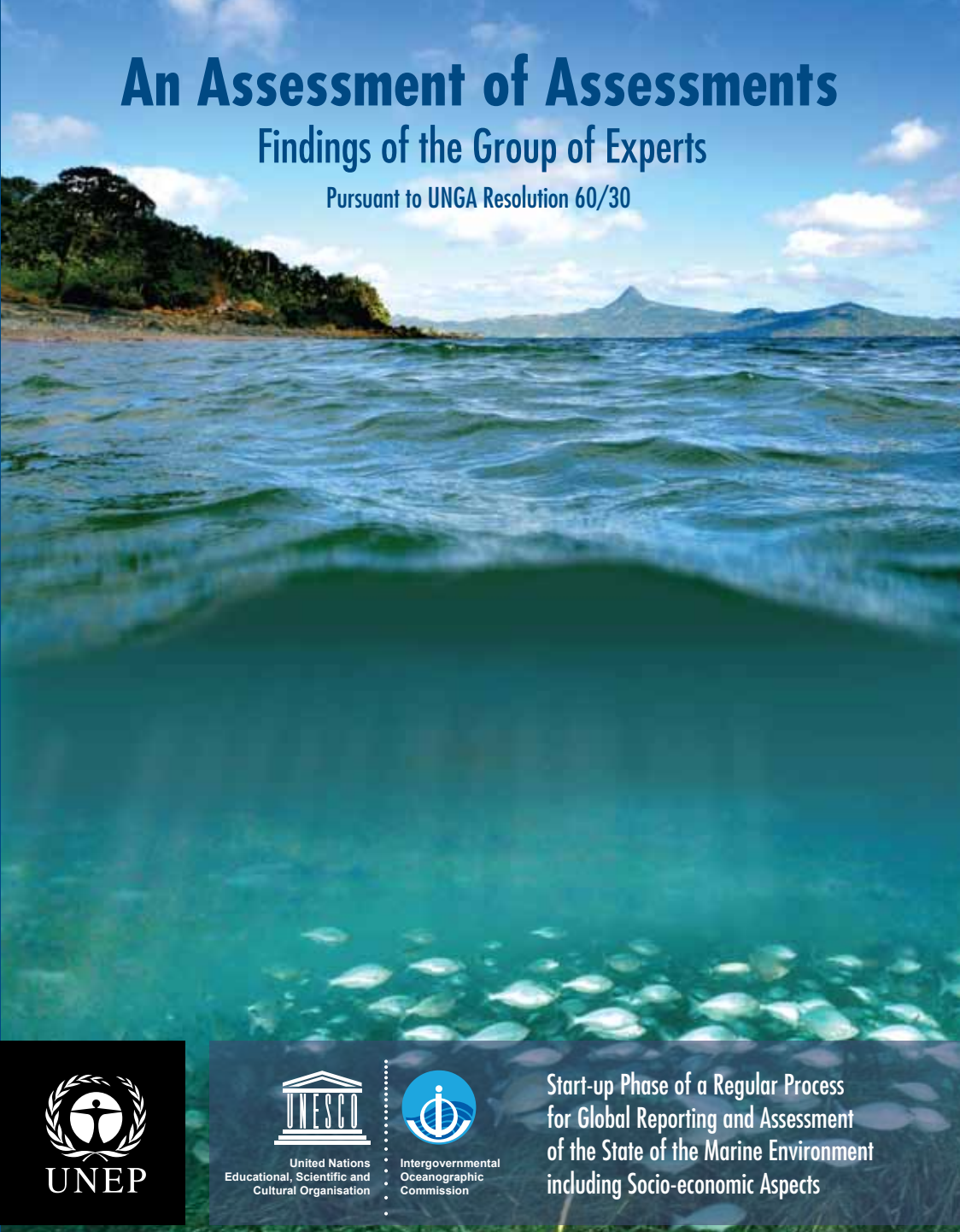
An Assessment of Assessments

Findings of the Group of Experts

Pursuant to UNGA Resolution 60/30



UNEP

United Nations Educational, Scientific and Cultural Organisation

Intergovernmental Oceanographic Commission

Start-up Phase of a Regular Process for Global Reporting and Assessment of the State of the Marine Environment including Socio-economic Aspects

Regional and Supra-regional Summaries and Technical Annexes

An Assessment of Assessments

Regional and Supra-regional Summaries and
Technical Annexes

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Regional and Supra-regional Summaries and Technical Annexes

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In memory of our friend and colleague Umit Ünlüata.

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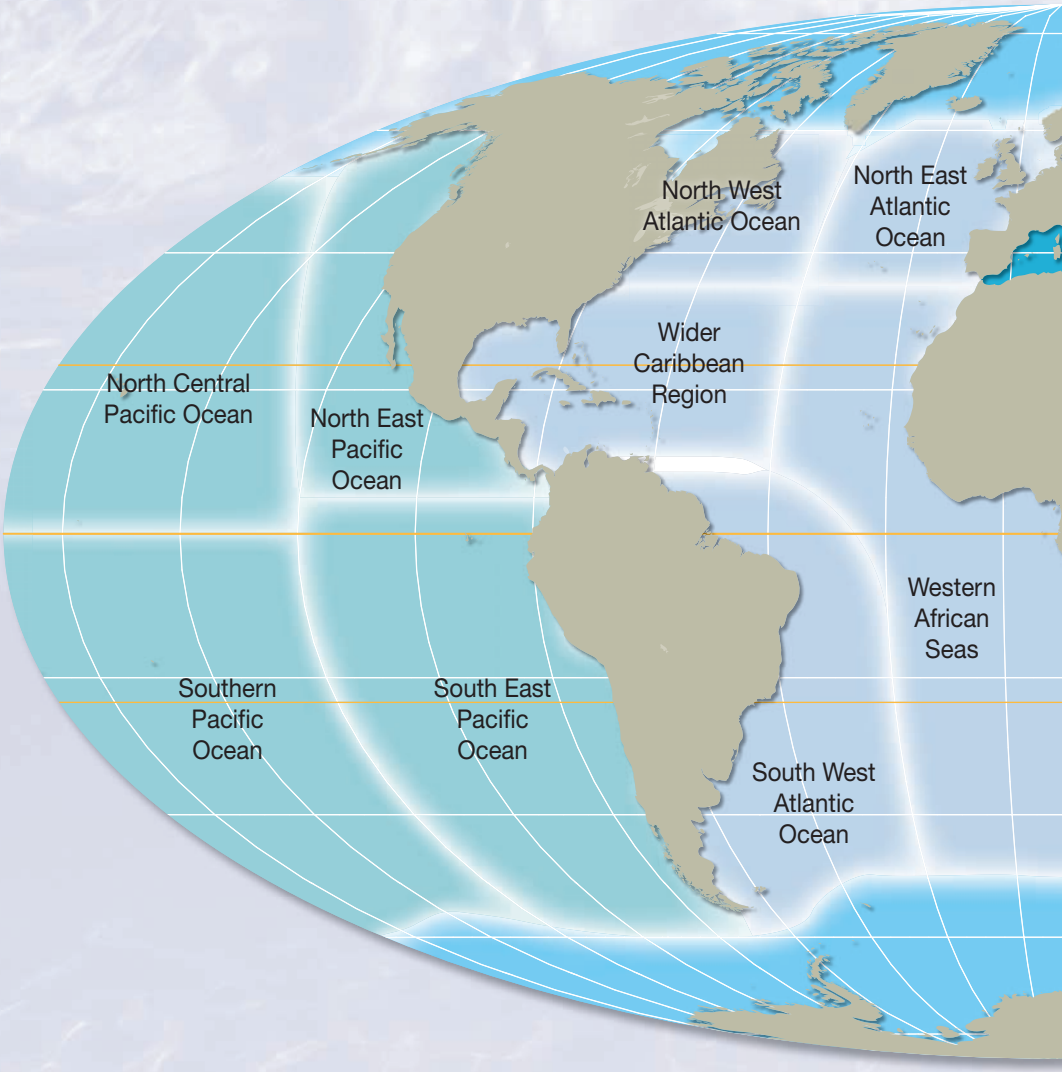
AoA Regions



