)

No single way exists to write a SMART objective. It will depend on the nature of the objective and its intended use. The real test is to compare the objective statement against the SMART criteria you have chosen to use and answer the simple question: Does the objective statement check most if not all of the criteria?

### Tip! Writing SMART Objectives

(These ideas may seem simple, but often it's the simple things that get lost or overlooked)

- Make sure you sort out the differences between goals and objectives; specify as many objectives as you think you will need to meet each goal;

- You don't have to follow the SMART order; usually it will work best to begin with "Measurable" (how can you measure what you want to achieve?); "Measurable" is the most important consideration. What evidence will you use to define success?

- Achievable is linked to measurable. There's no point in defining an outcome you know you can't realize, or one where you can't tell if or when you've finished it. How can you decide if it's achievable? Do you have the necessary resources to get it done? These are important questions;

- The devil is in the details. Does everyone involved understand your objectives? Are they free of jargon? Have you defined your terms? Have you used appropriate language?

- Timely means setting deadlines. You must have deadlines or your objectives will not be measurable.

Specifying SMART objectives is a difficult task. But it will be worth it. You will actually know you have accomplished something.

Adapted from: Andrew Bell
"Ten Steps to SMART Objectives"

**What are some examples of SMART objectives?**
Examples of SMART objectives include:

- Achieve 20% of the overall energy demand in the marine region from offshore renewable sources by 2020;
- Achieve by 2006 a minimum 15% reduction in the total quantity of oil in produced water from oil and gas operations discharged into the sea compared to the year 2000;
- Protect 90% of essential habitat for diving birds by 2018
- Ensure that adequate and appropriate marine space is available to produce 25% of energy needs from offshore sources by the year 2020;
- Implement a representative network of marine protected areas by 2012; and
- Reduce the time required to make decisions on marine construction permits by 50% by 2015.

Are there examples of SMART objectives being used in MSP practice? Well-specified and measureable objectives, i.e., SMART, are few and far between in MSP practice. However, a few examples exist.

Scotland, for example, has several SMART objectives for aquaculture in its draft marine plan:

- By 2020, increase the sustainable production of marine finfish at a rate of 4% per year to achieve a 50% increase in current production;
- By 2020, increase the sustainable freshwater production of juvenile salmon and trout by 50%; and
- By 2020, increase the sustainable production of shellfish, mussels especially, by at least 100%.

The United Kingdom is legally committed to delivering 15% of its energy demand from renewable sources by 2020. Its Climate Change Act requires the UK to reduce greenhouse gas emissions by at least 80% below 1990 levels by 2050 despite an increase in electricity demand of between 30-100% by 2050.

Under Germany's Renewable Energy Law, by 2020, 10,000 megawatts (the output of 10 nuclear power plants) will be connected to the grid and the share of renewable energies in the German electricity mix will move from 12% to 20%. Germany has opened up 20 areas in the North and Baltic seas for the construction of wind farms to achieve this objective.

The Puget Sound (USA) Partnership has adopted "ecosystem recovery targets" that can be interpreted as SMART objectives: (http://psp.wa.gov/downloads/AA2011/2011_Targets_11_03_11.pdf).

## Sources and Additional Reading


Bell, Andrew, undated. Ten steps to SMART objectives. At: http://www.natpact.info/uploads/Ten%20Steps%20to%20SMART%20objectives.pdf

Blanchard, Ken, 1985. Leadership and the One-Minute Manager.

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"Objectives are not fate; they are direction.
They are not commands; they are commitments.
They do not determine the future;
they are means to mobilize the resources and
energies of the business for the making of the future."

*Peter F. Drucker*
*American management consultant*

"Plans are only good intentions unless they immediately degenerate into hard work."
*Peter Drucker (1909-2005) American Management Consultant*

# STEP 3 IDENTIFYING MARINE SPATIAL **MANAGEMENT ACTIONS**

## What is the output of this step?

☞ Identification of a management action(s) for each objective in the spatial management plan.

[Note: an objective can be met by more than one management action.]

**How are management actions related to objectives?**
Each objective should have at least one management action or set of management actions that will be used to achieve the objective.

**What is a management action?**
Management actions are the heart of any management plan. They are the collective actions that will be implemented to achieve the management goals and objectives of the plan. Management actions should be the focus of performance monitoring and evaluation. Are the selected management actions the most effective way to achieve management objectives? Are they the least cost or most cost-effective way of achieving management objectives? And are they fair? Who pays and who benefits?

**DEFINITION OF A MANAGEMENT ACTION**
**A management action is a specific action taken to achieve a management objective; management actions should also identify the incentives (regulatory, economic, educational) that will be used to implement the management action and the institution or institutional arrangement that has the authority to use the incentive to implement the management action.**

An integrated management plan for a marine area will have many management actions (not all spatial and temporal) that will be applied to the important sectors of human activities, e.g., fisheries, marine transport, offshore renewable energy, minerals extraction, and oil and gas that use the resources of the marine area.

**REMEMBER !**
A very important purpose of any planning is to ***expand the range of alternatives considered in formulating management actions***. Often the goals of MSP have not been achieved, or have been achieved at substantially larger costs than would have been necessary, because planners and decision makers limited themselves to the consideration of only one or a few management actions.

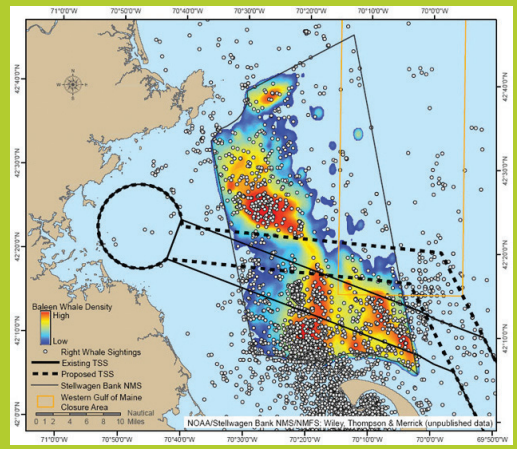
## A SIMPLE EXAMPLE OF MONITORING AND EVALUATING A SPATIAL MANAGEMENT ACTION: CHANGING THE BOSTON SHIPPING LANES TO DECREASE WHALE STRIKES


**A Near Miss Between a Container Ship and a Right Whale (red circle)**

The adjustment of Boston shipping traffic lanes illustrates how MSP can be used to bring industry, government, and the environmental community together to address a specific need. A small change to the Boston shipping lanes has helped mariners avoid dangerous collisions with whales, one species of which is critically endangered. The shipping lanes in and out of Boston harbor take vessels through waters where high concentrations of humpback, right, and other whales are found, especially in the Stellwagen Bank National Marine Sanctuary just offshore of Boston, putting both the whales and ships at risk of collisions. Collision with vessels is the leading human-caused source of mortality for the endangered North Atlantic right whale.

Using data on whale sightings collected over a 25-year period, researchers noticed that the shipping lanes were right next to an area where relatively few whales had been spotted. Scientists confirmed these findings, studying whale feeding behavior and developing maps of the seafloor to get a more complete picture of where the whales spend their time.

Based on these data, a proposal was made to move the shipping lanes 12 degrees to the north to an area with fewer whales. The IMO shifted the shipping lanes in 2007 based on the recommendations of a multi-stakeholder process. The resulting route increased travel time for ships by 10-22 minutes, but cut the risk of collisions with critically endangered right whales by an estimated 58% and with all other baleen whales by 81%.




**Whale Distribution and Shipping Lane Shifts in the Entrance to Boston Harbor (NOAA). The dotted line is the new Traffic Separation Scheme (TSS)**

**Case 1.**
**A simple example of monitoring and evaluating a spatial management action**

**What are examples of different types of marine management actions?**

There are four categories of management actions as illustrated in the following table:

**Table 5.** Categories of Management Actions in Marine Areas

| |
|---|
| **1. INPUT ACTIONS:** Actions that specify the inputs to human activities, e.g.,<br>• Limitations on fishing activity or capacity<br>• Limitations on shipping vessel size or horsepower<br>• Limitations on the amount of fertilizers and pesticides applied to agriculture lands |
| **2. PROCESS ACTIONS:** Actions that specify the nature of the process of human activities, e.g.,<br>• Specification of fishing gear type, mesh size<br>• Specification of "Best Available Technology" or Best Environmental Practice"<br>• Specification of level of waste treatment technology |
| **3. OUTPUT ACTIONS:** Actions that specify the outputs of human activities, e.g.,<br>• Limitations on the amount of pollutants discharged to marine environment<br>• Limitations on allowable catch and by-catch<br>• Tonnage limitation on sand and gravel extraction |
| **4. SPATIAL & TEMPORAL ACTIONS:** Actions that specify where and when types of human activities can occur, e.g.,<br>• Specification of areas closed to fishing or energy development<br>• Designation of areas for specific uses, e.g., wind farms, sand & gravel extraction, waste disposal<br>• Designation of marine protected areas |
| *Note: Examples of management actions are identified in the following sections.* |

**1. Input management actions:** Actions that specify the inputs of human activities in marine areas.

**Table 6.** Examples of INPUT Management Actions

| | |
|---|---|
| 1.1 | Limit fishing activity or capacity, e.g., number of vessels allowed to fish in the marine area |
| 1.2 | Limit vessel size or horsepower in the marine area |
| 1.3 | Specify fishing gear type, mesh size, etc. |
| 1.4 | Prohibit mobile (towed) fishing gear, e.g., trawls and dredges, in the marine area |
| 1.5 | Enhance food supply through increased aquaculture in the marine area |
| 1.6 | Limit the number of cruise ships operating in the marine area |
| 1.7 | Establish construction standards for ships used in the marine area |
| 1.8 | Require use of low sulphur bunker fuels in the marine area |

**2. Process management actions:** Actions that specify the nature of the production process of human activities in marine areas.

**Table 7.** Examples of PROCESS Management Actions

| | |
|---|---|
| 2.1 | Prohibit dynamite or cyanide fishing in the marine area |
| 2.2 | Prohibit shark finning In the marine area |
| 2.3 | Specify fishing gear type, mesh size, etc., to be used in the marine area |
| 2.4 | Prohibit bottom trawling in the marine area |
| 2.5 | Restrict fishing effort (days at sea) in the marine area |
| 2.6 | Require marine mammal or turtle excluder devices (TEDS) on fishing nets in the marine area |
| 2.7 | Require noise suppression devices on industrial equipment used in the marine area |
| 2.8 | Require "super slow sailing" to reduce emissions from shipping and reduce risk to marine mammals in the marine area |
| 2.9 | Restrict underwater blasting for dredging when marine mammals, turtles, large school of fish, or flocks of birds are in the marine area |
| 2.10 | Specify use of "best available technology" or "best environmental practice" |
| 2.11 | Develop health, safety, and environmental standards for industrial operation in the marine area |
| 2.12 | Encourage voluntary codes of practice by marine industries |
| 2.13 | Require emergency response plans for all marine industrial operations in the marine area |
| 2.14 | Require effective oil and hazardous material spill response capacity in the marine area |
| 2.15 | Require removal of disused offshore infrastructure |
| 2.16 | Improve marine charts, aids to navigation, and other marine services within the marine area |

**3. Output management actions:** Actions that specify the outputs of human activities in marine areas..

**Table 8.** Examples of OUTPUT Management Actions

| | |
|---|---|
| 3.1 | Limit amount of pollutants discharged to the marine area from industrial sources, both onshore and offshore |
| 3.2 | Limit ballast water discharges |
| 3.3 | Limit amount of allowable catch from the marine area |
| 3.4 | Require drill cuttings from oil and gas operations that are contaminated with oil-based fluids to be injected into subsurface formations or transported to shore for treatment |
| 3.5 | Limit allowable incidental by-catch within the marine area, including seabirds, marine mammals, and turtles |
| 3.6 | Limit the number of cruise ships operating in the marine area |
| 3.7 | Establish ship construction standards |
| 3.8 | Require use of low sulphur bunker fuels in the marine area |
| 3.9 | Limit the amount of sand and gravel extracted for the marine area |
| 3.10 | Establish liability and compensation for damages to the marine area and resources from industrial operations, e.g., from oil and hazardous materials spills |

**4. Spatial/Temporal management actions:** Actions that specify where in space and when in time human activities can occur in marine areas (see table in the following section for examples).

**Table 9. Examples of SPATIAL and TEMPORAL Management Actions**

| | |
|---|---|
| 4.1 | Specify areas or zones for specific activities only, e.g., commercial fishing, indigenous fishing and hunting, oil and gas development, sand extraction, military operations—all of the time |
| 4.2 | Specify areas or zones closed to specific activities—all of the time (spatial restrictions) |
| 4.3 | Specify areas or zones open for specific activities—during specific times (temporal restrictions) |
| 4.4 | Specify areas or zone closed to specific activities—during specific times, e.g., seasonal limitations on oil and gas development operations |
| 4.5 | Specify areas or zones open to all human activity—all of the time, e.g., development areas, "opportunity areas" |
| 4.6 | Prohibit dredged material disposal in environmentally or ecologically sensitive areas |
| 4.7 | Designate security zones, precautionary areas, safety zones, rights-of-way |
| 4.8 | Require use of low sulphur bunker fuels in the marine area |
| 4.9 | Limit fishing of specific life stages, e.g., no fishing in spawning grounds or juvenile areas, either permanent closures or temporal closures depending on species |
| 4.10 | Specify distance that tourism activities, e.g., cruise ships, can approach sensitive areas, e.g., seal haul out areas, or sensitive animals, e.g., whales/dolphins |
| 4.11 | Designate critical habitat, environmentally sensitive areas (EBSAs), e.g., marine mammal feeding areas, fish spawning areas |
| 4.12 | Designate Areas to Be Avoided (ATBA) to reduce risk of large ocean vessels from striking marine mammals |
| 4.13 | Designate a Particularly Sensitive Sea Area (PSSA) to provide special protection to sensitive areas that may be vulnerable to damage from maritime activities (designated by the International Maritime Organization) |
| 4.14 | Establish Emission Control Areas (ECAs) for industrial operations in the marine area (under MARPOL, Annex VI) |
| 4.15 | Limit human activities in areas adjacent to cultural, spiritual, or archeological sites |
| 4.16 | Provide exclusive use of an area or season to indigenous people |
| 4.17 | Limit human activities, e.g., wind farms, within a specified distance from shore |
| 4.18 | Nominate biologically or ecologically important areas as World Heritage marine sites (national governments through World Heritage Committee) |

## Sources and Additional Reading

Cochrane, Kevern L., and Serge Garcia (eds.), 2009. A Fishery Manager's Guidebook. Second Edition. Food and Agricultural Organization of the United Nations and Wiley-Blackwell. 544 p.

