2 Definitions and analytical framework

Chapter 2 presents the framework used by the Group of Experts in its work. The first part of the chapter describes the analytical framework used in Chapters 3 and 4. The framework evaluates how assessments come to be considered *relevant, legitimate* and *credible,* which are the three conditions considered necessary for an assessment to have *influence.* This is followed by a broad definition of assessment and a summary of the diverse types of assessments that have been examined as categorized in this report. The remaining portion of the chapter defines terms that are used in specific ways in the report. The emphasis is on providing consistent terminology for different types of assessments and consistent use of geographical terms.

ASSESSMENTS CAN INFORM DECISION MAKING

Assessments are formal efforts to assemble selected knowledge with a view toward making it publicly available in a form intended to be useful for decision making.

(Mitchell and others 2006)

2.1   This definition of assessments is generic with few assumptions or prescriptions about what an assessment should contain. Such a broad understanding of assessments has been useful for the Group of Experts' review of existing assessment practices. Certain points warrant further remarks.

2.2   By "formal" the definition requires that the assessment should be sufficiently organised to identify components such as products, participants and issuing authority. "Selected knowledge" indicates that the content has a defined scope or purpose and that not all information compiled and contributed is necessarily included in the report. The sources of knowledge may vary. While results from research and scientific knowledge predominate, assessments can supplement this with local, traditional or indigenous knowledge. Further, assessments can evaluate both existing information and research conducted expressly for the purpose.

2.3   The definition also notes the importance of ensuring that assessments are in the public domain, as they may influence public debate and different types of decision-makers. Governments, intergovernmental organizations and other international bodies that develop policies and measures are probably the most common and relevant decision-makers in the context of the marine assessments discussed here. But assessments may also influence decision-making entities such as scientific organizations, environmental advocacy groups, business, industry, labour and even individual private households. Some assessments thus can have a cascading effect that goes far beyond the originally defined target audience.

2.4   Assessments are an important mechanism for strengthening the relationship between science and policy and a crucial way for science to inform decision making. They can establish the importance of an issue, provide an authoritative analysis of policy-relevant scientific questions, demonstrate the benefits and costs of different policy options, identify new research directions and provide technical solutions (NRC 2007). They can also establish agreed baselines from which to judge progress.

2.5   Different assessments share many important features irrespective of topic or discipline, making it possible to draw generalizations (Miller and others 1997; Farrell and others 2001). A basic feature is that they must be conceived both as a product and a process. The *product* includes both the expert reports and underlying data and information used in the analyses. There may be additional outputs like a summary for decision-makers, alternative future scenarios, products geared for different user communities or briefings for the public and the media. The *process* includes the institutional arrangements (composition, mandate, procedures) established to govern, guide and conduct the assessment and to ensure that the mandate and procedures are followed. The *product* of an assessment can have obvious value as an authoritative presentation of expert findings and interpretations. But it is the *process* that agrees on the modalities, methods and procedures that make the products influential. Moreover, the process can strengthen relationships and understanding among experts in different fields and with different types of knowledge, and between experts and decision-makers or other stakeholders. To really understand the

influence that an assessment might have, it is critical to understand the process that produced it. A particular concern is how closely or loosely it is linked to decision-making processes (Farrell and Jäger 2005, NRC 2007).

2.6   This distinction between *product* and *process* is carried through in the examination of existing assessments in Chapter 3 and Chapter 4, which focuses primarily on how the assessment *process* can be designed so that its *products* have influence.

WHAT MAKES AN ASSESSMENT INFLUENTIAL?
Influence is more than affecting policy and behaviour

2.7   In the literature on assessments, it has become common to use "influence" as the term for describing their impact.[1] *Influence* is often understood as the ability to affect decisions on policy or behavior. In order to do so, an assessment must help to shape the perceptions of those making decisions – their understanding, beliefs, interests and goals. This can lead to changes in the way the issue is perceived and addressed in the future. Further, it can affect the strategies of the parties involved and lead to institutional change. All these elements change over time in a complex interplay among different actors. Therefore, the full extent of influences from an assessment may not emerge for a considerable time (Mitchell and others 2006).