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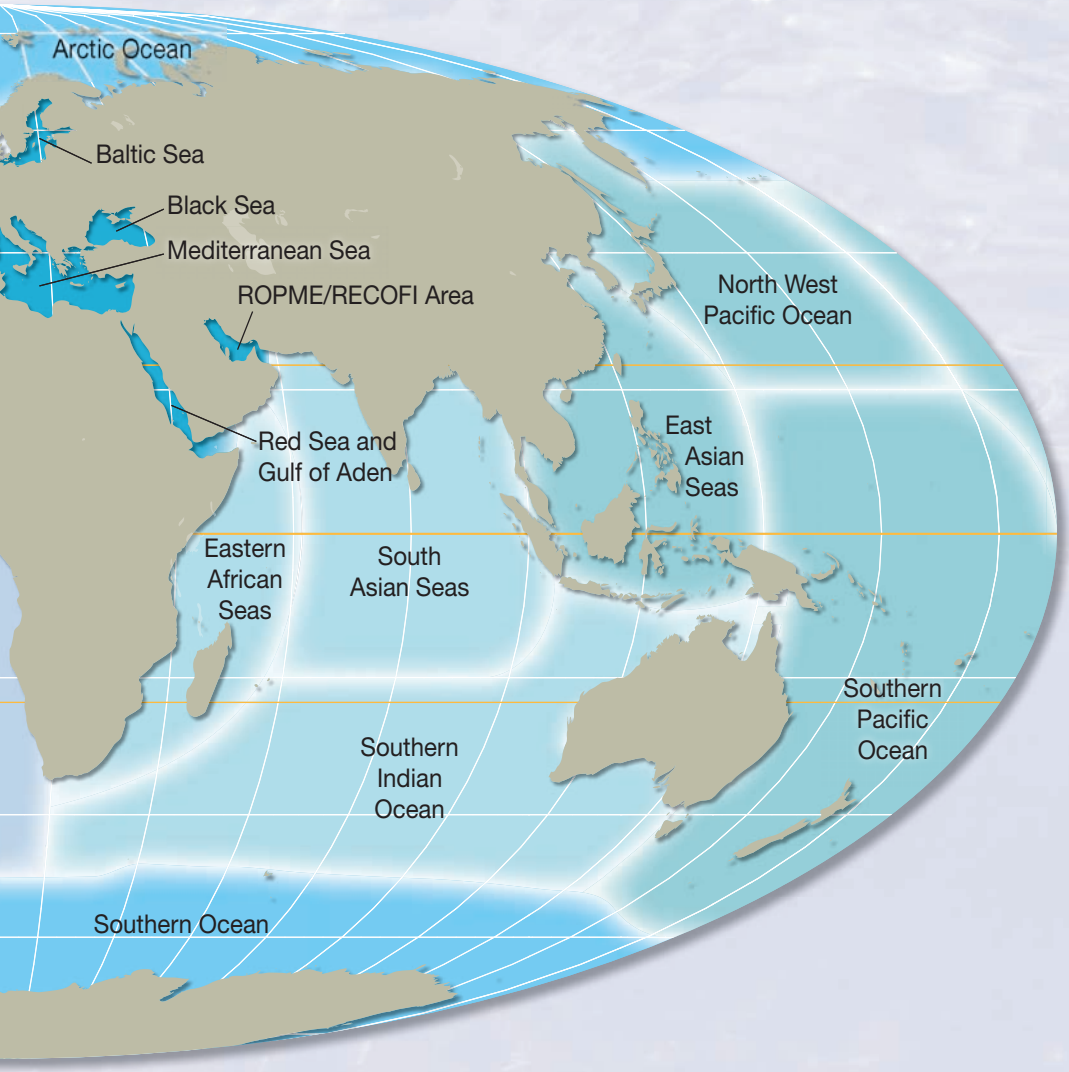

Foreword

Oceans and seas cover over 70 per cent of the Earth's surface, yet despite their central role in the economic, environmental and social affairs of six billion people, significant gaps exist in our understanding and management of the complex processes and trends at work including on the high seas.

There are several factors behind this. These range from a failure to integrate the numerous current assessments into a meaningful whole and a fragmented institutional landscape to a lack of capacity in some regions.

In 2002 governments at the World Summit on Sustainable Development (WSSD) moved to address the issue by deciding to keep the oceans under permanent review.

The "Assessment of Assessments" (AoA) is a start-up phase towards a Regular Process for global reporting and assessment of the state of the marine environment that takes the WSSD decision forward. It was initiated in response to a UN General Assembly Resolution in 2005.

The AoA represents the most comprehensive initiative undertaken to date by the UN system to better coordinate ocean governance. Its central recommendation calls for a mechanism that builds on existing global, regional and national institutions and processes while integrating all available information, including socio-economic data, on how our seas and oceans are actually being used.

Carried out through a regular process, this could play a major role in helping decision-makers find and apply sound and sustainable solutions to the challenges being faced.

The realization of the report has been a model of the UN 'Delivering as One'. Led by the United Nations Environment Programme and UNESCO's Intergovernmental Oceanographic Commission, it has included agencies such as the International Maritime Organization, the World Meteorological Organization and the Food and Agriculture Organization.