"Not everything that can be counted counts, and not everything that counts can be counted."
*Albert Einstein (1879-1955), German-American physicist*

"It will take more than one try to develop good indicators. Arriving at a final set of appropriate indicators will take time."
*Jody Kusek and Ray Rist 2004*

STEP 4

# IDENTIFYING **INDICATORS AND TARGETS OF PERFORMANCE** FOR MARINE SPATIAL MANAGEMENT ACTIONS

### What is the output of this step?

☞ Identification of at least one indicator for each management action.

[Note that a management action can have more than one indicator.]

**Tip! Identifying Indicators**

Several excellent guides to identifying and applying indicators to coastal and marine management, as well as marine protected area management, already exist including, *How Is Your MPA Doing?* (Pomeroy, Parks and Watson 2004) and A Handbook for Measuring the Progress and Outcomes of Integrated Coastal and Ocean Management (Belfiore et al. 2006). These documents are the background for the content of this section of the guide.

**How are indicators related to management actions?**

Each management action should have at least one indicator or set of indicators that will be used to measure and evaluate its performance over time

**Tip!**

To see examples of the relationship among management objectives, management actions, and indicators, see the Appendix to this guide, "Examples of the Relationship among Marine Spatial Plan Elements" on p. 75.

**What are performance indicators?**

**DEFINITION OF A PERFORMANCE INDICATOR**

**Performance indicators are quantitative or qualitative statements or measured (observed) parameters that can be used to measure the effects of specific management actions over time.**

Indicators generally simplify complex phenomena so that communication of information to policy makers and other interested parties, including the general public, is enabled or enhanced. They are powerful tools in the feedback loop to a marine spatial plan, as an early warning signal about an emerging issue, or in providing a concise message for engagement, education and awareness (Belfiore et al., 2006).

Effective marine spatial planning is based on four simple questions:

- **Inputs**: What do we need to carry out management?
- **Process**: How do we go about management?
- **Outputs**: What did we do and what products and services were produced?
- **Outcomes**: What did we actually achieve?

**"The central function of any performance measurement process is to provide regular, valid data on indicators of performance outcomes."**
***Harry P. Hatry 2006 American management consultant The Urban Institute***

You need to develop indicators for each of these categories, but it's the last question about real outcomes that stakeholders and the public care about most.

**What are the principal types of indicators?**
Marine spatial management indicators can be organized into three types:

- **Governance indicators** measure the performance of phases of the MSP process, e.g., the status of marine spatial management planning and implementation, stakeholder participation, compliance and enforcement, as well as the progress and quality of management actions and of the marine spatial management plan itself; governance indicators are particularly important at the beginning of the MSP process before real outcomes can be measured;

- **Socio-economic indicators** reflect the state of the human component of coastal and marine ecosystems, e.g., level of economic activity, and are an essential element in the development of MSP plans. They help measure the extent to which MSP is successful in managing the pressures of human activities in a way that results not only in an improved natural environment, but also in improved quality of life in coastal and marine areas, as well as in sustainable socio-economic benefits; and

- **Ecological or environmental indicators** reflect trends in characteristics of the marine 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 overfishing).

**What's the difference between indicators and indices?**
If two or more indicators are combined, an index is created. Indices are commonly used at a more aggregated level such as international or national studies. At these levels it may not be easy to analyze the causal links since the relationships between different indicators become more and more complex the more aggregated the level is.

This guide does not explore the development of indices, but to see an overall "ocean health index" go to: http://www.oceanhealthindex.org.

**What are the characteristics of good indicators?**
No universal set of indicators exists that would be applicable to all marine regions. However, a small set of well-chosen indicators is good practice. Characteristics of good indicators include:

- **Relevant** to the management objectives (Step 2) and management actions (Step 3)

- **Readily measurable**: on the time scales needed to support management, using existing instruments, monitoring programs, and available analytical tools; they should have well-established confidence limits, and should be distinguishable from background noise;

- **Cost-effective**: indicators should be cost-effective since monitoring resources are usually limited. There is often a trade-off between the information content of various indicators, and the cost of collecting that information. Simply put, the benefits should outweigh the costs;

- **Concrete**: indicators should be directly observable and measurable, rather than reflecting abstract properties, are desirable because they are more readily interpretable and accepted by diverse stakeholders;

- **Interpretable**: indicators should reflect aspects of concern to stakeholders and their meaning should be understood by as wide a range of stakeholders as possible;

- **Grounded on scientific theory**: they should be based on well-accepted scientific theory, rather than on poorly validated theoretical links;

- **Sensitive**: indicators should be sensitive to changes in the aspects

being monitored; they should be able to detect trends or impacts regarding things that are monitored;

- **Responsive**: they should be able to measure the effects of management actions so as to provide rapid and reliable feedback on the consequences of management actions; and

- **Specific**: indicators should respond to the aspects they are intended to measure and have the ability to distinguish the effects of other factors from the observed responses (Ehler and Douvere 2009).

## TASK 1: IDENTIFYING GOVERNANCE INDICATORS FOR MANAGEMENT ACTIONS

### Why are governance indicators especially important in MSP monitoring and evaluation?

Because of the length of time (time lags) required to implement most management actions and the time required to induce and observe actual effects in the environment or economy, governance indicators are particularly important to demonstrate progress (at least in producing MSP outputs) In the short run, i.e., 0-3 years.

And that's why we'll start with them.

Governance indicators measure the performance of phases of the MSP process, e.g., authority, financing, stakeholder participation, the status of marine spatial management planning and implementation, compliance and enforcement, as well as the progress and quality of management actions, and most importantly, the overall benefit of marine spatial management itself.

**DEFINITION OF GOVERNANCE**

**Governance is the process through which diverse elements of a society wield power and authority and thereby influence and enact policies and decisions concerning public life and economic and social development. Governments as well as the private sector and civil society carry out governance. However, governance is not the same as government.**

Despite numerous efforts to implement and monitor the progress of MSP, difficulties are still experienced with respect to linking management actions with observed on-the-ground changes and vice versa. Addressing this issue is becoming increasingly important because decision-makers and the public are demanding to see tangible results of MSP investments. The development of a small set of governance indicators that can be easily applied in different socio-political contexts looms as a major challenge for analysts and decision-makers.

Governance indicators that are important in measuring successful MSP management actions include:

- An appropriate legal authority (e.g., the establishment of MSP legislation or order);
- Appropriate institutional arrangements, such as a lead agency and a MSP coordinating body;
- Clear geographical boundaries of the MSP plan;
- A specified planning horizon for the plan, e.g., a 10-year plan;
- A clear deadline for the completion of the plan;
- A specified time frame for reviewing the plan, e.g., every five years;
- Regulatory powers and instruments for managing development within the marine management area;
- Human, technical and financial resources to develop and implement the plan; and
- Procedures in place for monitoring, evaluating and adjusting the MSP plan.

Governance indicators also measure the progress and quality of the governance process itself, that is, the extent to which a MSP plan is addressing the issue(s) that triggered the development of the MSP program in the first place. Governance indicators focus on variables related to inputs, processes, and outputs of MSP programs.

The governance management actions and related performance indicators presented in this guide can be developed to evaluate progress towards achieving the management goals and objectives in four main areas:

1. Institutional coordination and coherence to ensure that: (i) the functions of administrative actors are properly defined, including through the establishment of a coordinating mechanism; (ii) a legal framework exists to support MSP and the pursuance of coherent objectives; (iii) the impacts of sectoral plans, programs and projects potentially affecting marine areas are taken into account through procedures for environmental impact assessment (EIA) and strategic environmental assessment (SEA); and (iv) conflict resolution mechanisms are available to anticipate, resolve, or mitigate conflicts over the use of marine areas and resources;

2. Quality and effectiveness of management by (i) the formal adoption of integrated management plans; (ii) active implementation of these plans; (iii) routine monitoring and evaluation of management and its outputs, outcomes and impacts, as well as the consideration of results in adaptive management; and (iv) the sustained availability of human, financial and technical resources to enable effective management;

3. Improved knowledge, awareness and support by ensuring (i) the production of results from scientific research, its use for management and its dissemination to a wider audience; (ii) the participation of stakeholders in decision-making processes; (iii) the activities of NGOs and CBOs; and (iv) the introduction of MSP-related subjects into educational and training curricula for the formation of MSP cadres; and

4. "Mainstreaming" MSP into sustainable development by (i) the development and application of technologies that can enable and support MSP; (ii) the use of economic instruments to promote MSP goals and objectives through the private sector; and (iii) the incorporation of MSP goals and objectives into broader sustainable development strategies.

**What are examples of governance indicators?**
Governance indicators are used to measure the inputs, processes, and outputs of MSP.

When evaluating other elements in the management cycle, the level of inputs has to be kept in mind, especially in establishing whether an output or outcome has been achieved efficiently, i.e., at least cost, and whether current management levels are sustainable.

While process evaluations alone are not a reliable guide to management effectiveness, adoption of the "best possible" management processes and systems is essential for good management. The establishment of benchmarks or good practice guidelines for management can provide a basis on which to assess management process. What is "good practice" will vary from country to country and region to region.

Process evaluation does not address the question of whether the plans are appropriate or adequate, but simply whether they are being implemented. The adequacy of marine planning systems and the plans themselves are better assessed by the evaluation of socio-economic and environmental outcomes that are outlined in the next two sections.

**Box 3.**
**Examples of Governance Indicators**

**Governance indicators of Inputs**
- Effective authority for MSP established
- Responsible institution(s) for MSP identified and lead selected
- Required funding for MSP provided
- Required staff with appropriate skills provided

**Governance indicators of Process**
- MSP team established
- Stakeholders identified and engaged
- Stakeholders are satisfied with participation process
- Science advisory committee established

**Governance indicators of Outputs**
- Work plan completed
- MSP goals identified and objectives specified
- External pressures on marine area identified and documented
- Natural and social science information base established
- Ecologically and biologically significant areas (EBSAs) identified, documented, and mapped
- Forecasts of future human activities documented and mapped
- Alternative scenarios developed
- Preferred vision selected
- Alternative management actions to achieve preferred vision identified
- Management Plan completed
- Management Plan approved and implemented
- Management Plan enforced
- Zoning Plan and Regulations completed, approved and implemented

**Case 2.**
**Implementing an Integrated Management Plan**

## IMPLEMENTING AN INTEGRATED MANAGEMENT PLAN FOR THE NORWEGIAN BARENTS SEA

The Norwegian Parliament approved an integrated management plan for the Norwegian Barents Sea in June 2006, covering all areas offshore of one nautical mile of the coast within the Norwegian EEZ. It is one of the few examples in the world of a marine management plan that integrates the management of commercial fisheries with marine transport, oil and gas development, and nature conservation. The plan has been implemented through existing Norwegian legislation including the 2009 Biodiversity Act, the 2008 Ocean Resources Act, and the 1991 Pollution Act.

The plan represents an integration of previously separate management regimes, i.e., the management of fisheries, marine transport, and the hydrocarbon development industry is brought together under one umbrella to coordinate efforts and to achieve a healthy ecosystem. In practice, achieving measurable improvements in all these sectors was the main challenge, and these are being achieved by implementing: (i) area-based management to resolve conflicts between activities and protecting the environment; (ii) continuation of established management actions regulating the various activities; (iii) implementation of environmental quality objectives; and (iv) increased focus on international cooperation, particularly with Russia in the Barents Sea—all steps forward in governance.

The purpose of the plan is to provide a framework for the sustainable use of natural resources and goods derived from the marine area and at the same time maintain the structure, functioning and productivity of the ecosystems of the marine area. The plan aims at sustainable use of the ecosystem, within acceptable levels of pollution, with reduced risk of accidental spills, with sufficient capacity and readiness to deal with accidents, and seafood that is safe for consumption, while safeguarding biodiversity. Fisheries are not expected to experience further growth, whereas increased growth is anticipated in hydrocarbon exploitation and shipping for some time to come.

The plan identifies ecologically valuable areas (see map) and requires strict regulation of activities in these areas where they: (1) support high production and high concentration of species; (2) include a large proportion of endangered or vulnerable habitats; (3) are a key area for species for which Norway has a special responsibility or for endangered or vulnerable species; and (4) support internationally or nationally important population of certain species all year round or at specific times of the year. To reduce conflict between fisheries and shipping, Norway has moved shipping lanes outside Norwegian territorial waters (its 12-mile limit). To avoid future conflict, some areas have been closed to hydrocarbon exploration and exploitation (Lofoten, Bear Island, the Polar Front, and the ice edge; Figure 1). Several new sector-specific area-based management actions have been incorporated, including plans for extension of marine protected areas and the use of seasonally closed areas to protect spawning aggregations, fish eggs and larvae, and juvenile fish and shellfish.

Similar integrated management plans have now been developed for the Norwegian Sea (approved 2009) and the Norwegian North Sea (approved 2013).

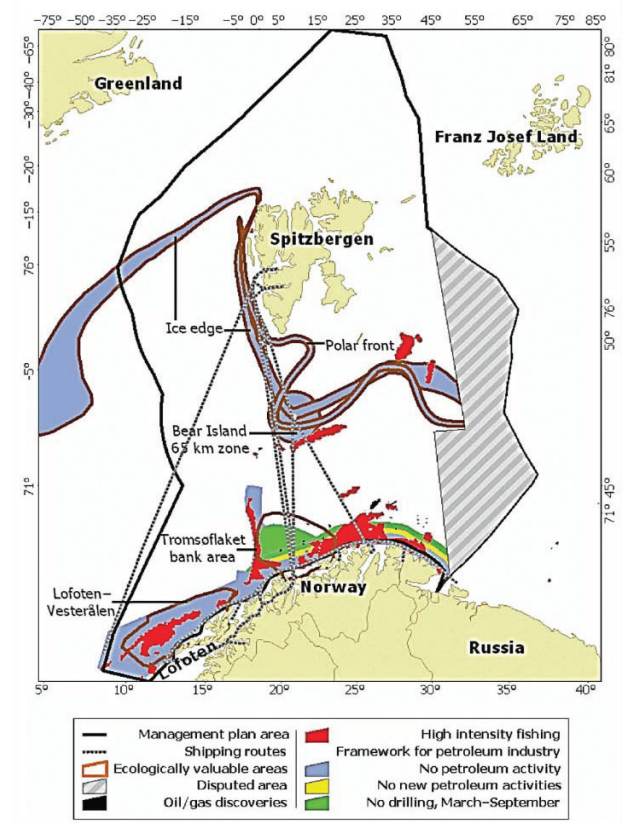



**Fig.1** **The Area Covered by the Integrated Management Plan for the Barents Sea, Showing Main Fishing Areas, Marine Transport Routes, the Area-based Framework for Hydrocarbon Extraction, and Particularly Valuable and Vulnerable Areas (see at http://www.unesco-ioc-marinesp.be).**
*© Royal Norwegian Ministry of Climate and Environment*

The Barents Sea plan was revised in 2010-11 to reflect new knowledge about vulnerable habitats and species, particularly cold water sponges and corals in the near shore environment, and approved by Parliament in 2011, under a new Ocean Resources Act.