Figure 2.1: **A conceptual framework for considering the influence of assessments**

Ultimate determinants	Attributes	Outcome
External factors: Scientific context Societal context User characteristics **Design of assessment:** Process Product	**Revelance** **Credibility** **Legitimacy**	**Influence on:** Understanding Goals Decisions Behaviour

Source: Modified from Eckley 2001

1 The Group of experts therefore has used influence to convey the sense of *usefulness*, the term suggested by the Ad Hoc Steering Group. Both depend on an assessment's perceived credibility, relevance and legitimacy as discussed later in this chapter.

External factors can be important for the influence of an assessment

2.8   Several external factors can affect an assessment's influence (Figure 2.1). The scientific context of an issue to be assessed is important and is influenced by the available data and information, maturity of understanding and degree of consensus in relevant fields (NRC 2007). How society perceives an issue may influence its willingness to dedicate attention and resources to it. It will also determine the range of solutions that are perceived as available and acceptable. In addition, certain characteristics of the users of an assessment also play a role; they may not consider the issue a priority, they may have different capacities to understand assessment results or be more or less open to new ideas and advice (Eckley 2001).

2.9   These external factors can affect greatly the way an assessment is received; an assessment may be disregarded if it does not address what are perceived as important aspects of an issue, fails to take into account well-established knowledge or includes recommendations seen as unrealistic. For other assessments, the scientific and societal context may create a window of opportunity which enables them to advance the understanding of a field and lay the foundation for important decisions (Mitchell and others 2006). Over time, assessments may contribute to changing the way an issue is perceived, thus paving the way for later assessments to be more influential. This has been demonstrated for the series of IPCC assessments (Torrance 2006).

Criteria for assessing the influence of an assessment

2.10   When establishing and conducting an assessment, choices can be made about the design of the process and the nature of the products required (see para. 4.14). Such choices will determine to what degree an assessment is perceived as *relevant, legitimate* and *credible.* These three attributes have been identified as central to an assessment's influence (Farrell and Jäger 2005, Mitchell and others 2006, NRC 2007). They are the criteria used for identifying "best practices" in Chapter 4.

    a.   *Relevance* (also referred to as salience) denotes the ability of an assessment to address the particular concerns of those using it. An assessment is relevant if the user is aware of it and it informs his/her decisions or behaviour.

The relevance of the *product* is enhanced if its analytical approach and findings are closely related to the needs and timing of decision-making processes and if they provide a means to help decision-makers set priorities. Relevance can be further enhanced if the assessment evaluates alternative options for policies and actions. The assessment is relevant if its geographic and thematic coverage are tailored for the relevant decision-making authorities and for those undertaking or managing the activities covered in the assessment. Such relevance can be enhanced if the *process* identifies key target audiences in the planning stages (e.g., policy-makers, managers, the media and other stakeholders) and ensures effective consultation and communication with them throughout the assessment. Capacity building can also strengthen relevance by making the scientific community more sensitive to the needs and concerns of broader society, by enhancing the ability of decision-makers to act on scientific information and by creating a larger informed audience (NRC 2007).

b. *Legitimacy* is a measure of the acceptability or perceived fairness of an assessment. A legitimate assessment is one that has been conducted in a manner that allows users to be satisfied that their interests have been taken into account appropriately and that the process has been fair.
The legitimacy of the *product* is enhanced if final reports reflect contributions from interested parties and how their concerns and inputs were judged and used. It also depends on balance in considering the concerns of different groups. This can be ensured through a *process* that provides fairly and adequately for participation. It is the process which establishes the modalities for interested parties to contribute to the design of an assessment and to air their concerns throughout the process. Legitimacy is enhanced if there is clearly-articulated agreement on the responsibilities of those who participate and appropriate balance among the experts. Transparent procedures, widespread availability of assessment products and efforts to strengthen the capacity of all interested groups to contribute, also enhance legitimacy.

c. *Credibility* is concerned with whether the knowledge assembled in the assessment is believed to be valid. An assessment gains credibility and authority by virtue of its information, methods and procedures. In cases where science has no clear answer or where

competing explanations exist, the credibility of the assessment depends on agreed and transparent procedures for dealing with uncertainty and disagreement and how this is reported.

