ADAPTIVE MANAGEMENT

The MSFD uses the ecosystem approach and adaptive management where humans are regarded as a key system component.

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WHAT

How to adapt to change

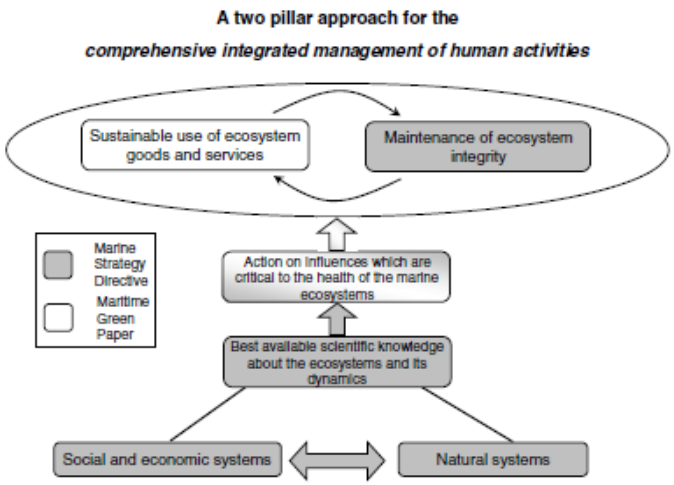
The European Marine Strategy Directive is an opportunity for a comprehensive policy for protecting, improving and sustainably using Europe's environmentally degraded seas.

Management task

Better appreciation of management and governance approaches that support different options for sustainable capture of benefits, within the multilevel policy/ legal framework of the EU

The Marine Strategy Framework Directive advocates the ecosystem approach to manage human activities that have an impact on the marine environment to achieve good environmental status by 2020.

The ecosystem system approach supports a ''two pillar'' approach to EU marine and maritime policy: policy designed to maximise the economic benefits from the sensible use of the marine environment whilst conserving the flow of economic goods and services from marine ecosystems whilst maintaining their resilience and biodiversity. The ecosystem approach accepts that humans and their natural environment form coupled social and ecological systems. At the core of this approach is the growing recognition that there is a need to find ways to ensure human welfare and wellbeing without unsustainably appropriating the earth's natural capital and destroying biological diversity. This approach also includes the principle of adaptive management.



Definition of the ecosystem approach mapped onto ''two pillar'' approach to marine and maritime policy.

Adoption of the 'ecosystem approach' offers an opportunity to develop more integrated policies, however, policymakers often express concern regarding how this approach should be delivered.

ADAPTIVE MANAGEMENT

Scientific uncertainties are often barriers to management decisions. Adaptive management works towards understandable ecological quality objectives in steps within political timeframes.

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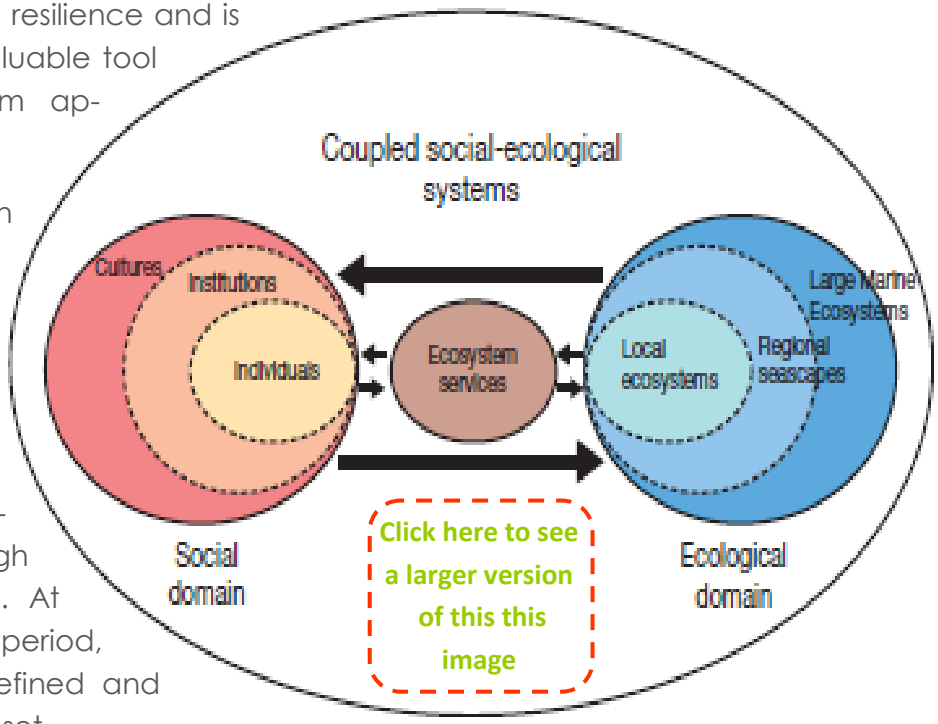
ADM