## TASK 2: IDENTIFYING SOCIO-ECONOMIC INDICATORS FOR MANAGEMENT ACTIONS

### The socio-economic dimension

The economy is what usually drives human uses of the marine environment, so its importance cannot be overstated. There are direct economic benefits as well as costs related to sustaining lives and livelihoods and the generation of wealth in coastal and marine areas. The MSP process should provide information to allow informed and rational decision-making with respect to the economic importance of coastal and ocean areas compared to other areas (Belfiore et al. 2006).

Historically, this has not been done due to the lack of or inadequate information on the economic value of the goods and services provided by marine ecosystems. MSP should provide an economic basis for comparison of the economic value of one activity relative to another. For example, in many, if not most instances, historic and traditional use is given preference over new or non-traditional use. This preference is often made without informed consideration of the economic contribution of one activity in relation to another. MSP could provide the basis for such comparisons, thereby facilitating what is referred to as "best use" decision-making. It can also provide valuable information on economic diversification. Economic diversity reduces the risk of economic decline (with attendant social consequences), and can also be important in reducing environmental impacts.

MSP should also provide information on the economic costs associated with a particular activity. While some of these costs are indirect and difficult to quantify (e.g., the opportunity costs of choosing one use over another; management and administration costs), others are easily quantifiable.

These costs may significantly affect the net economic value of an activity. For example, the cost of research and management of

sustainable commercial fisheries may be significant (up to or beyond 50% of the economic value of the activity), whereas that for a recreational fishery for the same species might be significantly lower. This interaction should be captured in MSP goals and objectives.

**Examples of Socio-Economic Outcome Indicators**

Many of the goals and objectives of MSP relate to socio-economic aspects such as livelihoods, food security, human health, monetary, and other benefits. Socio-economic indicators provide a useful means to represent the human component of marine ecosystems, as well as a useful tool in the development of MSP management actions. They are used to report and measure human activities and conditions in the marine area, and to assess the socio-economic impacts of MSP management interventions. Socio-economic indicators allow MSP managers to: (i) incorporate and monitor the concerns and interests of stakeholders in the management process; (ii) evaluate the impacts of management decisions on stakeholders; (iii) demonstrate the socioeconomic value of marine areas and their resources; and (iv) assess the costs and benefits of using coastal and marine areas and their resources.

**Box 4. Examples of Socio-Economic Indicators**

**Food Security Indicators**
- Nutritional needs of coastal residents met or improved
- Improved availability of locally-caught seafood for public consumption

**Livelihood Indicators**
- Economic status and relative wealth of coastal residents and/or resource users improved
- Household occupational and income structure stabilized or diversified through reduced marine resource dependency
- Local access to markets and capital improved
- Health of coastal residents and/or resource users improved

**Indicators of Non-monetary Benefits to Society**
- Aesthetic value enhanced or maintained
- Existence value enhanced or maintained
- Wilderness value enhanced or maintained
- Recreation opportunities enhanced or maintained
- Cultural value enhanced or maintained
- Ecological services values enhanced or maintained

**Indicators that Benefits Are Equitably Distributed**
- Monetary benefits distributed to and through coastal communities
- Non-monetary benefits distributed equitably to and through coastal communities
- Equity within social structures and between social groups improved and fair

**Indicators of Compatibility Between MSP and Local Culture**
- Adverse effects on traditional practices and relationships or social systems avoided or minimized
- Cultural features or historical sites and monuments linked to marine resources protected

**Indicators of Environmental Awareness**
- Respect for and/or understanding of local knowledge enhanced
- Public's understanding of environmental and social 'sustainability' improved
- Level of scientific knowledge held by public increased
- Scientific understanding expanded through research and monitoring

*Modified from Parks, Pomeroy and Watson 2004*

**Measuring Socio-Economic Indicators**

A few observations on the measurement of socio-economic indicators include:

*Availability of Information*: Unlike natural science data required for many of the ecological indicators, or new surveys that may be required to collect information for governance indicators, one of the unique aspects related to the development of socioeconomic indictors (particularly the economic dimension) is that the basic information is usually already available from secondary sources, most often collected by government agencies. Thus, the challenge is not the availability of information, but access to existing information, and compiling that data in a way that is most useful to the MSP process. For social indicators, however, it is less likely that the information will be readily available and will often require new data collection efforts.

*Data from Stakeholders*: Because in many cases MSP managers will be dependent on data from stakeholders and users of the marine environment, securing their active participation in the process at the outset will facilitate subsequent data collection efforts. Moreover, the participation of stakeholders will help ensure that the effort of developing and using indicators will be focused on those indicators that have the greatest utility to the greatest number of people.

*Display and distribution*: While many indicators rely on numerical data for their construction, the information should be transformed into graphical and visual displays wherever possible to facilitate analysis and understanding of the information that is presented. In particular, Internet-based mapping techniques can be very effectively (and cost-effectively) used for many of the socioeconomic aspects related to population distribution and dynamics.

## TASK 3: IDENTIFYING ECOLOGICAL AND BIOLOGICAL INDICATORS FOR MANAGEMENT ACTIONS

Coastal and marine ecosystems provide important goods (e.g., fish catch) and services (e.g., nutrient cycling) that are of significant benefit to humans. In addition to having value in their own right, healthy and optimally functioning ecosystems offer the greatest potential for maximization of social and economic benefits over the long-term.

Since the overall goal of MSP is to maximize the economic, social and cultural benefits derived from coastal and marine ecosystems, while conserving their biophysical properties on which their health and productivity depend. Therefore, the management of human activities in ocean areas must also take into consideration the core aspects of ecosystem health. A combination of oceanographic, biological, biophysical, geological, geographical and ecological indicators can help guide MSP managers and policymakers when dealing with environmental issues at the ecosystem scale (Belfiore et al. 2006).

**Indicators of Ecosystem Health**

The concept of "marine ecosystem health" is based on the structural and functional properties of ecosystems that should be conserved in any marine area. Identification of the main variables related to the ecosystem properties required to maintain ecosystem health should be identified. This involves the development of overall goals related to the desired state of the ecosystem properties or components. Goals should be consistent with the spatial scale of the ecosystem condition(s), and could be expressed as high-level narrative statements. For example, the goal to maintain biodiversity could be to:

"Conserve ecosystem structure—at all levels of biological organization—to maintain the biodiversity and natural resilience of the marine ecosystem."

The overall goal to maintain productivity could be expressed as:

> *"Conserve the function of each component of the marine ecosystem so that its role in the food web and its contribution to overall productivity are maintained"*

The goal to maintain the quality of the environment could be to:

> *"Conserve the geological, physical and chemical properties of the marine ecosystem to maintain overall environmental quality, i.e., water, sediment, biota and habitat quality."*

To ensure that this goal will be met, two different but complementary categories of objectives are needed: (1) the first deals with conserving the natural chemical (e.g., seawater salinity and nutrients), physical (e.g., temperature, currents, structural habitat features) and geological properties (e.g., nature of bottom, sediment grain size, seascape integrity); and (2) the second category of objectives focuses on physical or chemical elements such as contaminants that contribute to the degradation of the overall quality of the environment and ultimately affect marine life. A natural component could also become a contaminant when its naturally occurring level is exceeded (e.g.,nutrients), or a limiting factor (e.g., dissolved oxygen) when it is depleted as a result of human impacts. (e.g., nature of bottom, sediment grain size, seascape integrity).

**The Measurement of Ecological and Biological Indicators**

Some general guidance and considerations to remember when measuring and interpreting environmental indicators for management purposes include:

**Biological organization**

Changes in ecosystem organization or structure are reflected in changes in biodiversity. A major management challenge, however, is to distinguish between the natural variability of marine biodiversity (or productivity) and that caused by pressures from human activities. In some cases, such as eutrophication of coastal and marine areas, it may be relatively easy to correlate the observed change in biodiversity and/or productivity with human activities through the use of indicators such as nutrient concentrations (e.g., nitrates, phosphates), dissolved oxygen levels (or biological oxygen demand), frequency of algal blooms (including harmful microalgae and biotoxins), etc. In other cases, however, it is often not easy to show good correlations because of multiple sources of impacts, the variety of resulting effects and the possibility of cumulative impacts, particularly when biodiversity changes, overall productivity or habitat quality are the primary focus.

**Ecosystem health**

Primary productivity is of great importance in assessing marine ecosystem health; its measurement is usually an integral part of marine environmental monitoring programs. Measurements of primary productivity include the rates of production and phytoplankton quality (e.g., species composition of microalgal communities). Chlorophyll-a is a good proxy for microalgal biomass.

Good correlations also usually exist between chlorophyll-a levels and the availability of nutrients, the occurrence of phytoplankton blooms (measured by chlorophyll-a maximum peaks) and oxygen depletion (measured as dissolved oxygen concentrations or percent saturation level). Such direct relationships may be used for monitoring and addressing eutrophication issues.

In coastal and marine areas, the biomass and productivity of sea grass beds (sometimes simply evaluated in terms of area coverage) are also important measurements for assessing the health of the ecosystem. Not only macroalgae and plants provide adequate habitats for a variety of fish, shellfish and invertebrate species, they also contribute significantly to the natural clean up process of coastal waters as well as coastline stabilization.

The overall productivity of higher trophic levels is usually reported from a fishery perspective (e.g., fish catch). Specific indicators have been developed from fisheries research, ecological models, or commercial fish landings data (UNEP 2011).

**Variability of oceanographic properties**

Oceanographic and abiotic regime shifts and subsequent changes in biotic communities, including adaptation to environ-

mental changes, can be good indicators of transformations that have occurred within ecosystems under stress. On the other hand, these changes may reflect natural long-term variability, and are not a consequence of the effects of human activities. This is complicated by the fact that a sudden shift may occur as a consequence of long-term exposure to chronic perturbations. Therefore, the natural temporal and spatial variability of the oceanographic, physical and chemical properties of the marine ecosystem must be taken into consideration when monitoring these characteristics.

Large-scale variability in coastal and marine ecosystems is expected to occur as a consequence of global warming and climate change, which could potentially cause irreversible changes in ecosystem properties. A number of indicators can be used to track the effects of climate change locally, e.g., sea level rise, increase in frequency and extent of extreme climatic events (storms, hurricanes, flooding) or decrease in ice cover in high latitudes. It is very difficult – and perhaps impossible – to predict the amplitude and duration of the response of coastal and marine ecosystems to climate change. We can, however, assume that a healthy ecosystem is better able to adapt to such a change, within limits. What is unknown is at what point an irreversible shift to an alternate state will occur in response to these global changes.

Similarly, remote sensing, new monitoring technologies, as well as global systems for collecting and sharing data (e.g., GOOS) will become useful MSP tools as they are refined (i.e., to a regional scale), when the information is fully integrated and value-added products such as thematic maps and models, made available to the scientific community, including in countries where a strong science base does not yet exist (Belfiore et al. 2006).

**Introduction of contaminants**

Monitoring major groups of contaminants (e.g., persistent organic pollutants, hydrocarbons, heavy metals) dispersed and dissolved in the water column and/or accumulated on surface sediments provides a good indication of pollution pressure from human activities on the coastal and marine environment. In addition, monitoring the bioaccumulation of toxic chemicals in key groups and indicator species at the top of the food web (e.g., predatory fish, seabirds and eggs, marine mammals, humans) provides a good indication of the cumulative impacts and degree of exposure of marine organisms, as well as of human populations, to these chemicals.

**Habitat loss and degradation**

Habitat loss is commonly assessed by a direct measure of the area lost or an approximation of the percentage of the area lost for each habitat type, provided there were previous records as baseline to compare with. The relative coverage of protected and/or undisturbed habitats is also commonly reported and relatively easy to measure, and may serve to assess the effectiveness of management actions.

On the other hand, habitat degradation is much more complex to evaluate since various degrees of degradation may be observed, from slightly altered to almost entirely lost. Habitat quality is better reflected by a series of indicators that may be already used to monitor and assess other ecosystem components or properties or to address other issues, e.g., biodiversity of benthic communities, productivity of key benthic species, physical or chemical properties of the water column, geological properties of sediment, presence of contaminants in water, and sediment or biota.

Coastal human population is a common indicator of human pressure on coastal and marine ecosystems. While this does not directly reflect the effects, it is a good indicator for linking the ecological and socio-economic aspects of MSP (Belfiore et al. 2006).

**Box 5.**
**Examples of Ecological and Biological Indicators**

**Population-level Indicators**
- Populations of target species for extractive or non-extractive use restored to or maintained at desired reference points
- Losses to biodiversity and ecosystem functioning and structure prevented
- Populations of target species for extractive or non-extractive use protected from harvest at sites and/or life history stages where they are vulnerable
- Over-exploitation of living and/or non-living marine resources minimized, prevented or prohibited entirely
- Catch yields improved or sustained In fishing within the marine area

**Biodiversity Indicators**
- Resident ecosystems, communities, habitats, species, and gene pools adequately represented and protected
- Ecosystem functions maintained
- Rare, localized or endemic species protected
- Areas protected that are essential for life history phased of species
- Unnatural threats and human impacts eliminated or minimized within and outside the marine area
- Risk from unmanageable disturbances adequately spread across the marine area
- Alien and invasive species and genotypes removed or prevented from becoming established

**Species Indicators**
- Focal species abundance increased or maintained
- Habitat and ecosystem functions required for the survival of focal species restored or maintained
- Unnatural threats and human impacts eliminated or minimized within and outside the marine area
- Alien and invasive species and genotypes removed from the marine area or prevented from becoming established

**Habitat Protection Indicators**
- Habitat quality/and or quantity restored or maintained
- Ecological processes essential to habitat existence protected
- Unnatural threats and human impacts eliminated or minimized inside and outside the marine area
- Alien and invasive species and genotypes removed or prevented from becoming established

**Habitat Restoration Indicators**
- Populations of native species restored to desired reference points
- Ecosystem functions restored
- Unnatural threats and human impacts eliminated or minimized within and outside the marine area
- Alien and invasive species and genotypes removed or prevented from becoming established

*Modified from Parks, Pomeroy and Watson 2004*

## TASK 4: IDENTIFYING INTERIM TARGETS

Many of the outcomes of marine spatial management plans will take years, if not decades, to realize. Interim targets are important to ensure that the management actions are resulting in measurable incremental steps toward the eventual outcome.

**DEFINITION OF A TARGET**

**A target is an Interim point on the way to an outcome and eventually to a long-term management goal. Targets are based on known resources plus a reasonable projection of the condition of the resource based over a specified period of time.**

For example, if an objective is to produce 25% of energy supply from offshore renewable sources by 2025, an interim target could be to produce 10% by 2015 and 20% by 2020.