The credibility of *products* is enhanced by the use of high quality data and established methods and models, available to the wider expert community, and treatment of all contributions without bias. The *process* enhances credibility through appropriate and transparent procedures for dealing with selection of experts, inclusion of the necessary range of expertise and interpretational perspectives, formal procedures for quality assurance, peer review and the treatment of dissenting views and uncertainty. The expert community also judges credibility according to whether issues of particular significance from a scientific perspective have been included, and whether data and information are available to them so that they can verify assessment findings and conclusions. Credibility can further be enhanced if the assessment is conducted under the auspices of, or endorsed by, a reputable institution. Capacity building plays an important role in improving quality, and thus credibility, over time.

2.11   Assessment design features that may enhance one of these attributes may diminish another. Policy-makers could for instance question the relevance of an assessment if the scientists choose to address issues that are of high scientific interest but are difficult to link to current or emerging priorities on the political agenda. For example, efforts to enhance legitimacy by including more participants in an assessment process may reduce its credibility if the participants have limited knowledge of the issues. This illustrates that there are trade-offs to be made in the design of an assessment. Ignoring any of these attributes altogether has been shown to result in assessments that have no influence. Balance is needed among relevance, credibility and legitimacy and all three must be achieved to some extent (Farrell and Jäger 2005).

## ASSESSMENTS CAN BE CATEGORIZED ACCORDING TO THEIR PURPOSES

2.12   Much assessment terminology has been developed with a focus on the natural environment. However, the UN General Assembly has stated that the scope of a Regular Process should be the state

of the marine environment, *including socio-economic aspects.*[2] This means that both sides of the human – nature relationship should be considered; whereas human activities cause changes in the marine environment, human well-being and livelihoods are also positively and negatively affected by changes in the same environment. Moreover, human activities that directly impact the marine environment may be driven by indirect socio-economic and technological forces (see Drivers and Impacts, Box 2.1).

2.13   There are a variety of different ways that have been used to categorize assessments. Even though the categories may refer to discrete types, in reality most assessments are hybrids to some degree. The Group of Experts has used a categorization based on the main mandate and goals of the assessment (NRC 2007):

2.14   *Status and trend (or process) assessments* typically describe the present and changing status of ecosystems. Narrow status and trend assessments focus on a particular ecosystem component (for example, an oceanographic feature, a species or a habitat), whereas broader assessments may cover the whole ecosystem or major portions of it. A focus on socio-economic factors, however, can mean that this category may also encompass status and trend assessments of specific human uses of the oceans (for example, fishing or shipping), human benefits from the oceans (for example, food security) or socio-economic conditions in coastal societies (for example, employment in a fishery or the effects of contaminants on subsistence users).

2.15   *Impact assessments* identify and characterize the impacts of human activities and/or natural pressures on ecosystems and society (Figure 2.2). The range of activities and impacts studied can be narrow or broad. Impact assessments are frequently used to prepare for decisions on certain proposed developments by anticipating their potential impacts but may also be conducted after the development has been approved and realized to measure the consequences. A single assessment may evaluate only direct impacts on an ecosystem or parts of an ecosystem or it may further characterize the effects of ecosystem changes on communities or valued natural resources and economic sectors. Alternatively, these further impacts may be explored in additional, separate assessments.

2 Resolutions 57/141, 58/240, 59/24 and 60/30. See also chapter 1.

Figure 2.2: **Many marine impact assessments explore the relationship between human activities and the environment**

The starting point for the analysis can either be "downstream" from human activities to their impacts on ecosystem components, or "upstream" from ecosystem components to the pressures affecting them. A narrow impact assessment may focus on a single human activity like fishing, or pressures on a single species like an endangered seabird. A broad impact assessment considers all human and natural pressures on all components of the ecosystem – and how ecosystem changes in turn affect society.
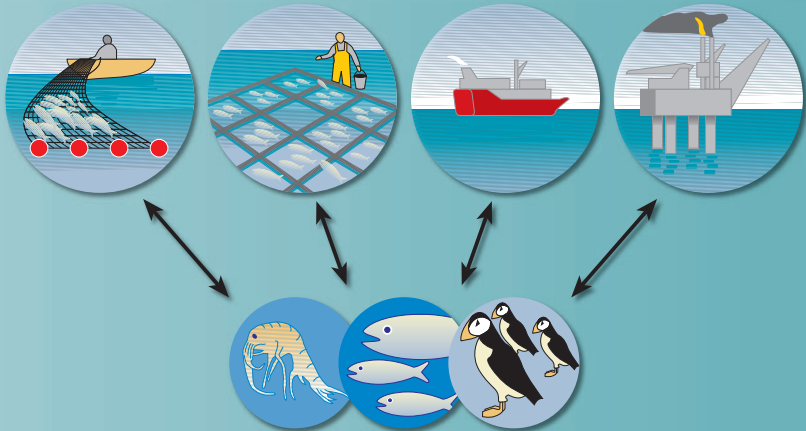
Source: Adapted from figure produced by the Norwegian Ministry of the Environment