Making decisions in the face of uncertainty

Adaptive management (AM) is a structured, iterative process of robust decision making in the face of uncertainty, which aims to reduce uncertainty over time via system monitoring.

Adaptive management offers a practical means of integrating knowledge over social and economic as well as ecological scales. It can accommodate unexpected events by encouraging approaches that build system resilience and is becoming accepted as a valuable tool for delivering the ecosystem approach.

Past management has been (and in many places continues to be) predominantly reactive in nature. Adaptive management encourages managers to adopt the most favourable pathway for a limited period; closely observing the outcome through carefully focused monitoring. At the end of this initial learning period, the model can be further refined and new management objectives set.



Described as 'learning by doing', adaptive management employs the best available multi-disciplinary knowledge to construct a dynamic conceptual model to examine scenarios for how a system might behave under different management regimes.

ADAPTIVE MANAGEMENT

Marine area governance is fragmented across countries and sectors. Adaptive management allows flexibility in policy-making and implementation. Long-term, inflexible decisions can be inadequate or even destructive.

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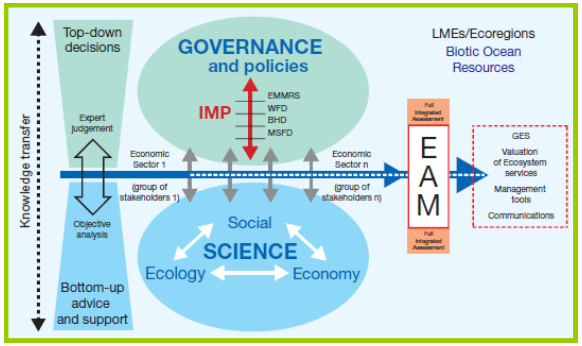
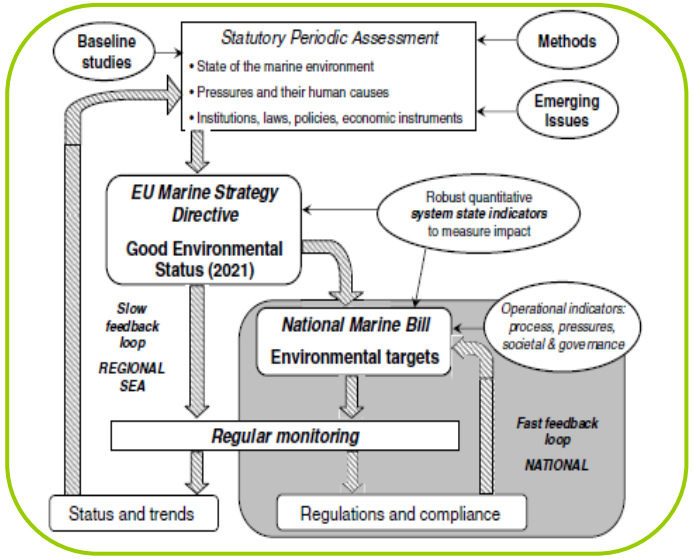
ADM

It's complicated

Adaptive management implements an ecosystem approach to address the complexity between socio-economic pressures and resulting state changes of the environment.

Adaptive management should be seen as a long-term process that builds on its results as it progresses. This 'learning-by-doing' serves as an important source of information to gain knowledge of how best to monitor the results of management and evaluate whether established goals are being attained.