Meanwhile, hundreds of scientists, experts and government representatives have participated not least in the peer-review of this report. The report is being presented to the *Ad Hoc Working Group of the Whole*, convened to recommend to the 64th session of the UN General Assembly a course of action on the Regular Process.

A positive endorsement will make good on the WSSD commitment. Crucially it will also pave the way to a first global integrated ocean assessment by 2014. It cannot come a moment too soon. Dramatic and profound changes are sweeping across the world's oceans and seas and their economically-vital ecosystems.

The clearing of mangroves and coastal wetlands to over-exploitation of fish stocks and rising tides of pollution are challenging the marine realm's ability to sustain livelihoods and life itself.

Meanwhile climbing concentrations of greenhouse gases – equal to a third or more of annual CO_2 emissions – are being absorbed, triggering mounting concern over the future marine food chain.

Koïchiro Matsuura

Director-General of the United Nations Educational, Scientific and Cultural Organization

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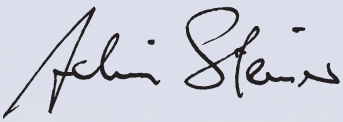

UN Under-Secretary General and Executive Director of the United Nations Environment Programme

Annex I: AoA Regions

No	AoA Regions	Related Regional Sea Programme(s)	Related Regional Fisheries Body/Bodies
01	Southern Ocean	Antarctic Treaty and Protocol	CCAMLR
02	Arctic Ocean	Arctic Council, PAME, AMAP, CAFF	CCBSP, NAMMCO, NEAFC
03	Baltic Sea	HELCOM	[IBSFC now non-operational[1]]
04	Black Sea	Black Sea Commission	GFCM
05	East Asian Seas	PEMSEA, East Asian Seas Action Plan	APFIC, SEAFDEC, WCPFC, CCSBT, (SPRFMO under negotiation)
06	Eastern African Seas	Nairobi Convention	SWIOFC
07	Mediterranean Sea	Barcelona Convention	GFCM
08	North Central Pacific Ocean	(none)	IATTC
09	North East Atlantic Ocean	OSPAR	ICCAT, NASCO, NEAFC
10	North East Pacific Ocean	Antigua Convention	IATTC, IPHC, NPAFC, OLDEPESCA, PSC
11	North West Atlantic Ocean	(None)	NAFO
12	North West Pacific Ocean	NOWPAP	APFIC, NPAFC
13	Red Sea & Gulf of Aden	PERSGA	(none)

1 Since the expansion of the European Union (EU) to include Estonia, Latvia, Lithuania and Poland, fisheries management questions in the Baltic are handled bilaterally between the EU and the Russian Federation. The International Baltic Sea Fisheries Commission is being wound up.

FAO Major Fisheries Area (and Sub-Area/Division where needed)	Related Large Marine Ecosystems (GIWA assessment for those marked *)
Atlantic (Antarctic), Antarctic and Southern Indian Ocean, Pacific (Antarctic)	Antarctica
Arctic Sea, Atlantic Northeast (Sub-Areas I, II, V and XIV)	Arctic Ocean, Beaufort Sea, Hudson Bay, West Greenland Shelf*, East Greenland Shelf*, Iceland Shelf, Faeroe Plateau*, Norwegian Shelf, Barents Sea*, Kara Sea*, Laptev Sea*, East Siberian Sea*, Chuckchi Sea*, West Bering Sea*, East Bering Sea
North-East Atlantic (Divisions IIIb, IIIc and IIId – Sound, Belt Sea and Baltic Sea)	Baltic Sea*
Mediterranean and Black Sea (Black Sea)	Black Sea*
Pacific West Central (part)	Gulf of Thailand, South China Sea*, Sulu-Celebes Sea*, Indonesian Seas*, Yellow Sea*, East China Sea
Western Indian Ocean (Sub-Areas 5, 6, 7 and 8)	Agulhas Current, Somali Coastal Current
Mediterranean and Black Sea (Mediterranean)	Mediterranean Sea
Pacific Eastern Central (part), Pacific Western Central (part)	Insular-Pacific Hawaiian (GIWA assessment of Eastern Equatorial Pacific)
Northeast Atlantic (Sub-Areas/Divisions IIIa, IV, V, VI, VII, VIII, IX, X, XI and XII)	Iberian Coastal, Celtic-Biscay Shelf, North Sea
Pacific East Central (part), Pacific Northeast	Pacific-Central American Coastal, Gulf of California*, California Current, Gulf of Alaska
Northwest Atlantic	Northeast US Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf,
Pacific Northwest	Kuroshio Current*, Sea of Japan, Oyashio Current*, Sea of Okhotsk*
Indian Ocean Western (Sub-Area 1)	Red Sea

No	AoA Regions	Related Regional Sea Programme(s)	Related Regional Fisheries Body/Bodies
14	ROPME/RECOFI Area	ROPME	RECOFI
15	South Asian Seas	SAS	BOBP-IGO, CCSBT, IOTC,
16	South East Pacific Ocean	CPPS	CPPS, IATTC, OLDEPESCA, (SPRFMO under negotiation)
17	Southern Indian Ocean	(none)	SIOFA
18	Southern Pacific Ocean	SPREP	FFA, WCPFC, CCSBT, (SPRFMO under negotiation)
19	South West Atlantic Ocean	(none)	COFREMAR
20	Western African Seas	Abidjan Convention	CECAF, COREP, ICCAT, SEAFO
21	Wider Caribbean Region	Cartagena Convention	OLDEPESCA, WECAFC

FAO Major Fisheries Area (and Sub-Area/Division where needed)	Related Large Marine Ecosystems (GIWA assessment for those marked *)
Indian Ocean Western (Sub-Area 2)	Arabian Sea (part)
Indian Ocean Western (Sub-Areas 3, 4 and 5)	Arabian Sea, Bay of Bengal (GIWA assessment of Indian Ocean Islands)
Pacific Southeast, Pacific Southwest, Indian Ocean Western (Sub-Area 6)	Humboldt Current* and the southern portion (Pacific Colombian) of the Pacific Central American Coastal Large Marine Ecosystems
Indian Ocean Eastern (Sub-Areas 2, 3, 4 and 5), Indian Ocean Western (Sub-Area 7)	North Australian Shelf, North-West Australian Shelf, West-Central Australian Shelf, Southwest Australian Shelf
	Northeast Australian Shelf and Great Barrier Reef, East-Central Australian Shelf, Southeast Australian Shelf, New Zealand Shelf (GIWA assessment of Pacific Islands)
Atlantic Southwest	Patagonian Shelf*, South Brazil Shelf, East Brazil Shelf, North Brazil Shelf (GIWA assessment of Brazil Current)
Atlantic Eastern Central, Atlantic Southeast	Canary Current*, Guinea Current*, Benguela Current*
Atlantic Western Central	Caribbean Sea*, Gulf of Mexico LME, SE US Continental LME, North Brazil LME

Annex II: Existing Institutional Arrangements for Organizing an Assessment

The purpose of this annex is to illustrate the structure and operation of various formal and less formal mechanisms for assessment. It is not intended to be an exhaustive list. A few entries provide additional information on the purposes and background of the process where this was considered necessary. The annex covers: (1) formal arrangements for marine assessment at regional and global levels; (2) networks and expert group processes for marine assessment; (3) an example of a specialized, independent marine assessment process; (4) special arrangements in situations of scientific uncertainty or controversy; and (5) a few assessment processes outside the marine realm.