2.16   *Response assessments* identify and evaluate measures that reduce human contributions or vulnerabilities to environmental changes. They can focus on potential future response options and evaluate their risks and likely outcomes, or they may evaluate the effectiveness of policies and measures already adopted.

2.17   In this report, the terms "sectoral assessments" and "thematic assessments" are used frequently according to the following:

2.18   *Sectoral assessments* address a particular sector of human activity such as fishing, tourism or oil and gas development. Industries and sectoral organizations and management authorities, such as regional fisheries management organizations or a ministry of energy responsible for the oil industry, need to undertake assessments based on their responsibilities and define the scope of the assessment accordingly. This may cover the status of the industry in socio-

economic terms, the status of a marine resource used by the industry sector, the impacts of the sector on the marine environment, sectoral response assessments and/or some combination of these. The common factor is that the particular human activity of concern delineates the scope of the assessment.

2.19   *Thematic assessments* focus on a theme or issue other than a single sector of human activity. They may cover one or more ecosystem component like sea turtles or coral reefs, or they may focus on a theme such as land-based sources of marine pollution or marine debris. In each case, it may be possible to undertake a status and trends, impact and/or response assessment. If the issue were coral reefs, for example, their current status and trends could be evaluated in one assessment. Separate thematic assessments can explore how different factors like fishing, tourism and increased ocean temperatures affect coral reefs, both today and under anticipated future conditions; they might also assess how these changes may affect communities and economic sectors like fishing. The most efficient measures to protect corals may be evaluated in a response assessment. On the other hand, all these issues could also be brought together in one assessment. Thematic assessments could also address issues like food security in novel ways. The common factor in thematic assessments, however, is the ecosystem feature(s) or general pressure used to delineate the scope of the assessment, not a particular industrial sector.

2.20   The relationship between different types of assessments can be illustrated by the widely-used Drivers – Pressures – State – Impacts – Responses (DPSIR) framework (see Box 2.1 and Figure 2.3). Each type may be used to examine one or more aspects of the interactions between society and nature. Placing an assessment within this framework will convey an understanding of which aspects and connections are covered – and whether other types of assessments may be necessary to supplement it.

INTEGRATED ASSESSMENTS

2.21   No part of marine ecosystems and no human activities related to them are isolated from other ecosystem components and activities. Consequently, assessments that take account of interactions and cumulative effects across all pressures and
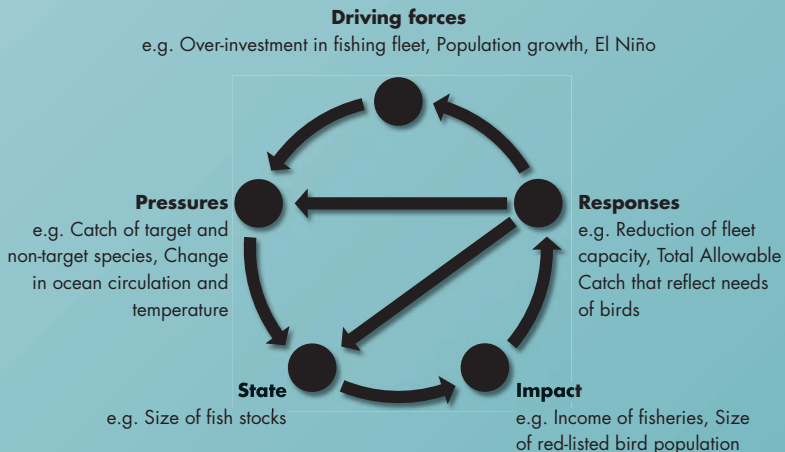
Box 2.1: **The DPSIR framework**