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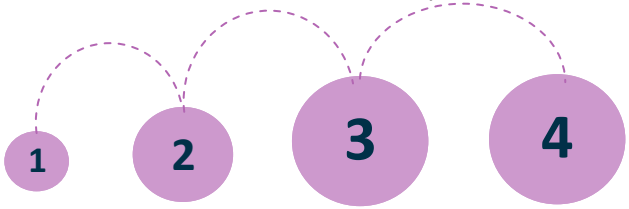
The process for applying adaptive management to marine systems that adheres to the approach outlined in the MSFD is illustrated here. The following pages outline a technical framework to implement Adaptive Management, broken down into 4 components,

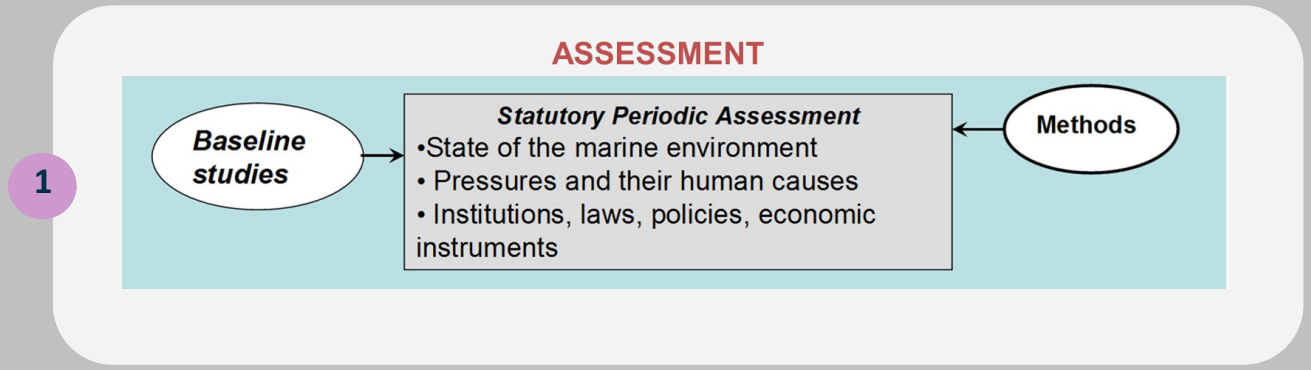


Applying Adaptive Management to the Ecosystem Approach gives equal attention to understanding natural, social system, and governance systems to achieve the management goal of the MSFD; to realise Good Environmental Status (GES) by 2020.

An adaptive management framework

Component 1: Initial Assessment

Research is conducted on causality using the Drivers – Pressures – State changes – Welfare (socio-economic) Impacts – Responses model (DPSWR, modified to consider institutional barriers to policy response to address Drivers, Pressures and Impacts.



The purpose of the initial assessment is to:

- Gather relevant information;
- Convert available data into objective information in order to define the nature and impact of the environmental problem and to establish priorities for further action;
- Add value to historical data through new interpretations;
- Make complex information available to a wide range of stakeholders in an understandable form.

Application of the DPSWR model helps to define scenarios upon which to plan management decisions. It is often convenient to conduct the analysis by building causal chains by successively answering the question "what is the cause?" starting from the state change itself and working backwards to the socio-economic drivers (or 'root causes'). An analysis of governance (including laws, institutions, finance, and public participation) provides information on the barriers that must be overcome in order to develop effective policy responses.