FORMAL ARRANGEMENTS AT THE REGIONAL LEVEL

The International Council for the Exploration of the Sea (ICES) was first established by treaty in 1902 and now operates under the 1964 Convention for the International Council for the Exploration of the Sea. ICES has advised its member states and the evolving RFMOs in the North Atlantic since the 1940s. It was influential in the establishment of early international agreements to regulate whaling in the 1930s and the development of the 1972 European regional agreement to control dumping of waste at sea. Today, ICES provides assessments and advice regarding fisheries to the European Commission (EC), NEAFC and NASCO, timed to feed into annual management decisions by international and national authorities. ICES also responds to requests for advice on environmental matters from OSPAR, HELCOM, their member States and the EC Directorates of Environment and Mare, including requests in relation to EC Directives. In addition, it actively develops and adapts assessment and advisory methods and processes to different contexts, including the Precautionary Approach and Ecosystem Approach. ICES also performs the following functions on a contractual basis to OSPAR: develops specific guidelines for monitoring programmes, to improve data quality assurance and promote comparability; receives national monitoring reports and manages certain datasets; develops rationales and supporting methodology for EQOs and undertakes peer reviews, as requested.

The structure of ICES has undergone several recent changes. A Council of representatives of member governments is the strategic policy and decision-making body. A Science Committee (SCICOM), established in 2008, comprised of one member from each country with the option of electing up to five additional members, now oversees all aspects of ICES' scientific work including the development of approaches that effectively deliver both the advisory and scientific programmes of ICES. It coordinates the work of more than 100 Expert Groups (EGs) charged with specific scientific analyses, ensuring interaction among scientific disciplines. These groups consist of scientists nominated by member states and working in their expert capacity. Their analyses are subject to peer review before submission to the ICES advisory structure. Also in 2008, the three ICES Advisory Committees (ACs) were consolidated into a single Advisory Committee (ACOM), composed of one scientist nominated by each country and under the direction of an independent chair appointed by the Council. ACOM is the sole competent body for providing ICES' scientific advice. It designs and manages advisory processes and produces and delivers advice, subject to direction from the Council. Observers may take part in the AC.

PICES (Pacific ICES), established by treaty in 1990, was conceived as a North Pacific counterpart to ICES. Its role is different, however, as it has concentrated on process assessments (synthesizing knowledge of global change processes) rather than providing assessments and advice in response to specific requests from organizations and bodies with policy and management functions. In 2004, PICES completed a North Pacific Ecosystem Status Report which will be updated before the end of this decade. In 2005 governments for the first time requested that PICES provide advice on six specific questions concerning the implications of regime shifts in the North Pacific since the late 1980s; the purpose was to inform marine resources management. PICES may undertake similar advisory projects at the request of governments, but is likely to continue concentrating on scientific reports that consider factors influencing change in the oceans, which are broadly relevant to policy and management.

The structure of PICES is similar to that of ICES. Its Governing Council is comprised of representatives of member governments. The Council considers any requests for scientific advice and gives final approval for membership of programmes and working groups initially selected by the Science Board; the latter oversees the work of numerous scientific committees. The Board is comprised of both the Chairs of the scientific committees and nationally

nominated members, while the committees are comprised of experts with appropriate expertise, nominated by member governments, who serve in their expert capacities.

The Regional Fisheries Management Organizations (RFMOs), established for the most part since the middle of the 20th Century, have adopted three types of mechanisms for obtaining assessments and scientific advice:

- an independent, external source (e.g., NEAFC seeking advice from ICES);
- professional staff experts (e.g., Secretariat of the Pacific Community, Secretariat of IATTC); and
- an advisory scientific body established by the constituent instrument of the RFMO (the Convention) or its rules of procedure, comprised of experts nominated by member states and supporting advisers (e.g., Scientific Committee of CCAMLR, Scientific Councils of NAFO and ICCAT). The full scientific body reviews the reports of various expert working groups and develops a report for the decision-making body (Kimball 1996; Willock and Lack 2006).

The latter mechanism is the most common. Three useful variations enhance the provision of independent expert advice. The first two allow the Scientific Committee (SC) of some RFMOs to seek outside advice on an *ad hoc* basis as well as to transmit unsolicited advice and analyses to the decision-making body. This strengthens the scientists' mandate by allowing them to highlight new and emerging issues or other concerns on which the decision-making body has not yet sought advice. In the third variation there is provision for independent scientific advice to be made available both to the SC and the decision-making body; that is, a further process may be adopted either when disputes arise or simply to guarantee an additional, independent source of analysis and advice (See para. 3.44 and Willock and Lack 2006).[1]

The Regional Seas programmes provide an important platform for sharing the best available information on the health of the oceans and cooperation in assessment. The levels of expertise available to each and the nature of the assessments vary. Some have a long history of undertaking assessments in one form or another, as under the OSPAR and HELCOM processes and

1 Under the Southern Bluefin Tuna Convention (CCSBT), an Advisory Panel of external scientists was established when controversy arose over stock assessments. Panelists participate in meetings of the stock assessment group and SC and their views are reflected in these reports, and they provide both the SC and the Commission with their own views. WCPFC provides as a general matter for engagement of the services of scientific experts to provide information and advice which is to be made available to both the decision making Commission and the SC (Art. 13).

in the Mediterranean Sea, while others are more recent and only beginning to undertake assessments. In the last decade, the support of the Global Environment Facility (GEF) International Waters projects for Transboundary Diagnostic Analyses (TDAs) in many of these programmes (e.g., Eastern and Western Africa, Wider Caribbean) has provided a baseline for future assessments as well as capacity building where resources are limited. (For further details, see the regional summaries found in Annex IV.) The OSPAR and HELCOM processes summarized below are meant to illustrate more formal mechanisms at the regional level, while the section below on networks and expert group processes considers different examples, including in the Mediterranean and Wider Caribbean regions. Mechanisms established through the GEF projects are considered in both sections.