Driving forces
e.g. Over-investment in fishing fleet, Population growth, El Niño

Pressures
e.g. Catch of target and
non-target species, Change
in ocean circulation and
temperature

Responses
e.g. Reduction of fleet
capacity, Total Allowable
Catch that reflect needs
of birds

State
e.g. Size of fish stocks

Impact
e.g. Income of fisheries, Size
of red-listed bird population

Figure 2.3: **The Driving Forces, Pressures, State, Impacts, Responses framework.**

Driving forces – **P**ressures – **S**tate – **I**mpacts – **R**esponses (DPSIR) is a framework for organizing information about the state of the environment. It reflects the complex chain of cause-and-effect in the interactions between society and the environment. *Driving forces* refer to economic, technological and social factors that shape human activities exerting pressures on the environment. The *pressures* are the specific ways that *human activities* lead to changes in the *state* of the environment and *impacts* on valued parts of ecosystems or on society. Natural factors (e.g., variation or trend in temperature, salinity or ocean currents) can also be considered as drivers or pressures depending on the nature of the assessment and the nature of the natural factor. Impacts may trigger *responses* from regulating authorities or the private sector. An analysis along this cause-effect chain can help to identify priorities and find the most efficient response measures, which in principle can be directed towards any parts of the chain from modifying the drivers to adapting to impacts (see figure above) (Stanners and others 2007). The model, sometimes simplified only to the PSR steps, offers a flexible framework and terminology which is commonly used in state of the environment reporting and assessment. Other related frameworks have differentiated or elaborated parts of the DPSIR framework such as the Millennium Ecosystem Assessment using direct and indirect drivers (MA 2005).

ecosystem components are needed to fully inform policy development and management. But assessments to support policy are not complete if they do not examine fully the human-environment interaction; that is, how environmental changes affect human well-being and the broader social and economic forces that

often underlie human activities causing environmental degradation. Such assessments require assessment teams with strong participation by both natural and social science experts and holders of relevant traditional and experiential knowledge.

2.22   The Group of Experts has used the term "integration" to mean assessments that integrate:
- ❑ Across environmental, economic and social aspects
- ❑ Across sectors
- ❑ Across ecosystem components

Assessments that integrate across all three aspects are referred to in this report as *fully integrated assessments*. Those that integrate well across at least one dimension are commonly referred to as integrated assessments by those performing or receiving them. However, when reference is made in this report to such partially integrated assessments, the text always specifies the dimension over which the integration occurs to highlight that the assessment is not *fully* integrated.

2.23   Policy making often requires that assessments be integrated across geographical scales (for example from sub-regional to regional to global level). However, as geographic scale increases information gaps and uncertainties about interactions also tend to increase, making integration more difficult. Hence, on large geographic scales integration may be only partially achieved, if at all. In this report, we use the terms "scale up" or "scale down" to refer to linkages across scales and regions rather than "integration".

2.24   The Group of Experts stresses that there is no *ideal* assessment – any type, combination or integration of assessments is legitimate if it meets the needs for which it was undertaken. However, for the goals identified in the request from the UN General Assembly to be met (see Box 2.2), *fully integrated assessments* will be necessary.

THE ECOSYSTEM APPROACH TO OCEAN MANAGEMENT

2.25   The move towards an ecosystem approach to ocean management is a major reason why integrated assessments are becoming more necessary. This approach has been endorsed as a cornerstone for policy and management in a range of international agreements and organizations. At the World Summit on Sustainable Development in

> ## Box 2.2: **The ecosystem approach to ocean management**
>
> While the concept of an ecosystem approach to ocean management has gained wide recognition, it has no generally agreed definition. The UN General Assembly has drawn attention to agreed consensual elements, including that "ecosystem approaches to ocean management should be focused on managing human activities in order to maintain, and where needed, restore ecosystem health to sustain goods and environmental services, provide social and economic benefits for food security, sustain livelihoods in support of international development goals …, and conserve marine biodiversity". It has also noted the need to set priorities for management interventions aimed at conserving ecosystem integrity. (UNGA resolution 61/222, UNGA 2006).
>
> Several organizations have developed their own definitions. The Group of Experts has found the following consensual definition from the scientific community particularly useful:
>
> "Ecosystem-based management is an integrated approach to management that considers the entire ecosystem, including humans. The goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need. Ecosystem-based management differs from current approaches that usually focus on a single species, sector, activity or concern; it considers the cumulative impacts of different sectors." (McLeod and others 2005)