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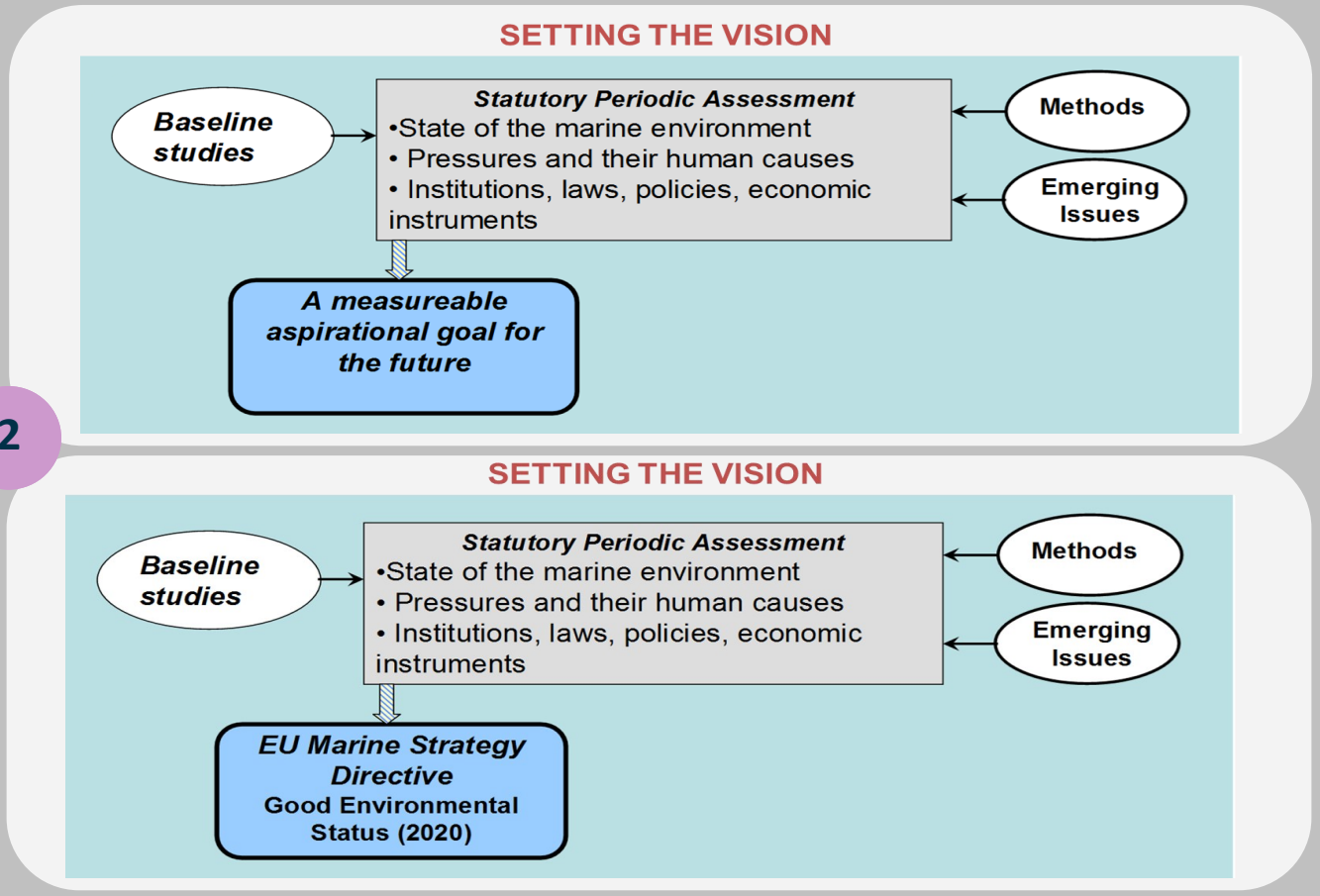
An adaptive management framework

Component 2: The definition of Ecological Quality Objectives and state change indicators.

Ecological Quality Objectives can be regarded as a statement of 'vision' of how the stakeholders would like to see the state of the system in the future.



The Ecological Quality Objectives (EcoQOs) are based on human values and as functional participants in the ecosystem; we cannot be outside observers. As information, knowledge and wisdom grow, the EcoQOs themselves will tend to change and the adaptive management model has to be flexible enough to allow this to happen.

Ecological Quality Objectives should be measurable environmental status goals that are clearly understandable by a wide range of stakeholders. They should be discussed with the stakeholders and where possible, developed with their full participation. They should also reflect key attributes of the system that can be quantified and they are often (but not always) set against a baseline clearly established in the initial assessment.

Ecological Quality Objectives provide the long-term goal for adaptive management.

An adaptive management framework

Component 3: Operational objectives and their indicators.

Operational objectives are used to define the pragmatic steps towards achieving agreed Ecological Quality Objectives.