OSPAR continues to evolve the management structure for the periodic Quality Status Reports (QSRs) of the North East Atlantic. While QSR 2000 was overseen by a scientific chairperson, QSR 2010 will be overseen and managed by a group consisting of a representative from each member government (MAQ). As in the past, principal responsibility for preparation of the QSR remains with OSPAR's expert Environmental Assessment and Monitoring Committee (ASMO). MAQ, however, will play a larger role than in previous reports in shaping the scope, structure, organization, peer review, products and communications of the assessment. It will review a draft consolidated text prepared by the secretariat that draws together the assessments undertaken through ASMO by various groups/committees, and it will consider comments from governments and observers, leading to a final draft which then will undergo expert peer review. It is ASMO, however, that will finalize the text in light of peer review.[2] The hope is that the new management structure will enhance the visibility of the report and emphasize delivery by governments of the five OSPAR strategies (biodiversity and ecosystems, eutrophication, hazardous substances, offshore oil and gas, radioactive substances).

The **Helsinki Commission (HELCOM)** is the governing body of the convention covering the Baltic Sea area, including the entire Baltic Sea catchment. One of HELCOM's key tasks is to assess trends in threats to the marine environment, their impacts, the resulting state of the marine environment and the effectiveness of adopted measures. The Commission provides guidance on the design of monitoring and assessment activities to MONAS (Monitoring

2 OSPAR: Agreement on the Production of the QSR 2010 (JAMP Product AA-2), Reference number: 2006–2.

and Assessment Group), which oversees a series of working groups that elaborate and implement monitoring programs and assessment activities. This forms the basis for the work of HELCOM's other main groups on policies and measures and helps to define the need for additional measures. MONAS gives final approval to the assessment reports going to the Commission and its expert members discuss findings with the Commission.

Two of the GEF International Waters LME projects in Africa, namely the Benguela Current Large Marine Ecosystem (BCLME) and the Guinea Current Large Marine Ecosystem (GCLME), led to the establishment of new regional mechanisms in 2006. The Benguela Current Commission evolved from scientists cooperating at the technical level to share knowledge on research and assessment on the region to a self-sustaining regional assessment and management mechanism; the latter encourages further cooperation and capacity building for the study and management of the shared ecosystem. The agreement among the countries concerned comprises a ministerial conference, a high-level commission of representatives of member states, an ecosystem advisory committee of experts nominated by each state and a secretariat. The Interim Guinea Current Commission was created within the framework of the Abidjan Convention (Western African seas). Also established at the ministerial level, it initially operated six activity centres on environmental information management, decision support and information and data exchange, marine productivity and biodiversity, fisheries and other living resources, pollution management, risk assessment and early warning, and oil spill contingency and emergency response. The Commission applied scientific information obtained from remote sensing and published and unpublished scientific reports and papers (GESAMP 2008). It is now expected that future assessments on non-fisheries issues will be undertaken under the Abidjan Convention, coordinated among the 22 member countries.

COORDINATING ASSESSMENTS AT THE REGIONAL LEVEL

Among the islands of the South Pacific, there is a well-developed system to coordinate the different regional organizations involved in assessments – the Council of Regional Organizations in the Pacific (CROP). Its responsibilities include coordinating the relationship between the region and the global GOOS system, as well as fisheries-related assessments and advice delivered to national authorities and regional fisheries management bodies (FFA, WCPFC, SPRFMO).

FORMAL ARRANGEMENTS AT THE GLOBAL LEVEL

Since its establishment in 1969, **the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP),** at the request of its sponsoring agencies, has provided scientific reviews and advice on a wide range of marine environmental issues. GESAMP has considerable experience in assessing the state of the global marine environment and is the only established mechanism for inter-agency scientific cooperation and coordination among UN organizations with responsibilities in marine environmental assessment. The Group published the first global assessment of the state of the marine environment in 1982, and published subsequent global assessments in 1990 and 2001. In 1994, GESAMP published guidelines for marine environmental assessments (GESAMP 1994). GESAMP's scientific reviews have addressed important marine environmental processes, potentially harmful substances and practices, aspects of management such as the application of integrated coastal management and risk assessment and communication, and incidents such as the *Mnemiopsis* outbreak in the Black Sea during the 1990s. The Group also maintains a classification system for hazardous substances carried by ships.

GESAMP is established and supported by an inter-agency mechanism of the UN system, comprising eight UN organizations.[3] It has an Executive Board (EB) composed of representatives of the sponsoring organizations and an Administrative Secretary. The EB, together with the Chair and vice-Chair of GESAMP, form the Executive Committee (EC). The EB develops GESAMP's budget and work plan and nominates its Chair and Vice-Chair. The EC oversees and reports on the operation of GESAMP and selects and appoints its members for terms not to exceed four years. Members serve in their independent, individual capacity. Assessments are carried out through working groups and short-term task teams constituted from GESAMP members and external experts, based on terms of reference proposed by the EC and approved by GESAMP. GESAMP members must approve all reports before publication. Following an in-depth evaluation in 2001, GESAMP is strengthening its engagement with the broader scientific community, governments, regional organizations and other major user groups to enhance the relevance and legitimacy of its advice. It seeks active collaboration with partner organizations through co-sponsorship of working groups and other activities. It is placing greater emphasis on more

3 UN, FAO, IMO, UNESCO-IOC, WMO, IAEA, UNIDO and UNEP. (WHO is a former member.) IMO hosts the GESAMP office and nominates its Administrative Secretary, who supervises support for the EC, GESAMP and its working groups.

visible and user-friendly reports and their delivery to key audiences, and on the transparency and accountability of its activities. Among other changes, the sponsoring organizations have established a pool of experts, based on transparent criteria, from which individuals will be selected for membership in GESAMP and its working groups and task teams, as peer reviewers, and for other activities (GESAMP 2005).

As with the RFMOs, under the **London Protocol and Convention** a standing scientific group comprised of experts nominated by Contracting Parties has been established to respond to requests from the Parties for scientific and technical advice, develop and review guidelines for waste assessment, consider national monitoring and assessment reports and keep under review scientific and technological developments so as to make recommendations to the Parties on these issues. The scientific group also assists in the development of, and keeps under review, a technical cooperation programme. In 2007 the Parties agreed to TORs for the scientific group to further develop issues surrounding ocean fertilization after examination of the scientific literature.[4] For in-depth or multidisciplinary studies and assessments, the Parties have often turned to GESAMP or *ad hoc* advisory groups. In such cases, the composition and terms of reference are agreed on a case-by-case basis by the Parties. Advice on matters associated with radiological protection and the management of radioactive matter is excluded from the mandate of the scientific group and handled by the International Atomic Energy Agency (IAEA). In these cases, the IAEA determines both the means by which advice should be prepared and the experts to be involved.