Target setting is a critical part of evaluation planning. In order to determine progress it is necessary to not only measure the indicator but identify beforehand a target for that indicator. Planning teams may hesitate to set targets, afraid that they may not accomplish them, or sometimes it is just difficult to predict targets. However, target setting helps to keep the marine spatial plan's expected results realistic, to plan resources, track and report progress against these targets, and to inform decision-making and uphold accountability.

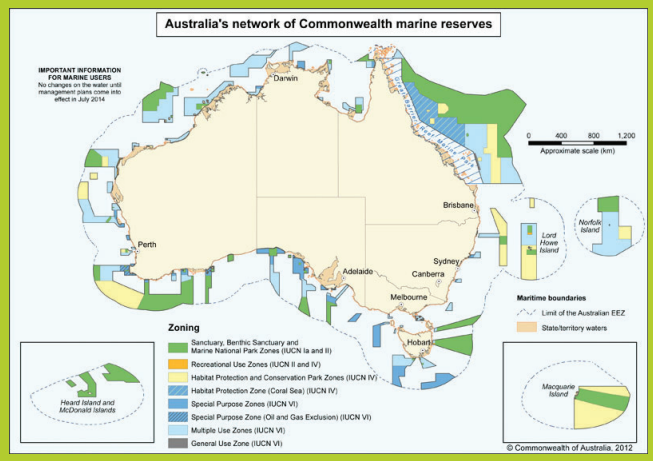
Knowing whether your indicator exceeds or underperforms its target helps to determine if your management actions are progressing according to plan, or whether there may need to be adjustments to the implementation or time frame. Generally, a good rule of thumb is that variance from the target greater than 10 per cent should be explained in periodic reports.

Do targets change? Absolutely. Data collected during evaluation often leads to reassessing and adjusting targets accordingly.

**Case 3.**
**Using MSP to Establish National System of Marine Reserves**

## USING MSP TO ESTABLISH A NATIONAL SYSTEM OF MARINE RESERVES IN AUSTRALIA

In 2002 the entire Australian exclusive economic zone (EEZ), the third largest in the world, was divided into five planning regions. After 10 years of planning, in November 2012 it completed and approved five marine bioregional plans for its EEZ. The major output of the Australian bioregional planning program was the designation of the world's largest national system of marine reserves, adding about 2.3 million km$^2$ of marine reserves and bringing the total area to 3.1 million km$^2$ managed for marine conservation, roughly a third of the entire EEZ of Australia. Some critics claim that the final design of the marine reserve system often avoided conflicts with fishing and oil and gas development. However, Australia is one of the few countries in the world that has honored its commitment to establish a national system of marine reserves by 2012 (a target) made in 2002 at the United Nations World Summit on Sustainable Development.




**The National System of Marine Reserves in Australia -- the largest in the world**

In September 2013 the newly elected environment minister announced a suspension and review of the "flawed management plans for marine protected areas that were imposed without fair or adequate consultation."

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# STEP 5 ESTABLISHING A **BASELINE** FOR **SELECTED INDICATORS**

### What is the output of this step?

☞ A description of the state-of-the-system, based on the selected indicators (Step 4), before any new management action/s of the Spatial Management Plan is/are implemented. It is the starting point from which progress and success will be measured.

One of the principal tasks of data collection for MSP should focus on collection and organizing information about the state of the marine area in a specified base year that should be as close as possible to the current year. A baseline of information about each of the indicators selected in the previous step is necessary before actual monitoring of the indicators begins.

A key questions of MSP is: ***Where are we now?*** Defining and describing where we are now is critical for both the analysis and evaluation of individual management actions before their implementation as well as for performance monitoring and evaluation after implementation of the marine spatial plan.

**DEFINITION OF BASELINE**

**A *baseline* is the situation before a marine spatial management plan begins; it is the starting point for performance monitoring and evaluation of each performance indicator.**

A performance baseline is information—qualitative or quantitative—that provides data at the beginning of, or just prior to, monitoring. The baseline is used as the starting point with which to measure performance. A baseline establishes the current condition against which future change can be tracked. For instance, it helps to inform planners and decision makers about current circumstances before projecting targets for a MSP plan. In this way, the baseline is used to learn about current or recent levels and patterns of performance. Importantly, baselines provide the evidence by which decision makers are able to measure subsequent MSP plan performance (Kusek and Rist 2005).

## TASK 1: BUILDING BASELINE INFORMATION FOR SELECTED INDICATORS

Baseline information should be built for indicators that will be used to measure the performance of each management action. Some key questions that should be asked when building the baseline information include:

1. What will be the sources of the data? Will they be qualitative or quantitative data?
2. What will be the data collection methods?
3. Who will collect the data?
4. What is the cost and difficulty to collect the data?
5. Who will analyze the data?
6. Who will report the data?
7. Who will use the data?

The answers to these questions (see Table 10) and the ability to develop and access these data will vary from country to country. The selected performance indicators, and the data collection strategies used to track those indicators, need to be grounded in the realities of what data are available, what data can presently be delivered, and what capacity exists to expand the breadth and depth of data collection and analysis over time.

**Table 10. Building Baseline information.**

| Indicator | Data Source? | Data Collection Method? | Who Will Collect Data? | Frequency of Collection? | Cost and Difficulty to Collect? | Who Will Analyze Data? | Who Will Report Data? | Who Will Use Data? |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| ..... | | | | | | | | |
| n | | | | | | | | |

**What are data sources for indicators?**

A number of issues need to be considered when identifying data sources. Can the data source be accessed in a practical fashion? Can the data source provide quality data? Can the data source be accessed on a regular and timely basis? Is primary data collection from the information source feasible and cost effective?

**Tip! Data Collection**

It's important to collect only the data that will be used in the performance evaluation (Step 6). After all, performance information should be a management tool—and there is no need to collect information that managers are not going to use.

*"As a rule of thumb, only collect baseline information that relates directly to the performance questions and indicators that you have identified. Do not spend time collecting other information." (IFAD 2002).*

Data sources for indicators can be "primary" or secondary. Primary data are collected directly by the organization concerned, and may include administrative, budget, or personnel data; surveys; interviews; and direct observation. Secondary data have been collected by other outside organizations, and are gathered for purposes other than those of the organization concerned.

There are pros and cons associated with the use of secondary data to establish performance trends on indicators. On the positive side, secondary data can be more cost efficient. Secondary data may also be used in instances when it is not practical or possible to collect primary data frequently, as in the case of large scale and expensive surveys.

However, for a variety of reasons, secondary data must be used with caution. Secondary data will have been gathered with other organizational goals or agendas in mind. Other questions arise in using secondary data as well:

- Are the data valid?
- Are they reliable?
- How often are the data collection instruments validated?

Furthermore, using secondary data means using someone else's data to report progress and success in moving toward your own desired outcomes. Are you as a manager comfortable with this arrangement, given all the advantages and disadvantages of doing so?

Examples of sources of actual data may include administrative records (written or computerized) from government and nongovernment organizations; interviews and surveys with target groups, program officials, and service providers; reports from trained observers; and field measurements and tests.

Managers are looking for information that they can trust and use in real time. Waiting for months or even a year or more for studies to be completed is not helpful. The new approach to building results-based evaluation systems is increasingly toward building those systems that provide more or less continuous information streams.

**How do different data collection methods compare?**

If the sources of data are known, what will be the strategies and instruments for data collection? Decisions will need to be made regarding how to obtain the necessary data from each source, how to prepare the data collection instruments to record the information appropriately, what procedures to use (surveys versus interviews, for example), how often to access the data sources, and so forth. The government might also contract externally to use existing capacity at universities and research centers for data collection efforts. Data collection can also be purchased from private sector providers.

However, any strategy that involves the long-term purchase of data collection from nongovernment vendors has certain vulnerabilities and is likely to be more expensive. Box 6 illustrates some of the possible methods of collecting data. There is no correct answer as to which method is best. It will depend on a given organization's resource availability, access, needs, time constraints, and so forth. It will also depend on the needs of the user of the information. For example, there may be questions about how much precision is actually needed by a given user in light of tradeoffs of cost and time. A combination of data collection strategies might work best in building the information system to support tracking each performance indicator. For example, an organization could choose to have only a few indicators and draw on data collection strategies from different places along the continuum. There is no one right approach to the selection of data collection strategies. A number of contingencies help to frame what is possible and what can be afforded. It is worth some time to understand the implications of choosing one collection strategy in comparison to other options. To just decide in an ad hoc, off-hand way to use surveys, or to conduct focus groups, or to undertake a stakeholder survey, is to create possibly critical problems later on.

Before any decisions are made on the data collection strategies to deploy, it is important to check with the users and stakeholders. Try to determine their level of comfort with the tradeoffs and with the sorts of performance information they will be receiving. Data collection strategies necessarily involve some tradeoffs with respect to cost, precision, credibility, and timeliness. For example, the more structured and formal methods for collecting data generally tend to be more precise, costly, and time consuming. It may be preferable to adopt less precise, more unstructured, and inexpensive data collection strategies if data are needed frequently and on a routine basis to inform management decision-making.

### Tip! The "Right" Number of Indicators

Since each indicator implies an explicit data collection strategy for measuring it, the key questions on data collection and management should be considered. Too many indicators can be difficult to track and may be a drain on available resources. Reducing the number of indicators is always preferable to trying to include too many.

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# STEP 6 MONITORING INDICATORS OF MANAGEMENT PERFORMANCE

**What are the outputs of this step?**

- ☞ A data collection plan
- ☞ Monitoring of at least one indicator for each management action

Once management actions, indicators, and targets have been selected,you are now ready to start monitoring for results. How do you put together a monitoring system that puts together the data necessary to inform the decision making process?

**Tip!**

A performance evaluation system focuses on achieving outcomes, and manages to each indicator. An activity-based management system focuses on working against a set of identified activities, without aligning these activities to outcomes, making it difficult to understand how the implementation of these activities results in improved performance. Be careful not to fall into the trap of equating being busy with being effective.

## TASK 1: DEVELOP A DATA COLLECTION PLAN

Since the purpose of performance monitoring is to measure real results (outcomes) of MSP, with indicators, targets and timeframes, normative questions should be used to answer questions about inputs, processes, and outputs. A normative question compares "what is?" with "what should be?" A normative question compares the current situation or the baseline with a specified target, goal, or objective. Examples of normative questions would include:

- Are you doing what you are supposed to be doing?
- Are you meeting your objectives and targets?
- Did you accomplish what you said you would accomplish?

You also want to ask cause-and-effect questions or questions that determine what difference management actions actually make? What has changed as a result of management actions? Cause-and-effect questions ask whether the desired outcomes have been achieved as a result of the marine spatial management plan? Cause-and-effect questions imply a comparison of performance of one or more management actions or indicators not only before or after

implementation, but also with and without the management action. You need to pose such questions in terms of cause and effect. Because many activities are occurring at the same time, it is difficult to demonstrate that the outcomes are solely, or at least primarily, the result of the management action. When coming up with a plan to answer cause-and-effect questions, care needs to be exercised to eliminate other possible explanations for whatever changes they measure. Did the spatial management action produce the desired outcome or was the outcome produced by a change in economic conditions or changes in the weather?

**11. A Matrix for Selecting and Ranking Evaluation Questions.**

Source: Fitzpatrick, Sanders, and Worthen 2004.

| Evaluation Question | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Would the evaluation question: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ..n |
| Be of interest to key audiences? | | | | | | | | |
| Reduce present uncertainty? | | | | | | | | |
| Yield important information? | | | | | | | | |
| Be critical to the evaluation's scope and comprehensiveness? | | | | | | | | |
| Be of continuing interest? | | | | | | | | |
| Be answerable given financial and human resources, time, methods, and technology available? | | | | | | | | |
| Have an impact on the outcomes of the marine spatial plan? | | | | | | | | |

The evaluation questions should relate to specific management actions. For example, if the goal is to maintain biodiversity, a number of management actions could be implemented. Each goal gets translated into management actions designed to achieve specific objectives. Ultimately, if the goal, the objectives, and the management actions are correct, then the overall outcomes should be achieved. If not, then the management goal, objectives, and management actions may need to be changed ((See section on Using the Results of Performance Evaluation to Adapt the Next Cycle of Marine Spatial Planning).

**The Needs of a Performance Monitoring System**

Every monitoring system needs four basic elements: ownership, management, maintenance, and credibility.

**Ownership**: Ownership has to come from those at every level who use the system, and demand for performance information at each level needs to be identified. Stakeholder ownership of data is critical. If people do not see the need for, or have a use for, the data collected, there will be problems with quality control and ownership. Without ownership, stakeholders will not be willing to invest time and resources in monitoring. The system will ultimately degenerate, and the quality of data will decline.

A strong political champion can help to ensure ownership of the monitoring system. A champion is needed to stress that good performance data must be generated, shared, and properly reported.

**Management**: Who, how, and where the system will be managed is critical to its sustainability. Data collection can also be hampered by overlap of data coming from different agencies; duplication of data in agencies and other sources; time lags in receiving data, i.e., data that are received too late to have an impact on the decision making process; and people not knowing what data are available.

**Maintenance**: Maintenance of monitoring systems is essential, to prevent the systems from decaying and collapsing. It's important to know who will collect what kind of information and when, and to ensure that information is flowing horizontally and vertically in the system. Performance monitoring systems, like other information systems must be continually managed.

Management and maintenance of monitoring and evaluation systems require creating the right incentives and providing sufficient financial, human, and technical resources for organizations, managers, and staff to carry out monitoring tasks. Individual and organizational responsibilities should be delineated, and a clear "line of sight" established—meaning that staff and organizations should understand their connections to common goals and objectives. Clear relationships need to be established between actions and results. Individuals and organizations need to understand how their specific tasks contribute to the big picture.

Good maintenance of monitoring systems should also take into account new advances in management and technology. Systems, procedures, or technologies may need upgrading and modernizing. Staff and managers should also be provided periodic training to keep their skills current. Unless systems are well managed, they will deteriorate. Monitoring systems—like any other systems—require constant rebuilding, renewal, and strengthening through good management.

**Credibility**: Credibility is also essential to any monitoring system. Valid and reliable data help ensure the credibility of the system. To be credible, monitoring systems need to be able to report all data—both good and bad. If bad news, or information demonstrating failure to meet desired outcomes and targets, is deliberately not reported, the system will not be credible. In some instances, political pressure may be brought to minimize bad news or not report certain data. If political constraints are such that no negative news or data can be reported, or the messenger is punished, the monitoring system will be compromised. In short, if people think information is politically motivated or tainted, they will not trust it and will not use it (See Step 8, Communicating the Results of Evaluation).

**Data Reliability, Validity, and Timeliness**

A data collection system for all indicators (implementation and results) should possess three key criteria: reliability, validity, and timeliness. To the extent that any of these criteria are absent, the credibility of the system will diminish.

**Reliability** is the extent to which the data collection system is stable and consistent across time and space. In other words, measurement of the indicators is conducted the same way every time.