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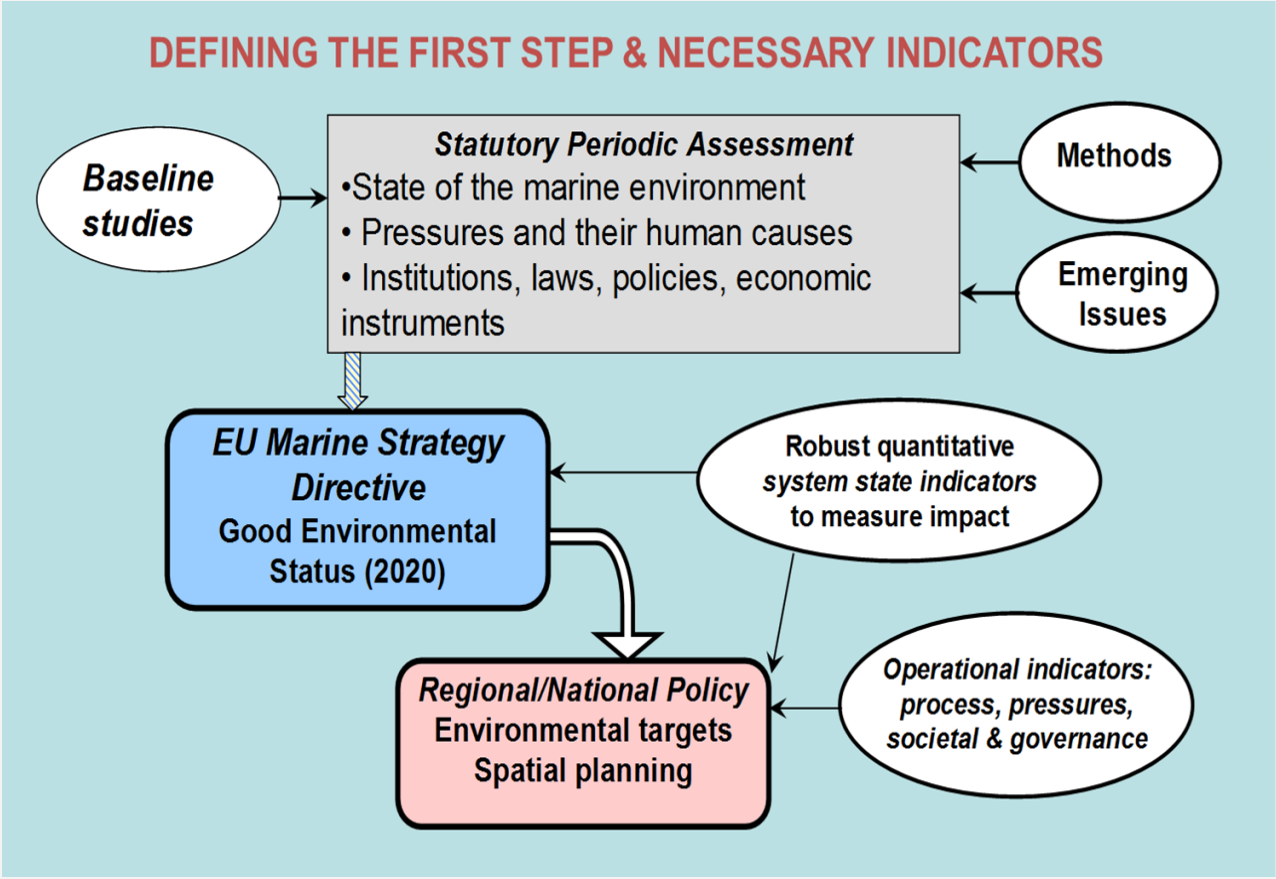

Operational objectives are best devised through a step-wise process starting with a facilitated 'brainstorming' activity between stakeholders to examine all practical options for achieving EcoQOs. The most promising options are submitted to feasibility studies. The options should not be limited to 'technical quick-fixes' but should include measures to address problems as close as possible to their social and economic root causes. Actions nearer the root causes are more likely to be lead to sustainable change but are often less politically palatable.

However, the indicators will often refer to the reduction of pressures (or in some cases socio-economic drivers) in the DPSWR scheme. They may also include project performance indicators.

Improved inter-sectoral cooperation, capacity building, environmental education and more effective compliance with existing regulations, may prove to be more effective than "end-of-pipe" engineering in many circumstances.

An adaptive management framework

Component 4: Monitoring schemes and feed-back mechanisms

A monitoring scheme should be clearly focussed on relevant system indicators. Those related to the EcoQOs constitute the basis of 'status and trends' reports that inform periodic assessments.