The **Assessment of Assessments (AoA)** process, as described elsewhere in this report, was established by UN General Assembly resolution 60/30 adopted in 2005 as a preparatory stage towards the establishment of a Regular Process. The organizational arrangement set out in the resolution consists of an Ad Hoc Steering Group (AHSG) to oversee the AoA; two UN agencies (UNEP and UNESCO-IOC) to co-lead the process, provide secretariat services and coordinate the work, guided by the AHSG; and a Group of Experts (up to 20). The members of the AHSG are 18 States and six UN Organizations (FAO, WMO, IMO, UNESCO-IOC, UNEP and ISA). The experts were proposed by the two lead agencies and approved by the AHSG.

4 Information Note 'Annotations to the Provisional Agenda and timetable' for the meeting of the Scientific Groups of the London Convention and the London Protocol, 19–23 May 2008, Document LC/SG 31/1/1, 18 January 2008, annex 3

NETWORKS AND EXPERT GROUP PROCESSES

The Group of Experts found a number of examples where expert networks form the core of an assessment process. A network is an inherently flexible mechanism whereby members (individuals and institutions) can easily form specialized, multidisciplinary groups to address specific problems on an *ad hoc* or long-term basis. In some regions, networks have served as an early, informal step in bringing together neighboring states to assess and address common problems. They are sometimes an ongoing legacy of previous assessment processes. As noted in Chapter 4, networks may or may not be linked directly to an intergovernmental decision-making process or to an established institution, although such links can provide an important avenue for accountability and transparency. *Expert group* processes, described in Chapter 4 under "quality assurance", can also be considered assessment networks.

While networks linked with convention processes tend to have experts nominated by governments, they generally involve a much wider range of participants, such as in the **Mediterranean** and **Wider Caribbean** Regional Seas programmes.

Similarly, the **GEF International Waters LME** projects rely on expert networks linked closely with governments but also involving others. The process entails the establishment at the regional level of a project steering committee comprised of representatives from the participating governments and international agencies; it may include representatives of other organizations as observers. At the national level, each country establishes an inter-ministerial committee that is expected to include ministers of environment, fisheries, energy and tourism and a wide range of stakeholders. A national technical working group ultimately reconciles input from various multi-disciplinary expert groups focusing on different environmental problems. The national working groups include experts from government agencies, research institutions, universities, NGOs and other partner organizations. The resulting national reports are then reviewed by a regional technical team (usually drawn from national technical groups and other regional experts) to develop a regional assessment (TDA), including the identification of priorities. This is reviewed at a consultative meeting involving stakeholders before approval by the steering committee and an intergovernmental meeting. Preparation of the strategic action plan (SAP), a negotiated policy document, follows a similar process. It establishes objectives and priorities and provides strategies for achieving them through more specific regional

and national actions. In many cases an established intergovernmental mechanism such as a Regional Seas programme/convention serves as the intergovernmental meeting for consideration and endorsement of outputs at regional level (Teng 2006). (See, for example, the South China Sea and Gulf of Thailand and the Yellow Sea LME projects.)

In some regions, largely in relation to coastal fisheries, FAO working groups play an important role in regular fisheries assessments. These typically involve scientists from the coastal states and from countries or organizations engaged in the fisheries, as well as FAO experts. The reports are reviewed within a multidisciplinary working group and by technical and independent experts.

The IUCN Red List assessments are undertaken by the designated Red List Authority (RLA), normally the appropriate specialist group of the IUCN Species Survival Commission (SSC). (An exception is Birdlife International for bird species.) These groups mobilize and draw on a network of scientists and partner organizations working around the world. Collectively they represent a comprehensive knowledge base on the biology and conservation status of the species being assessed. The criteria, categories and methods utilized in these assessments, agreed minimum documentation requirements and governance structures are intended to preserve the scientific integrity of the process (available at www.iucnredlist.org). A completed assessment is independently evaluated by at least two experts on the species in question; assessments are then checked by the SSC Red List office for completeness and internal consistency before any species are added to the List.

AN EXAMPLE OF A SPECIALIZED, INDEPENDENT ASSESSMENT PROCESS

The Marine Stewardship Council (MSC) is a not-for-profit independent body that certifies fisheries as ecologically sustainable. It is governed by a Board of Trustees whose members serve in their personal capacity. The Board is advised by a technical advisory body and a stakeholders' council. Explicit principles and criteria that set standards for assessing applications for MSC certification are developed by the technical advisory body. Their development entails a comprehensive consultation process. At present the organization is undertaking a project to improve the quality and consistency in the way guidance is interpreted and applied (See www.msc.org). Where a fishery is seeking certification, the guidance is applied by third

party certification bodies (certifiers). In each case, the applicant provides the information upon which the assessment is based. The certifier selects a group of experts to conduct the assessment, which adapts the MSC criteria, standards for rating a fishery on each criterion, and provides guidance on interpreting the criteria and standards to the specific fishery in question. The certification standards require assessment of fishery impacts on the food-web, marine habitats, by-catch species and ecosystem relationships as well as on target stocks. All steps in the process, including selection of experts, development of the case-specific assessment scoring standards and preparation of the assessment report, are made available on the internet for public comment; responses are required for each comment received. The final assessment report and recommendations on certification and any conditions that apply are also open for public comment. The MSC process provides for a formal appeals process through an independent review panel should there be objections to the decision on certification. Similar arrangements exist for the Marine Aquarium Council (MAC) and other bodies that create standards and certification procedures for "sustainable" marine practices – in the case of MAC, their activities are directed toward those engaged in the collection and care of ornamental marine life from reef to aquarium (www.aquariumcouncil.org).

SPECIAL ARRANGEMENTS IN SITUATIONS OF SCIENTIFIC UNCERTAINTY OR CONTROVERSY

A few intergovernmental bodies with established marine assessment/advisory bodies have established special, supplementary processes to focus on defined questions, notably when controversies have arisen. This permits a regular, usually simpler institutional arrangement to be used for more routine assessments but offers the possibility of establishing a distinct assessment mechanism when circumstances warrant. This has occurred, for instance, under the International Whaling Convention (IWC) in relation to assessment of Antarctic whale stocks in the 1960s and under the London Convention in 1986 to consider the disposal of (low-level) radioactive wastes at sea. In the first case, pursuant to a unanimous decision by the Commission, a small group of scientists was selected by the Chair of the Commission, in consultation with the Chair and vice-Chair of the IWC Scientific Committee (SC), to obtain the advice of qualified external scientists drawn from countries not engaged in Antarctic whaling. The group also included experts in the field of whale population dynamics, considered under-represented on the SC, thus broadening the methodological basis for assessment (Kimball

1996). In the case of the London Convention, an intergovernmental panel of experts on radioactive waste disposal at sea was established by the Parties to review political, legal, social and economic aspects, as well as scientific and technical aspects that had been the subject of an earlier expert panel report. Thus, the scope of discussion was broadened and the panel was more open to submissions from non-governmental stakeholders. Another special arrangement noted above is the advisory panel created under the CCSBT when controversy arose over fish stock assessments.