**Validity** is important: indicators should measure, as directly and succinctly as possible, actual and intended performance levels.

**Timeliness** consists of three elements: frequency (how often data are collected); currency (how recently data have been collected); and accessibility (data availability to support management decisions). If the data are not available to decision makers when they need it, the information becomes historical data. Management requires good and timely information. Recent, continuous data that decision makers can use to lead and manage in their work environment is now essential. It makes little sense to manage in the public sector using essentially historical data that may be three, four, or even five years old.

## TASK 2: COLLECT DATA RELEVANT TO EACH INDICATOR

**Sources of Data**

Data can be collected from many sources, including existing records, observations, surveys, focus groups, and expert judgment. No single way is the best way. The decision about which method to use depends on:

- What you need to know?
- Where the data reside?
- The resources and time available?
- The complexity of the data to be collected?
- The frequency of data collection? and
- The intended forms of data analysis.

**Box 6.**
**Key data collection methods and tools**

The following summarizes key data collection methods and tools used in monitoring and evaluation. This list is not complete, as tools and techniques are continually emerging and evolving in the field of monitoring and evaluation.

**Case study**. A detailed description of individuals, communities, organizations, events, programs, time periods or a story (discussed below). These studies are particularly useful in evaluating complex situations and exploring qualitative impact. A case study only helps to illustrate findings and includes comparisons (commonalities); only when combined with other case studies or methods can one draw conclusions.

**Checklist**. A list of items used for validating or inspecting whether procedures/steps have been followed, or the presence of examined behaviors. Checklists allow for systematic review that can be useful in setting benchmark standards and establishing periodic measures of improvement.

**Community interviews/meeting**. A form of public meeting open to all community members. Interaction is between the participants and the interviewer, who presides over the meeting and asks questions following a prepared interview guide.

**Direct observation**. A record of what observers see and hear at a specified site, using a detailed observation form. Observation may be of physical surroundings, activities or processes. Observation is a good technique for collecting data on behavioral patterns and physical conditions. An observation guide is often used to reliably look for consistent criteria, behaviors, or patterns.

**Document review**. A review of documents (secondary data) can provide cost-effective and timely baseline information and a historical perspective of the plan. It includes written documentation (e.g. project records and reports, administrative databases, training materials, correspondence, legislation and policy documents) as well as videos, electronic data or photos.

**Focus group discussion**. Focused discussion with a small group (usually eight to 12 people) of participants to record attitudes, perceptions and beliefs relevant to the issues being examined. A moderator introduces the topic and uses a prepared interview guide to lead the discussion and extract conversation, opinions and reactions.

**Interviews**. An open-ended (semi-structured) interview is a technique for questioning that allows the interviewer to probe and pursue topics of interest in depth (rather than just "yes/no" questions). A closed-ended (structured) interview systematically follows carefully organized questions (prepared in advance in an interviewer's guide) that only allow a limited range of answers, such as "yes/no" or expressed by a rating/number on a scale. Replies can easily be numerically coded for statistical analysis.

**Key informant interview**. An interview with a person having special information about a particular topic. These interviews are generally conducted in an open-ended or semi-structured fashion.

**Laboratory testing**. Precise measurement of specific objective phenomenon, e.g. a water quality indicator.

**Box 7.**
**Rules for Collecting Data**

- Use multiple data collection methods when possible;
- Use available data if possible (doing so is faster, less expensive, and easier than generating new data);
- If using available data, find out how earlier evaluators collected the data, defined the variables, and ensured accuracy of the data. Check the extent of missing data; and
- If original data must be collected, establish procedures and follow them (protocol); maintain accurate records of definitions and coding; pretest, pretest, pretest; and verify the accuracy of coding and data input.

**Box 8.**
**Minimizing Data Collection Costs**

Data collection is typically one of the most expensive aspects of evaluation. One of the best ways to lessen data collection costs is to reduce the amount of data collected (Bamberger et al. 2006). The following questions can help simplify data collection and reduce costs:

- Is the information necessary and sufficient? Collect only what is necessary for program management and evaluation. Limit information needs to the stated objectives and indicators.
- Are there reliable secondary sources of data? Secondary data can save considerable time and costs – as long as it is reliable.
- Is the sample size adequate but not excessive? Determine the sample size that is necessary to estimate or detect change.
- Can the data collection instruments be simplified? Eliminate unnecessary questions from questionnaires and checklists. In addition to saving time and cost, this has the added benefit of reducing survey fatigue among respondents.
- Are there alternative, cost-saving methods? Sometimes targeted qualitative approaches can reduce the costs of the data collection, data management and statistical analysis required by a survey – when such statistical accuracy is not necessary.
- Self-administered questionnaires can also reduce costs.

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"True genius resides in the capacity for evaluation of uncertain, hazardous, and conflicting information."
*Winston Churchill (1874-1968), Prime Minister of the United Kingdom*

"Evaluation activities "…have seldom invoked enthusiasm among coastal managers or among politicians or bureaucrats."
*Professor Steven Olsen, University of Rhode Island*

# STEP 7 EVALUATING THE RESULTS OF PERFORMANCE MONITORING

**What are the outputs of this step ?**

- ☞ An evaluation plan.
- ☞ An analysis and interpretation of the monitoring data
- ☞ An evaluation report

**What are the characteristics of a quality evaluation?**
The characteristics of a quality evaluation include:

**Impartiality**: The evaluation should be free of political or other bias and deliberate distortions. The information should be presented with a description of its strengths and weaknesses. All relevant information should be presented, not just that which reinforces the views of the management agency;

**Usefulness**: Evaluation information needs to be relevant, timely, and written in an understandable form. It also needs to address the questions asked, and be presented in a form and best understood by the management agency;

**Technical adequacy**: The information needs to meet relevant technical standards—appropriate design, correct sampling procedures, accurate wording of questionnaires and interview guides, appropriate statistical or content analysis, and adequate support for conclusions and recommendations;

**Stakeholder involvement**: There should be adequate assurance that the relevant stakeholders have been consulted and involved in the evaluation effort. If the stakeholders are to trust the information, take ownership of the findings, and agree to incorporate what has been learned into ongoing and new policies, programs, and projects, they have to be included in the political process as active partners. Creating a façade of involvement, or denying involvement to stakeholders, are sure ways of generating hostility and resentment toward the evaluation—and even toward the management agency that asked for the evaluation in the first place;

**Feedback and dissemination**: Sharing information in an appropriate targeted, and timely fashion is a frequent distinguishing characteristic of evaluation utilization. There will be communication breakdowns, a loss of trust, and either indifference or suspicion about the findings themselves if: (a) evaluation information is not appropriately shared and provided to those for whom it is relevant; (b) the evaluator does not plan to systematically disseminate the information and instead presumes that the work is done when the report or information is provided; and (c) no effort is made to target the information appropriately to the audience for whom it is intended; and

**Value for money**: Spend what is needed to gain the information, but no more. Gathering expensive data that will not be used is not

appropriate—nor is using expensive strategies for data collection when less expensive means are available. The cost of the evaluation needs to be proportional to the overall cost of the MSP program.

## TASK 1. PREPARE A DATA EVALUATION PLAN

Developing a data evaluation plan is an important part of the monitoring and evaluation process. Evaluators should be aware of the options for data analysis—and their respective strengths and weaknesses—as they plan the evaluation. The objective of the evaluation should be specific and indicate the analysis and graphics that will result from the information collected. A common mistake is collecting vast amounts of data that are never used.

Whether the evaluation design emphasizes mostly qualitative data or quantitative data, data collection and data analysis will overlap. At the start of data collection, a small amount of time is spent in data analysis. As the evaluation continues, more time is spent on data analysis and less on data collection.

## TASK 2. ANALYZE AND INTERPRET THE DATA

Data analysis is the process of converting collected (raw) data into usable information. This is a critical step of the evaluation planning process because it shapes the information that is reported and its potential use. It is really a continuous process throughout the planning cycle to make sense of gathered data to inform ongoing and future programming. Such analysis can occur when data is initially collected, and certainly when data is explained in data reporting (discussed in the next step). Data analysis involves looking for trends, clusters or other relationships between different types of data, assessing performance against plans and targets, forming conclusions, anticipating problems and identifying solutions and best practices for decision-making and organizational learning. Reliable and timely analysis is essential for data credibility and use.

Data collected from field monitoring and other sources fall into two categories: qualitative and quantitative.

**Tip!**

| Task | Tips |
|---|---|
| **Collect data** | Keep good records<br>Write up interviews, impressions, and notes from focus groups immediately after data are collected<br>Make constant comparisons as you progress<br>Meet with team regularly to compare notes, identify themes, and make adjustments |
| **Summarize data** | Write one-page summary immediately after each major interview or focus group<br>Include all main issues<br>Identify most interesting, illuminating, or important issue discussed or information obtained<br>Identify new questions to be explored |
| **Use tools to keep track** | Create a separate file for your own reactions during the evaluation, including your feelings, hunches, and reactions<br>Record your ideas as they emerge<br>Keep a file of quotations from the data collection process for use in bringing your narrative to life when you write your evaluation |
| **Store data** | Make sure all of your information is in one place<br>Make copies of all information, and place originals in a central file<br>Use copies to write on, cut, and paste as needed |

*Source: Modified from Imas and Rist 2009*

**Analyzing Qualitative Data**: Qualitative data analysis is used to make sense of non-numerical data collected as part of the evaluation. Analyzing semi-structured observations, open-ended interviews, written documents, and focus group transcripts all require the use of qualitative techniques.

When collecting qualitative data, it is important to accurately capture all observations; good notes are essential. This means paying close attention to what people say and how they say it. While taking notes, evaluators should try not to interpret what people say. Instead, they should write down what they observe, including body language and anything potentially relevant that happens during data collection (for example, interruptions during the interview). Evaluators should capture immediate thoughts, reactions, and interpretations and should keep them in a separate section of their notes.

It is important to provide evaluators time immediately after an interview, observation, mapping exercise, or focus group to review, add to, and write up their notes so that they will be able to make sense of them later on. It is surprising how difficult it is to understand notes taken even just a day earlier if they are not clearly written.
After collecting qualitative data, the evaluator will have many pages of notes and transcriptions of observations, interviews, and other data sources. Organizing and making sense of this information can be challenging. The choice of the organization of data should strive to answer the evaluation questions.

- Storytelling approaches present data either chronologically (telling the story from start to finish) or as a flashback (starting at the end and then working backward to describe how the ending emerged).
- Case study approaches present information about people or groups; critical incidents are usually presented in order of appearance; and
- Analytical frameworks include descriptions of processes, illumination of key issues (often equivalent to the primary evaluation questions), organization of questions, and discussion of key concepts, such as leadership versus followership.

Evaluators describe data and interpret them. Before qualitative data can be analyzed, they need to be presented clearly, in a descriptive way. Interpreting data means finding possible causal links, making inferences, attaching meanings, and dealing with cases that contradict the analysis.

Many people are afraid of using statistics. Consequently, there is a tendency to think that using qualitative methods is somehow the easier option. In fact, good qualitative data analysis requires more than meets the eye. Analyzing qualitative data can be labor intensive and time-consuming, but it can reveal insights about behaviors or processes that are not obtainable from quantitative data. Evaluators need to plan enough time to do it well.

Evaluating Quantitative Data: Quantitative data are analyzed using statistics and expert scientists and other in the field should form part of your evaluation team to review these data. When preparing to evaluate quantitative data, some questions to ask include:

- How were the data collected and compiled?
- Do the data represent only a snapshot of a longer time series? If so, you may want to see the full time series to look at larger trends.
- What is the statistical power of the data? Have enough data points been collected to draw conclusions?
- Can the data be made publically available so others can replicate your calculations?

Content analysis is a process for analyzing qualitative data. Analyzing qualitative data is labor intensive and time-consuming, but doing so can reveal valuable information. After collecting qualitative data, evaluators need to organize them. The data can be sorted so that patterns and commonalities appear. Once sorted (either manually or electronically), the data can be coded and then interpreted.

Evaluators usually use both qualitative and quantitative methods. Using more than one method has many benefits in many cases. In cases in which only a few questions are posed that are relatively easy to answer, a single approach is usually recommended.

**Tip!**

| Task | Tips |
|---|---|
| **Analyze the data** | Bring order to the data<br>Consider placing data on a spreadsheet<br>Consider using a computer to assist with data analysis<br>Sort the data to reveal patterns and themes |
| **Interpret the data** | When possible, have teams of at least two people review and categorize the data to compare their findings and to review and revise them if they differ<br>Look for meaning and significance in the data<br>Link themes and categories to the processes of planning, outcomes, or both. Are some of the themes more relevant when respondents discuss the outcome issues? Look for alternative explanations and other ways of understanding the data |
| **Share and review information** | Share information early and often with key informants<br>Have others review early drafts with the intent of obtaining information, questions, other ways of interpreting the data, and other possible sources of data |
| **Write the report** | Describe major themes of present material as it reflects what happened over time<br>Highlight interesting perspectives even if noted by only one or two people<br>Stay focused; with large amounts of data, it is easy to get lost<br>Include only important information. Ask yourself whether information answers the evaluation questions and will be information useful to stakeholders? |

*Source: Modified from Porteous 2005*

## TASK 3. WRITE THE EVALUATION REPORT

### What Are the Uses of Evaluation Findings?

The value of an evaluation comes from its use. Two uses of evaluation include:

**Help Make Resource Allocation Decisions**: Evaluation information can inform managers what management actions have been more or less successful in terms of their outcomes and what resources they might merit. Similarly, evaluation information can help guide decisions on whether the results of existing efforts suggest expanding, redesigning, or even dropping the management action.

**Help Rethink the Causes of a Problem**: Frequently, management actions appear not to have any notable consequences on an existing problem. While the absence of change may be attributable of either poor design or poor implementation, it may also be that the management action has no effect because the problem is different than originally presumed. Evaluation information can raise the need for a reevaluation of the presumed cause of a problem—and what alternative management actions might be needed.

The purpose of a report is to communicate with decision makers, planning professionals, and stakeholders.

**Tip! Preparing the Evaluation Report**

- Keep your purpose and audience in mind as you write the report. Learn as much as possible about the audience, and write the report in a way that is best suited to reach it.
- Use words that are simple, active , positive , familiar, and culturally sensitive.
- Avoid abbreviations and acronyms to the maximum extent possible.
- Limit background information to that needed to introduce the report and to make its context clear. Additional context can be included as an annex if necessary.