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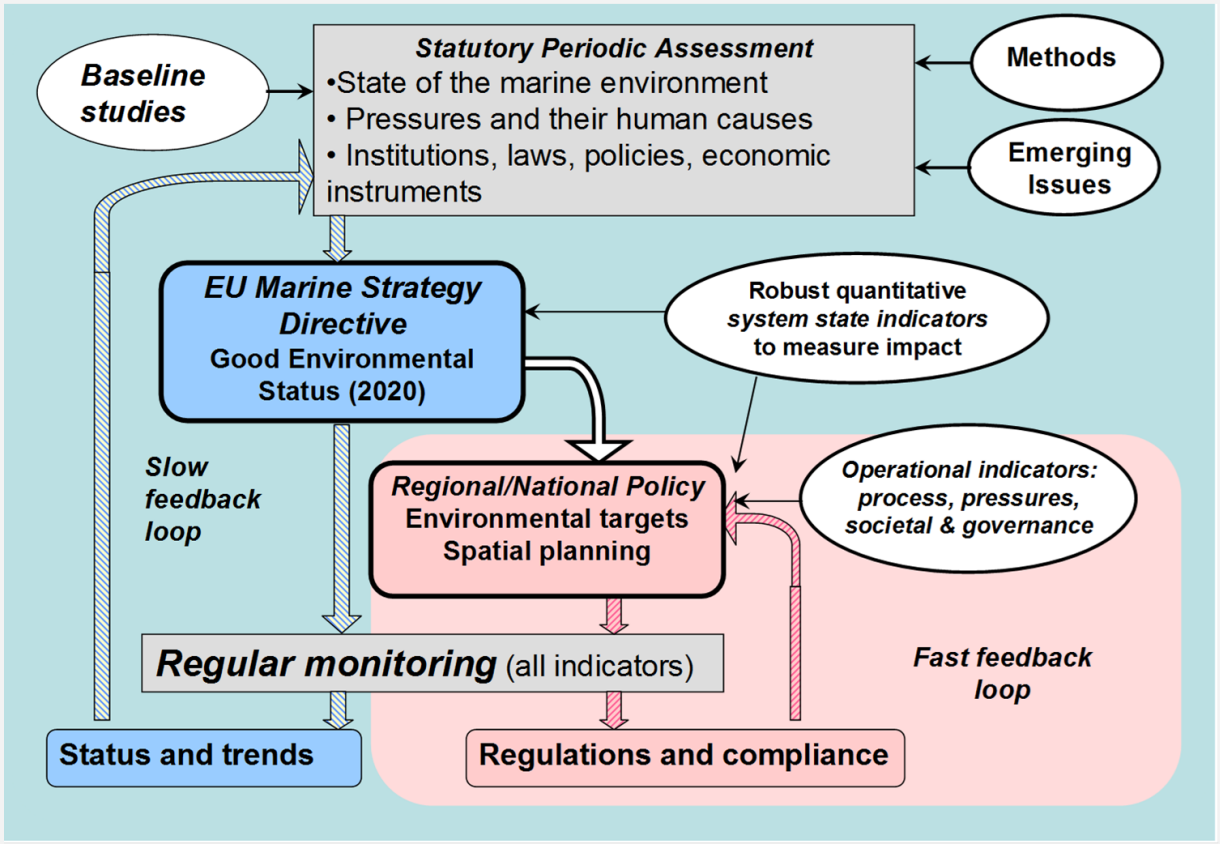
COMPLIANCE AND FEEDBACK & PROGRESS TOWARDS THE VISION