In the **Mediterranean, under the Barcelona Convention**, a more extensive review process was used when a proposed assessment potentially raised controversial issues. The normal procedure is that first drafts of pollution assessments are reviewed by national focal points from the pollution monitoring component (MED POL), where they may be revised before being sent for final review to national focal points for the Mediterranean Action Plan (MAP). When a potentially controversial *transboundary* pollution assessment was undertaken in 2003, a special coordinator and team leader were appointed and 14 experts were selected from various disciplines to draft the assessment. It was then reviewed at an expert meeting by additional experts, and a revised draft sent to national focal points for MED POL and then to MAP focal points. This process reinforced the scientific credibility of the assessment.

When questions of uncertainty arose over the implications of regime shifts in the North Pacific, governments turned for the first time to **PICES**, as noted above, seeking answers to specific policy-relevant questions; that is, they made a special arrangement to obtain scientific advice.

Many individual States have internal scientific assessment and advisory processes for marine issues.[5] However, when a particular issue is especially controversial or advice is widely challenged, they may turn to an independently appointed Panel or a body such as the National Academy of Sciences (US) or the Royal Society (UK), for a review and assessment that is usually broader in scope than the routine assessments of government agencies. These reviews often include efforts to engage stakeholders and experts in at least a consultation phase, if not the assessment itself.

5 Two key documents guiding the Canadian process, for example, are: A Framework for Science and Technology Advice: Principles and Guidelines for the Effective Use of Science and Technology Advice in Government Decision Making (available at http://strategis.ic.gc.ca/pics/te/stadvice_e.pdf) and External Participation in the RAP Process (available at http://www.dfo-mpo.gc.ca/csas/csas/Process-Processus/ExtPart-PartExt/Ext-Part-RAP_e.htm).

OUTSIDE THE MARINE REALM

The Intergovernmental Panel on Climate Change (IPCC) is perhaps the best known assessment mechanism outside the marine realm, with its relatively complex and formal structure and extensive network of contributing experts. Its structure consists of a plenary intergovernmental Panel and working groups, whose members are nominated by governments and selected by the working group chairs, who are appointed by the Panel. (Governments may nominate experts from NGOs and other types of organizations.) Principles governing the IPCC's work state that, since the IPCC is an intergovernmental body, review of its documents should involve both peer review by experts and review by governments. The review process generally takes place in three stages. For each of the three working groups, review of a first draft of the report is undertaken by recognized experts in the relevant areas and experts nominated by governments and participating organizations (IGOs, NGOs). A second draft of the working group report and the first draft of the associated Summary for Policymakers (SPM) are then reviewed by all governments, authors and the same reviewers involved in the expert review. The next revision of the working group report is then "accepted" by the working group, while its SPM is subject to line-by-line "approval" by the working group.[6] Each working group SPM must be consistent with the factual material contained in the underlying report. It is subsequently "accepted" by the Panel in plenary meetings; the Panel may not change the text but it can note any substantial disagreement. The full Synthesis Report is "adopted" by the Panel in plenary and its SPM is "approved" line by line by the Panel, which ensures that the SPM is consistent with the full Synthesis Report and that the latter is consistent with the underlying reports.

The mechanism of the Arctic Climate Impact Assessment (ACIA) is particularly interesting. The assessment, initiated in 2000 and completed in 2004, was conducted under the auspices of a sponsoring partnership among the eight Arctic countries, six indigenous Arctic peoples organizations ("Permanent Participants" in the Arctic Council) and the International Arctic Science Committee (IASC), an NGO comprised of the national science organizations of 18 member countries. The eight

6 "Acceptance" of reports by working groups or the Panel signifies that the material has not been subject to line-by-line discussion and agreement, but nevertheless presents a comprehensive, objective and balanced view of the subject matter. "Adoption" of IPCC reports is a process of section-by-section (not line-by-line) endorsement used for the full Synthesis Report. "Approval" of SPMs, including that of the Synthesis Report, signifies that the material has been subject to detailed, line-by-line discussion and agreement. (Procedures for the Preparation, Review, Acceptance, Adoption, Approval and Publication of IPCC Reports, 2006).

governments of the Arctic Council approved the ACIA "implementation plan", which frames the principles, questions and scope for the assessment and sets out the role and membership of a Steering Committee to guide the process. The Steering Committee included lead authors together with two representatives from each of two official intergovernmental working groups of the Arctic Council – AMAP (Arctic Monitoring and Assessment Programme) and CAFF (Conservation of Arctic Flora and Fauna); two representatives of the IASC and two representatives of Arctic indigenous peoples. The Steering Committee reported twice a year to the Arctic Council (NRC 2007, ACIA 2000).

The ACIA implementation plan provided for a clear distinction between science and policy. Policy-makers helped frame the questions and scope of the assessment but the scientists had full responsibility for the scientific reports and conclusions. The preparation of a separate policy document based on the scientific reports, with recommendations for follow-up measures, was the responsibility of AMAP and CAFF, the intergovernmental working groups. The scientists contributed to and reviewed the policy draft to ensure its scientific accuracy. The policy recommendations were then negotiated by representatives of governments and the Permanent Participants in consultation with the scientists, but the scientists did not have any final say over these recommendations. The policy document was finally adopted by ministers from the eight Arctic governments.

The **Millennium Ecosystem Assessment (MA)** was carried out between 2001 and 2005 to assess ecosystems (including marine), the services they provide and the consequences of ecosystem change for human well-being. The MA also analyzed options to enhance the conservation and sustainable use of ecosystems and their contributions to human well-being. The MA was carried out under the direction of a Board including representatives of four global conventions (CBD, UNCCD, Ramsar Convention, CMS), five UN agencies (FAO, UNESCO, UNDP, WHO, UNEP), international scientific organizations (ICSU) and leaders from the private sector, NGOs and indigenous groups. Additional partners and donors included the World Bank, GEF, IUCN, CGIAR and the UN Foundation. UNEP coordinated the MA partnership, and several co-executing agencies hosted the MA's distributed secretariat: WorldFish Center (ICLARM) – Director's office and technical support unit (TSU) for the working group on sub-global assessments; UNEP-WCMC – TSU for the working group on condition and trends; ICSU/SCOPE (Scientific Committee on Problems of the

Environment) – TSU for the working group on scenarios; and the Institute for Economic Growth (IEG) in India – TSU for the working group on responses. Outreach and publications functions were undertaken by the World Resources Institute (WRI), in collaboration with the Meridian Institute, both of Washington, DC.