Johannesburg, governments encouraged the application by 2010 of the ecosystem approach as a tool to ensure the sustainable development of the oceans (UN 2002). The UN General Assembly in 2006 invited states to consider the agreed consensual elements of an ecosystem approach developed at the seventh meeting of the Informal Consultative Process on Oceans and the Law of the Sea (see Box 2.2).

2.26   This motivation for achieving fully integrated assessments stems from the growing range and intensity of ocean uses and their interactive and cumulative effects. As noted in the UN report (UNGA 2006), an ecosystem approach may be applied within a single sector such as fisheries. But while sectoral ecosystem approaches need to be applied rigorously, this is not sufficient for maintaining and restoring ecosystem health where other human activities have an impact on the system. A more integrated approach to managing human activities across sectors is necessary.

2.27   For the purposes of the Regular Process, and in order to implement ecosystem approaches to ocean management, the Group of Experts stresses the importance of progressing towards fully integrated assessments, especially at the regional level.

Chapter 5 discusses how this might be achieved. One of the major benefits of integrated assessments is that they can improve understanding of the relative significance of impacts on the marine environment from different (human) activities. This can be used to develop broad, cross-sectoral management strategies setting priorities for action in order to maintain ecosystem integrity. Within such a framework, however, there will continue to be a need for more specific assessments to underpin the strategies and measures of different sectoral authorities. In this sense there is no "either-or" choice between fully integrated and narrower assessments – both should be used, as each will inform and complement the other.

THE AoA REGIONS

2.28   The UN General Assembly has emphasized that the Regular Process should build on existing regional assessments. There is, however, no commonly agreed regional division of the world's oceans; several divisions exist for different purposes, often not covering the whole ocean area. The Group of Experts therefore agreed on a list of 21 regions solely for the purpose of reviewing assessments at the regional level (see Annex I and the map on page 16). The AoA regions are a practical compromise among the many regionalization systems that have been proposed, and are based on both bio-geographic factors and existing assessment mechanisms. They are delineated to avoid unnecessary overlaps while ensuring global coverage, including high seas areas. No precise boundaries are established between them.

2.29   The AoA regions take into account:
a. Existing regional mechanisms (e.g., Regional Seas organizations, regional fisheries bodies, Food and Agriculture Organization (FAO) statistical areas, Large Marine Ecosystem (LME) programmes) that have permanent, government-recognised structures;

b. Ecologically sensible delineations conducive to an ecosystem approach, for example an LME or groupings of linked LMEs, and the work on marine eco-regions of the world (Spalding and others 2008) and Global Open Ocean and Deep Sea bio-regionalization (UNESCO 2009);

c. Ready accommodation of past or existing monitoring and assessment programmes;

d. An administratively manageable number of regional units;

e. The need to ensure coverage of areas within and beyond national jurisdiction, including all ocean basins; and

f. The exclusion of three land-locked bodies of water: the Aral Sea, the Dead Sea and the Caspian.

ASSESSMENT TERMINOLOGY

2.30   Definitions and explanations for many of the terms and concepts described above and used in subsequent parts of the report are provided in the 'Use of Terms' section (see page 20). This will inform readers how terminology is used in *this* report. Communications among disciplines, fields and regions would undoubtedly improve if consistent assessment terminology were used. The Regular Process could play a constructive role in promoting such convergence.

GEOGRAPHICAL TERMINOLOGY

2.31   Geographic levels referred to in the report have the following meanings:

❑ **Global:** All the world's oceans;

❑ **Regional:** Any existing regional division, including AoA regions as defined above;

❑ **Supra-regional:** Any geographical unit extending beyond a region but not global;

❑ **Sub-regional:** Sub-division of a regional unit into smaller units. An example is a large marine ecosystem comprising part of an AoA region;

❑ **National:** Ocean areas under coastal states' jurisdiction;

❑ **Sub-national:** Any sub-division of areas within national jurisdiction.

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