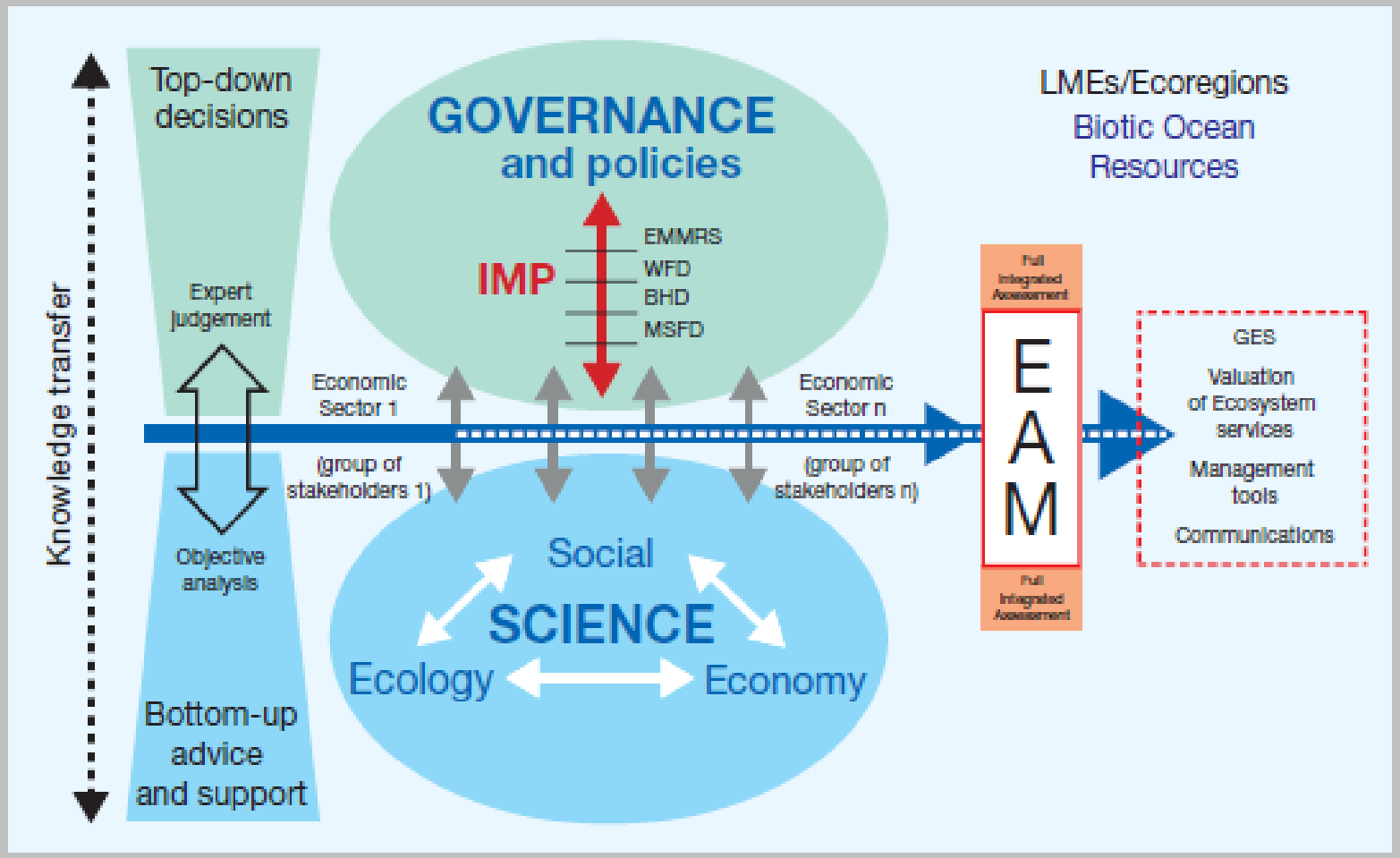
The indicators for compliance with operational objectives are also monitored on a regular basis. However, the frequency of measurement should be much higher as rapid change would be anticipated. Indeed, part of the political pragmatism used when setting operational objectives is to ensure that they can be achieved within a project cycle of 3-5 years.

This scheme for adaptive management leads to a rapid feedback loop and new objectives can be set within the normal term of office of a public official (enabling greater 'ownership' of the process).

Click on arrow below to go back to all guidelines

Schematic representation of the implementation of an Ecosystem Approach to Management of Biotic Ocean Resources in European Large Marine Ecosystems/Ecoregions.

The Ecosystem Approach to Management (EAM) considers the entire ecosystem, including humans, in an integrated manner. Its goal is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need. EAM essentially requires the high-level integration of governance in the form of expert judgement (referred here by the Integrated Maritime policy – IMP) and with science in the form of objective science and knowledge (e.g. towards the 'real' integration between the social, ecological and economic sciences).