*(continued from page 57)*

### Tip! Preparing the Evaluation Report

- Provide enough information about the evaluation design and methods so readers have confidence in the report's credibility but recognize its limitations. Warn readers about interpreting the findings in ways that may not be valid. Again, details can be put in an annex.
- Write an executive summary.
- Organize the material in the body of the report into sections that address major themes or answer key evaluation questions.
- Place major points first in each section, with minor points later in the section. Open each paragraph by stating the point it addresses.
- Support conclusions and recommendations with evidence.
- Place technical information, including the design matrix and any survey instruments, in an appendix.
- Leave time to revise, revise, and revise!!
- Find someone who has not seen any of the material to proof read the draft. Ask the proofreader to identify anything that was left out or is not clear.
- If possible, have an external reviewer with expertise on the issues and knowledge of evaluation methodology review the final draft and suggest changes to the document as necessary. If peer review is not feasible, ask a colleague who is not associated with the evaluation to review the report.

*Source: Modified from Imas and Rist 2009*

The Evaluation report should have the following sections:
**Executive summary** (2-4 pages): A short summary of the report that identifies the evaluation questions addressed; describes the methodology used; and summarizes the report's findings, conclusions, and recommendations findings, conclusions, and recommendations.

**The evaluation report**: The body of an evaluation report should contain the following components, usually divided into chapters:

**Introduction** : Description of the evaluation findings, conclusions, recommendations.

You should include the following components in the introduction to the report:
- purpose of the evaluation, background information
- program goals and objectives, evaluation questions.

The brief description of the evaluation includes the following components:
- purpose • scope • questions • methodology • limitations
- people involved (advisory board, evaluation team).

The findings follow the description of the evaluation. In writing this section, evaluators should
- present findings in a way that the audience can clearly understand
- include only the most important findings
- organize the findings around study questions, major themes, or issues
- use charts, tables, and other graphic elements to highlight major points.

The last parts of the report are the conclusions and recommendations that readers often read first. Evaluators often have difficulty distinguishing findings from conclusions. Findings describe what was found in the evaluation. They may relate to whether a criterion was or was not met. Findings should be supported by evidence.

**Conclusions** are based on professional assessment of the findings. They should be made about each evaluation sub-objective as well as the overall objective of the marine spatial plan. No new information should be presented in the conclusions section.

**Recommendations** advocate action. They indicate what the report wants the planning agency or other key stakeholders to do. Recommendations are often difficult to draft. They should not be overly prescriptive, thus reducing management's prerogative to identify specific solutions to the problems identified. At the same time, recommendations cannot be so general that they have no teeth. Recommendations should be clear and specific enough so that all understand what needs to be done to satisfy them, what organization or unit needs to take action, and when it should be done. Reports should not include "laundry lists" of recommendations. You should limit the number of major recommendations to three or four. It is better to group recommendations so that they are a manageable number (three to four) with subparts, as needed. You should link recommendations back to the goals and objectives of the plan.

The tone of the recommendations should be considered. It is important to remember that reports do not make decisions; people do.

"The single biggest problem in communication is the illusion that it has taken place."
*George Bernard Shaw (1856-1950) Irish playwright*

"….[R]eporting is too often the step to which evaluators give the least thought."
*Worthen, Sanders, & Fitzpatrick 1997*

# STEP 8 **COMMUNICATING** THE **RESULTS** OF PERFORMANCE EVALUATION

**What is the output of this step?**

☞ Development of a clear *Communications Plan* is an important output of this step that sets the stage for preparing the *Evaluation Report* and presenting the findings to important audiences, including stakeholders and decision makers. New forms of communications including blogs, webinars, interactive web pages, and web-based multimedia video reports should be considered.

## TASK 1. DEVELOP A COMMUNICATIONS PLAN

Once data collection and analysis are completed, it's time for you to share preliminary results and to make plans to communicate the final results. Communicating what has been learned is one of the most important parts of an evaluation.

A Communications Plan is a set of actions that describe how you intend to communicate the results of an evaluation. The Communications Plan should:

- Guide the process for successfully sharing the results of the evaluation; and
- Answer the following questions:
- Who will do the communicating?
- Who will take the lead in developing the plan?
- What are the communications objectives?
- Who is the target audience?
- How will the audience use the evaluation findings?
- How will the results be communicated?
- What resources are available for communicating?

Performance evaluation information is a management tool. Learning occurs when evaluation processes and findings are effectively communicated and reported. Evaluation information can inform policy makers and program managers if the spatial management plan and its management actions are leading to desired outcomes and why management actions are or are not working.

Evaluation reports serve many purposes. The central purpose, however, is to "deliver the message"—inform the appropriate audiences about the findings and conclusions resulting from the collection, analysis, and interpretation of evaluation information (Worthen, Sanders, and Fitzpatrick 1997).

Monitoring and evaluation reports can play many different roles, and the information produced can be put to very different uses to:

- Demonstrate accountability—delivering on political promises made to citizenry and other stakeholders;
- Convince—using evidence from findings;
- Educate—reporting findings to help organizational learning;
- Explore and investigate—seeing what works, what does not, and why;

- Document—recording and creating an institutional memory;
- Involve—engaging stakeholders through a participatory process;
- Gain support—demonstrating results to help gain support among stakeholders; and
- Promote understanding—reporting results to enhance understanding of projects, programs, and policies.

**When to communicate the results of performance evaluation?**
Communications should take place both during and after evaluation. Both are equally important. The more collaborative and participatory the approach to evaluation, the more frequent and inclusive the communication should be. Update Stakeholders on the progress and interim findings of the evaluation. Thank them for their participation in data collection.

**Table 12. Timing and specific purposes of evaluation communicating and reporting.** Source: Torres et al. 2005.

| During the evaluation | After the evaluation |
|---|---|
| Include stakeholders in decision making about evaluation design and implementation | Build general awareness of and/or support for the plan and the evaluation |
| Inform stakeholders and other audiences about specific upcoming evaluation activities | Communicate final findings to support change and improvement |
| Keep informed about the overall progress of evaluation | Communicate final findings to show results, demonstrate accountability |
| Communicate interim findings | |

## TASK 2. SUMMARIZE THE EVALUATION REPORT

**How to communicate effectively?**
A study of communicating and reporting practices of evaluators revealed a number of practices responsible for successful experiences. One of the most essential practices is that communicating and reporting do not wait for the end of the evaluation before beginning to communicate with stakeholders and decision makers (Torres et al. 2005). Table 13 describes some good practices of communicating results.

**Table 13. Good Practices of Communicating Results.**

| | |
|---|---|
| **Timely and Frequent Contact** | From the start, plan for effective communicating and reporting and assign a budget for these tasks. *During the evaluation, report and communicate on evaluation progress.* Towards the end of the evaluation, communicate and report preliminary evaluation findings and negotiate recommendations. Negative evaluation findings are much harder to accept and to use constructively if they come as a surprise. |
| **It's the Users** | All reporting and communicating formats must be tailored to *what the audience needs to know*. Evaluators need to understand how different stakeholder individuals and groups learn and process information. Avoid producing overly long, academic-style reports for busy decision-makers or neglecting the illiterate or less powerful. |
| **Variety is the Spice of Life** | A *variety of reporting formats helps ensure understanding.* These range from the final evaluation report and executive summary to working sessions |
| **Keep Content Clear and Simple** | Written formats such as reports, executive summaries, and fact sheets must *use clear, jargon-free language and include visuals* such as graphs, charts, tables, and illustrations to quickly communicate information and findings. Quantitative data should be presented alongside qualitative data. *Recommendations for adapting the management plan should be ranked, concrete, specific, and feasible.* |

**Table 14.** What are some of the challenges of communicating results?

| Obstacle or Challenge | How it affects communicating and reporting |
|---|---|
| General evaluation anxiety | Just the word "evaluation" can provoke anxiety among staff and cause resistance since the results can affect decisions about staffing or resource allocation. External evaluators, who need time to establish trust and relationships, may increase anxiety. |
| Failure to plan from the start | Not communicating regularly with stakeholders can cause disengagement, disinterest, and ultimately non-use of findings.<br>Evaluation teams find out too late that no budget was allocated to report production, verbal presentations, or dissemination. |
| Less-than-optimal organizational culture—defined as the management operating style, the way authority and responsibility is assigned, or how staff are developed | Staff may view negative or sensitive evaluation results as shameful criticism and resist discussing them openly.<br><br>Leaders who are uncomfortable to share performance information in open meetings hinder dissemination of performance findings.<br><br>Ongoing communication during an evaluation is inhibited by the organization's dysfunctional information-sharing systems. |

"I'm sorry the letter I have written you is so long. I didn't have time to write a short one."
*George Bernard Shaw (1856-1950)*
*Irish Playwright*
*Co-founder of London School of Economics*

## TASK 3. PRESENT THE EVALUATION TO STAKEHOLDERS AND DECISION MAKERS

### Simplicity as a virtue

An evaluation can use sophisticated techniques to confirm the strength of its findings, but the real challenge is to think creatively about how to translate those findings into simple, straightforward, and understandable presentations. This process will focus the presentation and highlight the most important findings. Distinguish between the complexity of analysis and the clarity of presentation. Present the full picture without getting bogged down in details.

Some of the techniques that can be used include:

- Evaluation summary sheets
- Findings tables
- Scorecards
- Photo stories
- Blogs
- Interactive web pages
- Multimedia video reports
- Webinars

**Tip! The Number of Key Messages**

The number of key messages to be communicated should be limited to between three and five. Limit the complexity of your key messages, and vary the message depending on the audience. Keep your key messages consistent and make sure everyone on the evaluation team is communicating the same messages. Avoid jargon and acronyms and keep the messages short and concise.

### What happens when the news is bad?

The news from evaluation is not always good. A good performance measurement system is intended to surface problems—not just bring good news. This is another of the political aspects of performance or results-based evaluation. Reporting on bad news is a critical aspect of how one distinguishes success from failure. If the difference cannot be determined, it is likely that managers are rewarding both failure and success. A good performance system can serve as a kind of early warning system. Performance evaluation reports should include explanations (if possible) about poor outcomes and identify steps taken or planned to correct problems (Hatry 1999). Messengers

should not be punished for delivering bad news. Instilling fear of bringing forward bad news will not encourage reporting and use of findings.

**Making an Oral Presentation**

Many people have tremendous fear of speaking in public. Fear of public speaking can be eased by being well prepared and by practicing a presentation ahead of time.

- In planning a presentation, consider the following questions:
- Who is in the audience? What do they expect? How much detail do they want?
- What is the point of my presentation? What are the three most important messages I want the audience to remember? What do I want the audience to do with the information I present?
- Are there language or technical challenges to communicating this information to this audience?
- How can I find out ahead of time how the audience may respond to my presentation?
- How much time will I have to give my presentation?
- What audiovisual resources will I be able to use (slides, overhead projections)? When preparing a presentation, keep the audience in mind, focus on the main messages, and respect the simple time-proven rule "Tell them what you will tell them, tell them, and then tell them what you told them."

One of the best ways to improve the quality of a presentation is to practice. Rehearse the presentation alone before rehearsing in front of others. Solicit feedback after the rehearsal, and adjust the presentation accordingly. Make sure that the presentation fills the time allocated and does not run over. During the presentation, talk to the audience, not to your notes. Make eye contact with many people in the audience. If you are using a projector and screen, print out a copy of all slides and place them in front of you so that you are never standing with your back to the audience and reading from the screen.

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"It's a bad plan that admits no modification."
*Publilius Syrus (1st C BC) Roman slave and poet*

"When it is obvious that the goals cannot be reached, don't adjust the goals, adjust the action steps."
*Confucius (551-479 BC) Chinese philosopher*

# **USING THE RESULTS** OF PERFORMANCE MONITORING AND EVALUATION **TO ADAPT THE NEXT CYCLE** OF MARINE SPATIAL PLANNING

### What are the outputs of this step?

☞ The principal output of this step is the use of the results of the evaluation (Step 8) to revise and adapt the marine spatial management plan as part of the continuing management cycle (see p. 8). This step will involve considering the findings to modify management goals and objectives and management actions if they are not moving toward desired outcomes. Resources should be reallocated from what is not working, to what works.

☞ Another output should be the identification of critical missing information or applied research needs that could reduce uncertainties in the analysis and decision making in the next round of planning.

**What Is an "Adaptive Approach" to Management?**
An adaptive approach involves exploring alternative ways to meet management objectives, predicting the outcomes of alternatives based on the current state of knowledge, monitoring to learn about the impacts of management actions, and then using the results to update knowledge and adjust management actions (Williams et al. 2009).

An adaptive approach provides a framework for making good decisions in the face of critical uncertainties, and a formal process for reducing uncertainties so that management performance can be improved over time.

The results of performance monitoring and evaluation can and should be used to modify the components of a marine spatial plan, including objectives and management actions. For example, if a management action proves to be ineffective, too expensive to continue, or produces unintended consequences, it should be changed as soon as possible or at least in the next round of plan revision. Similarly, if an objective of achieving 90% of desired outcome proves to be too expensive, then the objective could be reduced to achieving something less at less cost.

**Box 9.**
**An adaptive approach to management**

**Adaptive Management: policy as hypothesis, management by experiment**

Learning is not a haphazard by-product of mistakes in policy or management. In contrast to the usual system of rewards and advancement, which tends to discourage admission of error, by using adaptive management managers and decision-makers view unanticipated outcomes as opportunities to learn, and accept learning as an integrated and valued part of the management process. Learning while doing accelerates progress towards improved policies and management.

Learning is facilitated by feedback obtained from monitoring and evaluation… Without adequate investment in feedback, learning about the consequences of policies or management actions is slow; change is cumbersome and can come too late. The result is a situation where staff simply 'muddle through'.

*Parks Canada 2000*

## TASK 1. PROPOSE CHANGES IN MANAGEMENT OBJECTIVES AND MANAGEMENT ACTIONS

This task should address two broad questions: First, what has been accomplished through the MSP process and learned from its successes and failures? Secondly, how has the context (e.g., environment, governance, technology, economy—all tracked through state-of-the-environment monitoring) changed since the program was initiated? The answers to these questions can then be used to re-focus planning and management in the future.

If the management objectives are not being achieved on schedule, at a reasonable cost, and with a fair distribution of the costs and benefits of implementation, the management objectives and management actions should be modified. For example, objectives in the first round of planning may have been too ambitious in trying to achieve too much too soon. Or the cost of implementing a particular management action may have been too high and could have been lower through a different management action. Or the costs of implementing a management action may have fallen disproportionately on a particular group of users or geographic location. If any of these outcomes are apparent, then the management plan should be modified in the next round of planning.

Marine spatial plans can be changed by:

- Modifying MSP goals and objectives (for example, if monitoring and evaluation results show that the costs of achieving them outweigh the benefits to society or the environment);
- Modifying desired MSP outcomes (for example, the level of protection over a large marine protected area could be changed if the desired outcome is not being achieved); and
- Modifying MSP management actions (for example, alternative combinations of management actions, incentives and institutional arrangements could be suggested if initial strategies are considered ineffective, too expensive, or inequitable).

Modifications to the MSP program should not be made in an improvised way. They should instead be made as part of the next round of planning in a continuous process. The management actions of any first MSP program should be viewed as the initial set of actions that can change the behavior of human activities toward a desired future. Some management actions will produce results in a short time; others will take much longer.