There has been substantial discussion of follow-up to the MA. The focus of current discussions is an **Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)**. These discussions build on a MA follow-up strategy, initiated by UNEP, and consultations on the possible establishment of an **International Mechanism of Scientific Expertise on Biodiversity (IMoSEB)** initiated in 2006 by the government of France. Their purpose is to consider mechanisms to improve the science-policy interface for conservation and sustainable use of biodiversity, long-term human well-being and sustainable development. This includes consideration of establishing an authoritative, independent scientific body responsive to policy needs identified by decision-making organizations at global and sub-global levels, as well as the building of scientific capacity at national and regional levels. UNEP was invited by the IMoSEB process to convene an *ad hoc* open-ended intergovernmental multi-stakeholder meeting in November 2008 on the IPBES. The Governing Council of UNEP in February 2009 invited UNEP to continue to support efforts by governments and relevant organizations to explore mechanisms for the purposes noted and requested the Executive Director to convene a second intergovernmental and multi-stakeholder meeting. In addition, CBD/COP Decision IX/15 (May 2008) acknowledges the global MA follow-up strategy and requests the UNEP Executive Director to contribute actively to its implementation. It further requests a CBD working group to consider the outcomes of the November 2008 meeting, and implications for implementation and organization of the work of the Convention, and to make recommendations for consideration by CBD/COP10.

The structure of the MA follow-up initiative consists of a 19-member implementation group and a 10-member executive committee.[7] Both are co-chaired by UNEP and UNDP, which also serve as the secretariat. A wider advisory group is being established.

7 Executive Committee: UNEP, UNDP, ICSU, IUCN, Stockholm Resilience Centre, Swedish International Biodiversity Programme/ Swedish Biodiversity Centre (SwedBio), UNEP-WCMC, UNESCO, UNU-IAS, WRI. Implementation Group members include the former as well as: EEA, FAO, GEF, CBD, Swedish International Development Agency (SIDA), The Cropper Foundation, Dutch Ministry of Foreign Affairs (DGIS), UNEP-UNDP Poverty Environment Initiative and UN International Strategy for Disaster Reduction (ISDR). See Document UNEP/CBD/COP/9/INF/26 2008.

The IMoSEB structure includes an International Steering Committee (ISC), an Executive Committee (EC) and an Executive Secretariat. The ISC consists of about 90 members comprising scientists, government representatives, intergovernmental and UN agencies, international and non-governmental organizations and indigenous and local community representatives. The 14-member EC is appointed by ISC members and broadly represents the range of stakeholders of the ISC. Members serve in their individual capacity. Of the 3-member Executive Secretariat, two are from the Institut Francais de la Biodiversite (IFB) and one from DIVERSITAS.

REFERENCES

ACIA (2000): Arctic Climate Impact Assessment (ACIA). *An Assessment of Consequences of Climate Variability and Change and the Effects of Increased UV in the Arctic Region. Implementation Plan.* Prepared by the Assessment Steering Committee, September 2000.

GESAMP (1994): *Guidelines for Marine Environmental Assessments.* IMO/FAO/UNESCO/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP). Reports and studies 54, 40 pp.

GESAMP (2005): *The New GESAMP: Science for Sustainable Oceans: A strategic vision for the IMO/FAO/UNESCO-IOC/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection.* London, IMO, 21 pp. See also www.gesamp.org

GESAMP (2008): Science and Regional Organizations: How can GESAMP help with current needs and future challenges? Report from the Workshop held during the 34th session of GESAMP. 9 May 2007. Reports to GESAMP No. 1, 41 pp.

Kimball, L.A. (1996): *Treaty Implementation: Scientific and Technical Advice Enters a New Stage.* Studies in Transnational Legal Policy 28. American Society of International Law, Washington, DC.

Teng, Seng-Keh (2006): Practitioner Guidelines for Preparation of Transboundary Diagnostic Analysis (TDA) and Strategic Action Programme (SAP) in the East Asian Seas Region. Southeast Asia Regional Learning Center (SEA-RLC), Southeast Asia START Regional Center (SEA START RC), Chulalongkorn University, Bangkok, Thailand.

UNEP/CBD/COP/9/INF/26 (2008): The Millennium Ecosystem Assessment Follow-up: A global strategy for turning knowledge into action: 28 April 2008.

Willock, A. and Lack, M. (2006): *Follow the Leader: Learning from Experience and Best Practice in Regional Fishery Management Organizations.* WWF International and TRAFFIC International.

Annex III: AoA Profile and Criteria for Selection of Experts

Decision adopted by the Ad Hoc Steering Group at its first meeting

Recommended notional profile and selection criteria for the Group of Experts

I. NOTIONAL PROFILE

1. Experts who are or have been involved at a high level in major global, regional or national marine assessments should make up 50–75 per cent of the total membership of the group of experts.

   Such experts should come from a range of institutional and regional settings and should preferably have considerable experience or knowledge of assessment processes outside their primary area of work or region. They should also provide a balanced representation of expertise from across the physical, biological, and social sciences;

2. Experts with high-level knowledge or experience of important international assessment processes outside the marine realm, e.g., atmospheric, agricultural, and freshwater assessments, should account for 5–15 per cent of the total membership of the group;

3. Experts who have participated in the independent analysis of assessment processes and the interface between science and policy should account for 10–20 per cent of the total membership of the group;

4. Independent senior scientists, including social scientists should account for 15–35 per cent of the total membership of the group;

5. Experts with extensive knowledge of United Nations processes related to the marine environment should account for 5–10 per cent of the total membership of the group;

6. Experts in the law of the sea and ocean governance issues should account for 5–15 per cent of the total membership of the group;

7. Experts with experience in the design and management of major international initiatives in marine science, assessment, environmental protection or related areas, should account for 10–15 per cent of the total membership of the group; and

8. Experts with experience as "users" of major assessments, i.e., in the application of assessment results in the formulation and implementation of related policies, should account for at least 20 per cent of the total membership of the group but preferably as high a proportion as possible.

II. CRITERIA FOR THE SELECTION OF EXPERTS

9. The recommended criteria for the selection of individual members of the group of experts, bearing in mind the need for balanced geographic and gender representation, are set out below. Individuals selected to participate in the group of experts must have:
    a. Experience and expertise in one or several of the categories described in the collective profile of the group of experts;
    b. Internationally recognized excellence in their field or fields of expertise;
    c. Demonstrated high-level participation in international processes relevant to the marine environment; and
    d. The ability to serve in an independent, individual capacity.