BHD: Birds and Habitats Directive

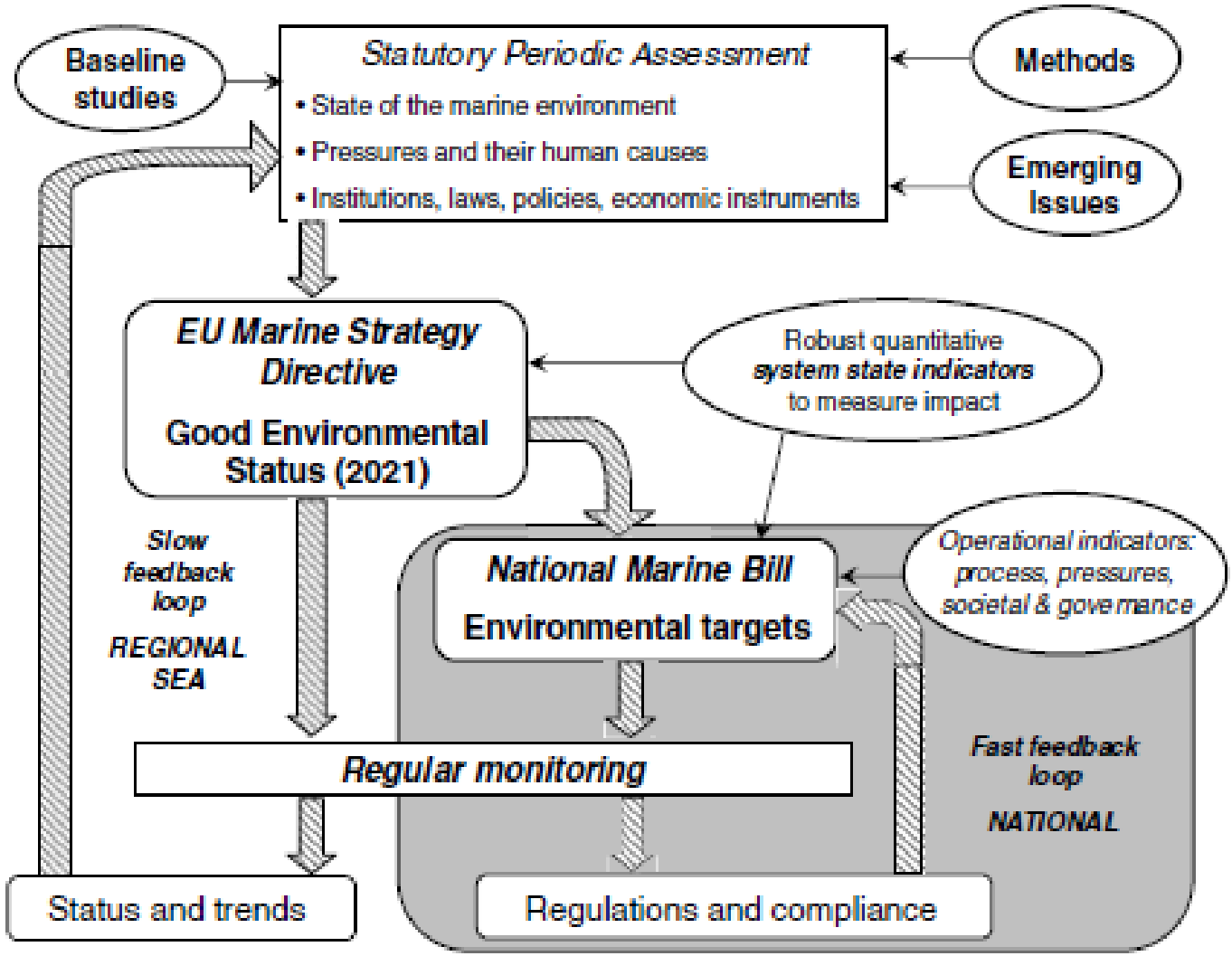
GES: Good Environmental Status

WFD: Water Framework Directive

EMMRS: European Marine and Maritime Research Strategy

MSFD: Marine Strategy Framework Directive

The process for applying adaptive management to marine systems that adheres to the approach outlined in the MSFD



Dynamic human and ecological systems are referred to as "coupled social-ecological systems". Interactions between the social and ecological domains occur over multiple geographic and organizational scales, and understanding connections across scales is critical to the long term success of Ecosystem Approach to Management efforts. While some domains may be relatively smaller in scale, such as individuals and institutions, they are not necessary all nested. For example, cultures occur at geographical scales that are parallel to or larger than institutions. Ecosystem services represent a key connection between the domains, and the flow of services is affected by both social and ecological factors.