**TASK 2. PROPOSE REALLOCATION OF RESOURCES TO MANAGEMENT ACTIONS THAT APPEAR TO BE WORKING; REDUCE/ELIMINATE RESOURCE ALLOCATIONS TO MANAGEMENT ACTIONS THAT ARE NOT WORKING**

**TASK 3. COMMUNICATE RECOMMENDED CHANGES OF EXISTING SPATIAL MANAGEMENT PLAN TO DECISION MAKERS, PLANNING PROFESSIONALS AND STAKEHOLDERS**

The evaluation team, management partners, and stakeholders should meet to discuss the implications for changes in the next round of planning. In discussing these possible changes target audiences should be encouraged to interpret results in such a way that they come to their own findings and conclusions rather than being given the findings and conclusions as interpreted by the evaluation team. Given the participatory nature of adaptive management, evaluation results should be openly shared with target audiences to ensure transparency and accountability (Parks 2011).

**TASK 4. IDENTIFY NEW INFORMATION OR APPLIED RESEARCH THAT COULD REDUCE UNCERTAINTY IN THE NEXT ROUND OF MSP**

As any MSP program matures, the role of applied research similarly evolves, from identifying issues to developing the information needed for management and understanding the results of research, monitoring and evaluation. Reporting on success in management is very important to developing a research agenda; so is reporting on setbacks and failures.

Uncertainties always exist with respect to various aspects of developing management actions for any marine area. Therefore, an integral component of a management action includes whatever short- and long-run data collection and research is required to have sufficient data or information for MSP or to confirm an assumption made based only on the available information in the initial round of planning. Other uncertainties, such as the relationship between a type of habitat and productivity with respect to a given species, may require data collection and longer-run research.

Typically MSP requires a long-term commitment to data collection, management and analysis. But long-term data are frequently not available when MSP is initiated. Often, a data set extending over many decades is needed to understand the significance of human impacts compared to the natural impacts and processes that underpin the functioning of a marine ecosystem. In the meantime, you should exercise caution when interpreting results. Ideally, monitoring and research should be supported by long-term funding as part of the core management of the marine area.

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# APPENDICES

**Figure 4.** Example of a Governance Outcome of a Marine Spatial Plan.

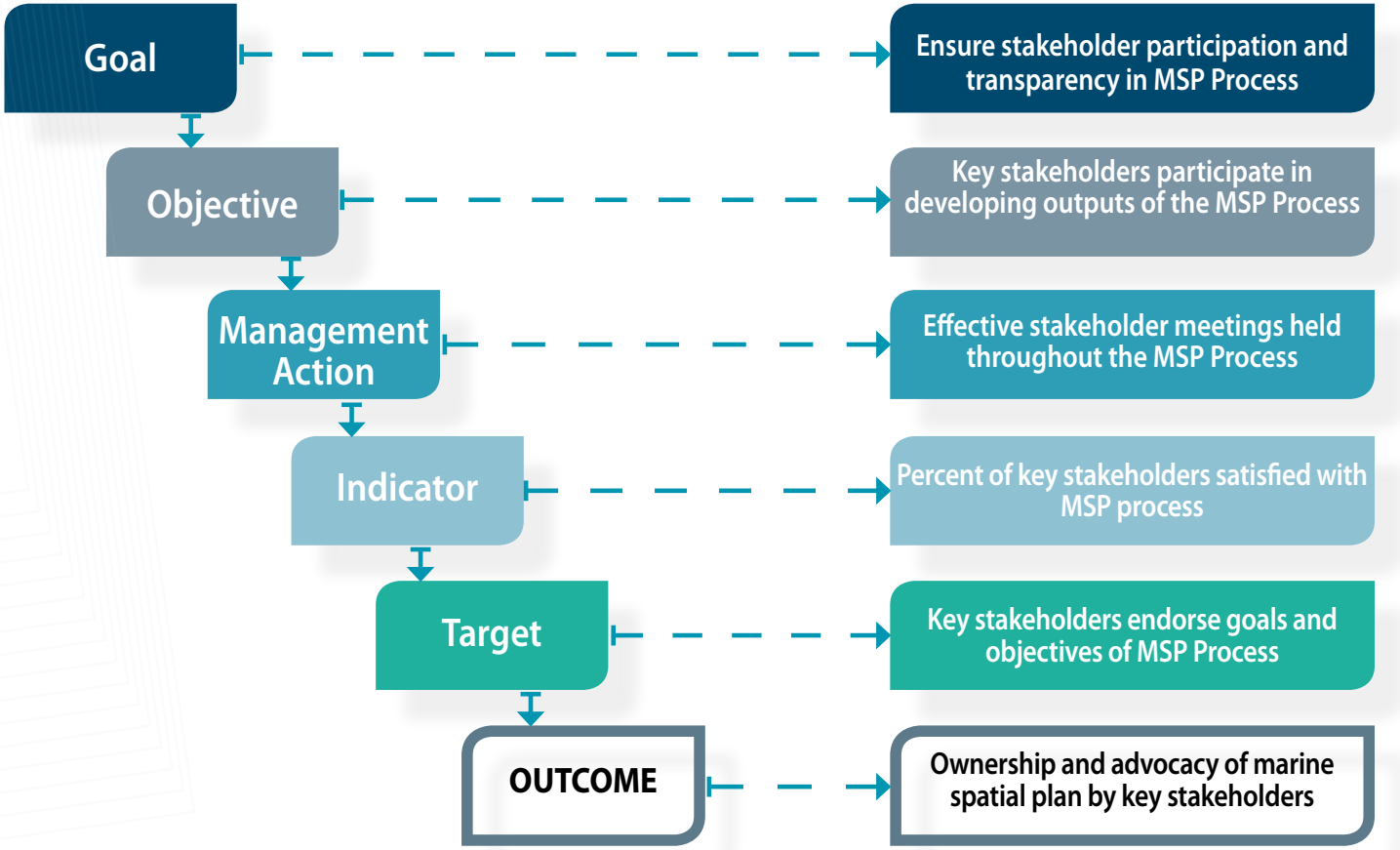

**Figure 5.** Example of an Economic Outcome of a Marine Spatial Plan.

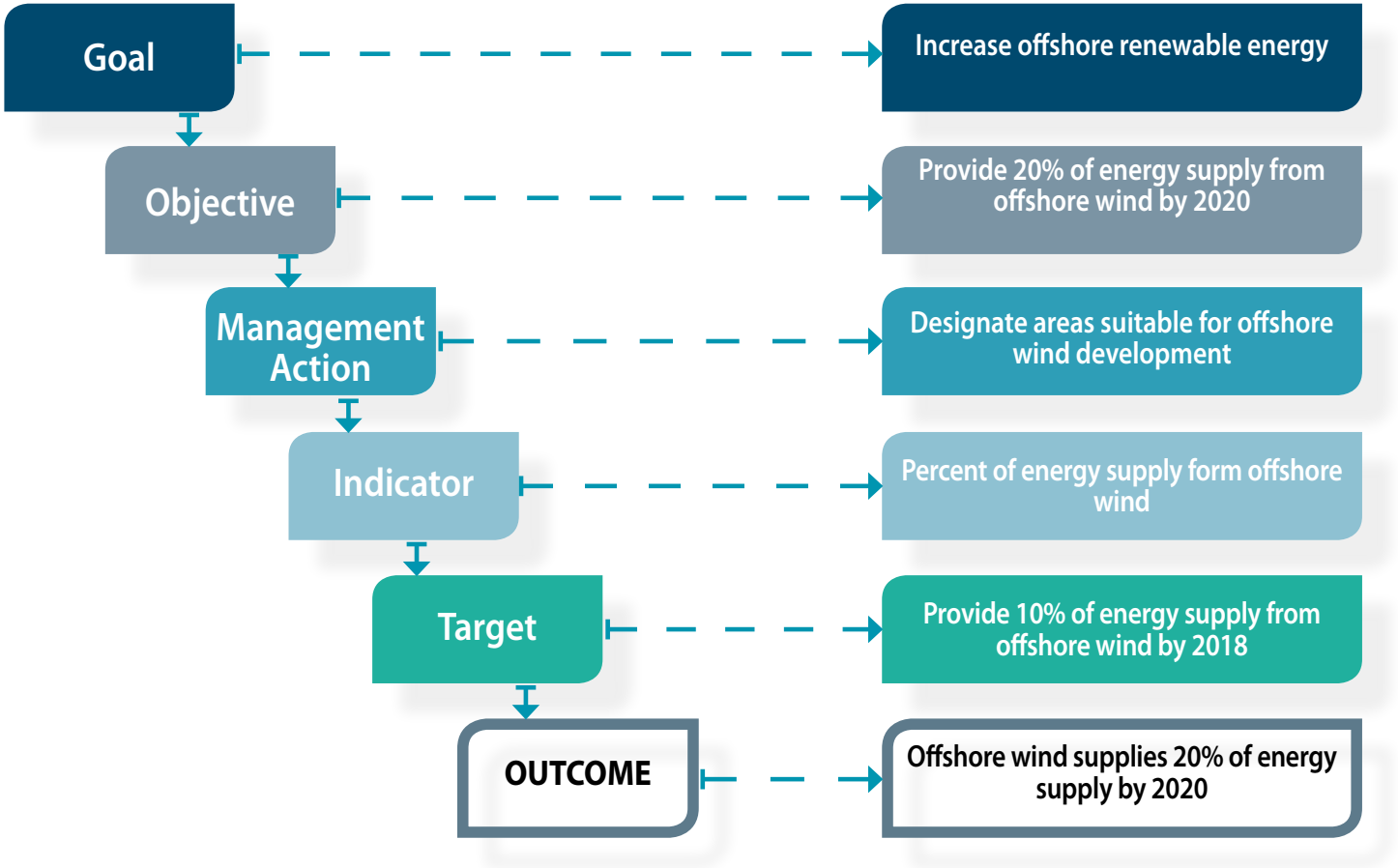

**Figure 6.** Example of an Ecological Outcome of a Marine Spatial Plan.

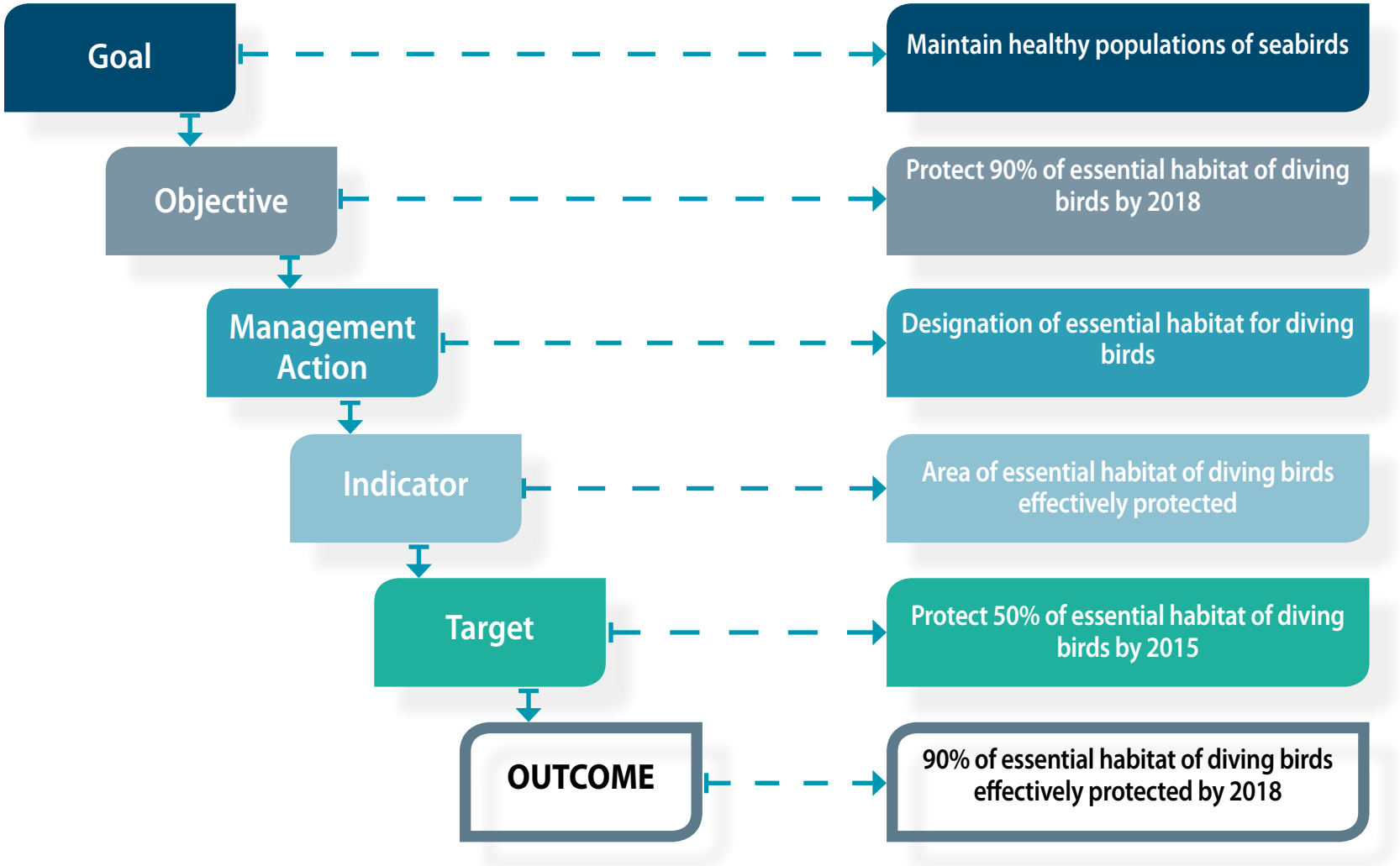

**Table 15.** Examples of Relationships Among Elements of a Marine Spatial Plan.

| Goals | Objectives | Management Actions | Indicators | Targets |
|---|---|---|---|---|
| **Governance** | | | | |
| Establish clear authority to conduct MSP | Before initiating MSP process, obtain authority to carry out and implement MSP | Use existing legislation or pass new legislation; use existing or new executive agreement or order<br>Lead institution clearly identified<br>Roles of other institutions clearly identified | Clear authority established through existing or new legislation, new executive order, or agreement among executive branch leaders | Not applicable |
| Define timetable for initiating, completing and revising MSP process | Before initiating MSP process, define timetable for initiating, completing, and revising MSP process | A specific timetable for MSP process is developed | Timetable for initiating and completing spatial plan clearly specified<br>Timetable for plan evaluation and revision clearly specified | Not applicable |
| Define the base year and the time horizon for planning, e.g., 10 years, 20 years | | A specific base year and planning period is defined | | Not applicable |
| Define boundaries of the MSP area | Before initiating MSP process, define administrative and analytical boundaries of the MSP area | Administrative and analytical boundaries are clearly defined and mapped | | Not applicable |
| Ensure strong political advocacy for MSP | Before initiating MSP process, political champion is identified | Political "champion" who will advocate for marine spatial planning identified | Willing and able political champion and advocate identified | Not applicable |
| Ensure allocation of adequate resources to conduct MSP | Ensure sufficient resources prior to starting MSP process | Use resources available through normal budgeting channels<br>Use user charges to cover costs of planning and implementation of MSP<br>Obtain grant to finance MSP and implementation | Adequate funds available prior to starting MSP process | Not applicable |
| Ensure a transparent, participatory MSP process | Work plan developed for MSP process before work begins | | | Early task at beginning of MSP process |
| | | Establish Stakeholder Advisory Group | Stakeholder Advisory Group established and participating routinely and openly in MSP process | Early task at beginning of MSP process |
| | Ensure stakeholders are actively involved in the MSP process | Hold stakeholder meetings throughout all steps of the entire MSP process | Stakeholders participating actively in all phases of MSP process<br>Stakeholder advocate for the final MSP plan | |

| Goals | Objectives | Management Actions | Indicators | Targets |
|---|---|---|---|---|
| | Conflicts among stakeholders are resolved in a transparent and equitable way | | Stakeholders are satisfied with the resolution of conflicts during MSP process | |
| | Specify clear, measurable MSP objectives at the beginning of the MSP process | | Objectives are SMART<br>Decision makers and stakeholders support objectives | |
| Develop and implement integrated marine spatial plan for territorial sea and/or EEZ | Complete marine spatial management plan by __ years after starting the process | | Management plan approved and implemented for territorial sea and/or EEZ __ years after start of MSP process<br>Management plan incorporated all important marine and coastal sectors, including fishing | |
| Integrate marine spatial plan with adjacent coastal zone or shoreline management plans | Base plan on best available scientific information | Establish Science Advisory Body (SAB)<br>Scientific team advises planning team in developing objectives, management actions, indicators, monitoring and evaluation | SAB agree that plan uses best available scientific information | |
| Reduce time required for marine use permitting | | Reduce time required to complete permitting process by __% for requests within approved development areas | Time required to issue permits within preapproved marine areas | |
| | Ensure clear authority for enforcement of management actions | Enforcement action taken for non compliance with plan | | |
| | Develop a monitoring and evaluation plan to track performance of management actions | Performance monitoring and evaluation plan developed and available to decision makers and stakeholders | Monitoring plan developed and supported by decision makers and stakeholders<br>Evaluation plan developed and supported by decision makers and stakeholders | |

| Goals | Objectives | Management Actions | Indicators | Targets |
|---|---|---|---|---|
| **Economy** | | | | |
| Maintain a healthy and productive economy in the marine area | Maximize economic development in the marine sectors | | Total economic value<br>Value of living resources<br>Value of non-living resources<br>Value of non-consumptive uses, e.g., tourism<br>Economic value-added<br>Value of exports<br>Management & administrative costs | |
| | | | Direct investment<br>Investment by government<br>Private sector investment<br>Foreign direct investment | |
| Increase employment in marine sectors | | | Total employment<br>Number employed by marine sector<br>Employment payroll value | |
| Ensure existing marine jobs are not displaced through space allocation decisions | | | | |
| Foster economic diversification in the marine sectors of the marine area | | | Sectoral diversification<br>Land-based activities dependent on marine environment<br>Activities in the marine management area out to the 200-nm limit<br>Non-living resource exploitation<br>Non-consumptive use | |
| Produce __% of energy supply of the marine area from offshore renewable energy | Produce by 2022 30% of the energy needed in the marine area from offshore renewable sources | Locate wind farms in places suitable for the turbines and associated power cables | No wind farms located in ecologically or biologically sensitive areas, e.g., bird migration routes | 15% of energy needed in the marine area produced by offshore renewable sources by 2017 |
| | | Locate wind farms in places where few competing activities exist | Wind farms located in places of low use and low environmental sensitivity | |
| | | | No loss of existing areas designated for conservation | |
| | | Ensure appropriate lighting, safety distances to shipping routes, safety zones around turbines, identify uses permitted within wind farms | No wind farms located in shipping lanes or anchoring sites | |

| Goals | Objectives | Management Actions | Indicators | Targets |
|---|---|---|---|---|
| Reduce conflicts between renewable energy and scientific activities | | | No wind farms located in areas of long-term scientific research and monitoring | |
| Reduce conflicts between commercial and recreational fishers | | Establish areas reserved for commercial or recreational fishing only | No commercial fishing occurring in recreational fishing reserved areas | Reduce commercial fishing by 95% in areas reserved for recreational fishing within 3 years |
| Reduce conflicts among current users of marine space, e.g., between wind farms and marine transportation, between offshore aquaculture and commercial fishing | Ensure 90% of current uses do not conflict with each other by 2015 | Designate development areas for compatible uses | Number of space use conflicts identified and resolved | |
| Promote compatibilities among current users of marine space, e.g., between offshore wind farms and aquaculture | | Designate development areas for compatible uses | Number of space use compatibilities identified and implemented | |
| Reduce conflicts among future users of marine space, e.g., between wave energy development and fishing | Ensure 90% of future uses do not conflict with each other by 2020 | Designate development areas for compatible uses | Number of space use conflicts identified and resolved | |
| Promote compatibilities among future users of marine space | | Designate development areas for compatible uses | Number (of area) of space use compatibilities identified and implemented | |
| Reduce conflicts between economic uses and the natural environment | | | | |
| Increase certainty in planning for new marine investments | Ensure adequate marine areas are identified to accommodate future development goals | Identify areas that are suitable for new infrastructure and marine resource development | Areas designated as appropriate for infrastructure construction | |
| **Environmental/Ecological** | | | | |
| Maintain biological diversity and resilience of the ecosystem of the marine area | Achieve no further loss of diversity of genes, species and communities at ecologically relevant scales by 2020 | | Distributional range<br>Population abundance/biomass<br>Habitat area<br>Condition of species and communities<br>Area covered by the species | |
| Maintain species distribution | | | Distribution of Species<br>Horizontal distribution (patchiness, aggregation)<br>Vertical distribution (food web/trophic structure) | |

| Goals | Objectives | Management Actions | Indicators | Targets |
|---|---|---|---|---|
| Maintain species abundance | | | Abundance of species<br>Biomass (key populations)<br>Number of individuals (marine mammals)<br>Density (sea grasses, benthic organisms) | |
| Maintain primary production and reproduction | | | Production and Reproduction<br>Primary productivity, both quantity (biomass) and quality (HABs)<br>Secondary productivity<br>Life history stages<br>Reproductive parameters<br>Spawning survival rates<br>Mean generation time (longevity) | |
| Maintain trophic interactions | | | Trophic Interactions<br>Complexity of food web<br>Key predator/prey interactions<br>Keystone species<br>Size spectra | |
| Maintain species health | | | Species Health<br>Species at risk of extinction<br>Bioaccumulation of toxic compounds<br>Diseases and abnormalities<br>Seafood quality | |
| Maintain mortalities below thresholds | | | Mortality<br>Fishing mortality<br>Incidental mortalities (by-catch)<br>Natural mortality (predation, diseases) | |
| Reduce by-catch | Reduce by-catch of marine mammals, reptiles, seabirds, and non-target fish in the marine area to near zero by 2020 | | | |
| Rebuild overfished stocks of commercial species | Reduce fishing effort for selected species by 30% by 2020 | Reduce number of fishing vessels in marine area through boat buy-back programs | Recovery of targeted fish stocks | Fishing effort reduced by 15% by 2016 |
| Ensure all fish are safe to eat | Reduce concentrations of cadmium, mercury, and dioxins, and PCBs in edible parts of fish to near zero by 2030 | | | |

| Goals | Objectives | Management Actions | Indicators | Targets |
|---|---|---|---|---|
| Maintain/Improve habitat quality | | | Habitat quality<br>Habitat types<br>Habitat alteration<br>Sea level change<br>Seascape and seafloor integrity<br>Sediment quality (nature and property of sediments) | |
| | By 2020 have an ecologically-coherent and well-managed network of marine protected areas | Designation and implementation of MPA network monitoring and enforcement established | | |
| Restore degraded habitats | Restore 30% of degraded sea grass beds by 2018 | Replant degraded sea grass beds | | — % of seagrass beds restored by — |
| Ensure protection of ecologically valuable species | Protect 75% of the habitat of diving birds by 2020 | Designate habitat of diving birds as critical habitat | Surface area of diving bird habitats designated as critical and effectively managed | 50% of diving bird habitat protected by 2018 |
| | Restore 25% of degraded wetland areas by 2018 | Replant degraded wetland areas | | |
| Ensure protection of commercially important species | Protect 85% of economically-important fish spawning and nursery areas by 2018 | Designate fish spawning and nursery areas as critical habitat | | 50% of economically-important fish spawning and nursery areas by 2015 |
| Ensure protection of threatened and endangered species | Protect 90% of important areas of threatened and endangered species by 2020 | Designate marine mammal calving and nursery areas as critical habitats | Surface area of marine mammal habitats designated as critical and effectively managed | 70% of important areas of threatened and endangered species protected by 2015 |
| | Protect 90% of marine mammal migration routes by 2018 | Manage vessel operations in migration routes during migration periods to reduce strikes/deaths | Number of vessel strikes or deaths of marine mammals | |
| | | Establish MPAs to protect areas of important to the life history of marine mammals | | |

| Goals | Objectives | Management Actions | Indicators | Targets |
|---|---|---|---|---|
| Maintain/Improve Water Quality | Reduce the average annual total water-borne load of nitrogen entering the marine area by 50% by 2025 | Apply Best Environmental Practice (BEP) and Best Available Technology (BAT) to reduce discharges from agri-cultural activities<br>Implement a permit system for farms with livestock production above a specified size<br>Collect and treat urban wastewater discharges from households and industries before discharge to estu-aries and coastal waters | Chlorophyll concentration<br>Water transparency<br>Abundance of macroalgae<br>Species shifta<br>Dissolved oxygen levels | Reduce the average annual total water-borne load of nitrogen entering the marine area by 25% by 2018 |
| Maintain/Improve Air Quality | Reduce the average annual atmospheric deposition of nitrogen compounds to the marine area by 50% by 2025 | Limit emissions from coastal power plants<br>Limit emissions from automobiles | Winter surface concentrations of nutrients reflect close to natural levels<br>Chlorophyll a concentrations reflect close to natural levels of algal blooms<br>Depth range of submerged vegetation reflect the natural distribution and occurrence of plants and animals | Reduce the average annual atmospheric deposition of nitrogen compounds to the marine area by 50% by 2025 |
| | Reduce emissions of $NO_x$ & $SO_x$ from shipping in the marine area by 80% by 2020 | Limit emissions from ships | | |
| | Reduce emissions of $CO_2$ by —% by 2025 | Capture $CO_2$ emissions at power plants, refineries, cement plants, steel mills, and other large stationary sources | | |

# IOC Manuals and Guides

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|---|---|
| 1 rev. 2 | Guide to IGOSS Data Archives and Exchange (BATHY and TESAC). 1993. 27 pp. (English, French, Spanish, Russian) |
| 2 | International Catalogue of Ocean Data Station. 1976. (Out of stock) |
| 3 rev. 3 | Guide to Operational Procedures for the Collection and Exchange of JCOMM Oceanographic Data. Third Revised Edition, 1999. 38 pp. (English, French, Spanish, Russian) |
| 4 | Guide to Oceanographic and Marine Meteorological Instruments and Observing Practices. 1975. 54 pp. (English) |
| 5 rev. 2 | Guide for Establishing a National Oceanographic Data Centre. Second Revised Edition, 2008. 27 pp. (English) (Electronic only) |
| 6 rev. | Wave Reporting Procedures for Tide Observers in the Tsunami Warning System. 1968. 30 pp. (English) |
| 7 | Guide to Operational Procedures for the IGOSS Pilot Project on Marine Pollution (Petroleum) Monitoring. 1976. 50 pp. (French, Spanish) |
| 8 | (Superseded by IOC Manuals and Guides No. 16) |
| 9 rev. | Manual on International Oceanographic Data Exchange. (Fifth Edition). 1991. 82 pp. (French, Spanish, Russian) |
| 9 Annex I | (Superseded by IOC Manuals and Guides No. 17) |
| 9 Annex II | Guide for Responsible National Oceanographic Data Centres. 1982. 29 pp. (English, French, Spanish, Russian) |
| 10 | (Superseded by IOC Manuals and Guides No. 16) |
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| 13 | Manual for Monitoring Oil and Dissolved/Dispersed Petroleum Hydrocarbons in Marine Waters and on Beaches. 1984. 35 pp. (English, French, Spanish, Russian) |
| 14 | Manual on Sea-Level Measurements and Interpretation. (English, French, Spanish, Russian) |
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| 16 | Marine Environmental Data Information Referral Catalogue. Third Edition. 1993. 157 pp. (Composite English/French/Spanish/Russian) |
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| 24 | Guide to Satellite Remote Sensing of the Marine Environment. 1992. 178 pp. (English) |

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| 32 | Oceanographic Survey Techniques and Living Resources Assessment Methods. 1996. 34 pp. (English) |
| 33 | Manual on Harmful Marine Microalgae. 1995. (English) [superseded by a sale publication in 2003, 92-3-103871-0. UNESCO Publishing] |
| 34 | Environmental Design and Analysis in Marine Environmental Sampling. 1996. 86 pp. (English) |
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| 42 | Des outils et des hommes pour une gestion intégrée des zones côtières - Guide méthodologique, vol.II/<br>Steps and Tools Towards Integrated Coastal Area Management – Methodological Guide, Vol. II. 2001. 64 pp. (French, English; Spanish) |
| 43 | Black Sea Data Management Guide (Under preparation) |
| 44 | Submarine Groundwater Discharge in Coastal Areas – Management implications, measurements and effects. 2004. 35 pp. (English) |
| 45 | A Reference Guide on the Use of Indicators for Integrated Coastal Management. 2003. 127 pp. (English). ICAM Dossier No. 1 |
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| 47 | TsunamiTeacher – An information and resource toolkit building capacity to respond to tsunamis and mitigate their effects. 2006.<br>DVD (English, Bahasa Indonesia, Bangladesh Bangla, French, Spanish, and Thai) |
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| 54 | Ocean Data Standards Series: |
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| 63 | The IHO-IOC General Bathymetric Chart of the Oceans (GEBCO) Cook Book. 2012. 221 pp. (English). Also IHO Publication B-11 |
| 64 | Ocean Data Publication Cookbook. 2013. 41 pp. (English) |
| 65 | Tsunami Preparedness Civil Protection: Good Practices Guide. 2013. 57 pp. (English) |
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