

Intergovernmental Oceanographic Commission
Reports of Meetings of Experts and Equivalent Bodies



**IOC-IUCN-NOAA
Consultative Committee Meeting
on Large Marine Ecosystems
(LMEs)**

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1.0 INTRODUCTION AND IOC WELCOME

Wendy Watson Wright, the General Secretary of the IOC-UNESCO, stated that: IOC is delighted to host, for the 13th time, the annual LME Consultative Meeting. The IOC will continue to provide support for the LME programs. Large Marine Ecosystems are effective building blocks for the assessment of an integrated ocean system, as proposed under the UN Regular Process for the Global Assessment of the Marine Environment. The LME projects are critical in providing information and collecting data that is then used by countries engaging in the TDA and SAP process and other transboundary water management approaches.

Wright indicated that a Transboundary Waters Assessment Project (TWAP) was submitted by the IOC-UNESCO and UNEP to the GEF as a medium-sized project. The indicator-based methodology approach will measure changing conditions within four different types of international transboundary water systems (open ocean water, LMEs, groundwater (aquifers), and surface water). This approach will be used in conjunction with the five modular LME approach and will develop a core set of status indicators. The proposed TWAP partnerships will build around an already existing network that has proven successful. Wright announced that IOC endorsed a revised strategy for Integrated Coastal Area Management (ICAM). The strategy promotes area-based management tools, will improve spatial integration in the marine environment, and will develop principles for monitoring and evaluating Marine Spatial Planning. It will communicate these principles to practitioners in a guidebook. She concluded her remarks by indicating that the IOC and its UN partners will play a leading role in highlighting ocean issues at Rio +20, both as a contributor of the UN-wide system and as an advocate for stronger recognition of the ocean in the Blue-Green economy (See ANNEX I for the full communication from General Secretary Wright to the 13th Consultative Committee Meeting).

2.0 LME ASSESSMENT AND MANAGEMENT

2.1 Changing Conditions and Management Strategies for the Yellow Sea LME (YSLME) in Relation to Sustainable Fisheries Yields

Qisheng Tang, of the Yellow Sea Fisheries Research Institute in Qingdao, reported that coastal development, overfishing, climate change (natural oscillating changes and global warming), and eutrophication from land-based pollution are examples of multiple stressors in the YSLME. Overfishing has caused a species shift in dominance over the past 60 years. This species shift has led to the replacement of commercially valuable, long-lived, high trophic level, piscivorous benthic fishes with low-value, short-lived, low-trophic level, planktivorous pelagic fishes. In the past 150 years there have been four regime shifts in sea surface temperature (SST) in the YSLME: a warm regime before 1900, a cold regime between 1900 and the mid 1940s, a warm regime with a cooling trend from the mid 1940s to the mid 1970s, and a warm regime

with a warming trend from the mid 1970s to the present day. This data was found to be consistent with the regimes of northern hemisphere air temperatures (Burroughs, 2003). Significant warming has been identified in China's coastal waters. Serious eutrophication and nutrient structure changes have been observed in the YSLME with red tides, green tides, jellyfish blooms and the emergence of anoxic zones.

Adaptive management practices are being implemented in the YSLME project to achieve sustainable fisheries yields, to encourage the development of a resource-conserving marine fishing industry, and to promote environmentally-friendly mariculture that will contribute to the reduction of fishing effort on capture fisheries, promote stock enhancement programs and develop carbon sinks through mariculture of mollusks. The mariculture of shellfish and seaweed, through the filter feeding of phytoplankton and particulate organic materials and plant photosynthesis, can utilize a significant component of coastal ocean carbon and serve as a carbon sink. The mariculture of shellfish and seaweed removes 3.10-4.34 million MtC per year globally, while 1.00-1.37 million MtC per year are being removed from the Yellow Sea LME. These figures are based on annual production estimates for shellfish and seaweed mariculture. In an effort to recover depleted fish stocks, China has closed capture fisheries in the Yellow Sea, East China Sea and the South China Sea LMEs during summer months for 60 -90 days. In 2006-2010, 50 billion juvenile shrimp, jellyfish, and crab were introduced into the YSLME to augment the capture fisheries.

2.2. Assessment and Monitoring of the Benguela Current LME in Support of the Benguela Current Commission

Hashali Hamukuaya reported that the transition to a Benguela Current Commission (BCC) has been carried out in record time. Elements that have helped the transition are: the continuity of negotiators and the strong political will of the three participating nations, Angola, Namibia, and South Africa, to manage the BCLME in a sustainable manner. In relation to the project SAP and five module LME methodology, Angola, Namibia and South Africa were each represented in the BCC by four participating ministries. The proposed structure of the BCC includes a Ministerial Conference, a Commission and a Secretariat headed by an Executive Secretary and three Standing Committees. Sustainable conservation and management of goods and services from an ecosystem perspective, are the core principles of the BCC. The BCC has established partnerships with various donor and development partners that finance the scientific and technical operations of the Commission. The Commission's visibility has increased markedly since the appointment of a media and communications consultant.

The vision of the Commission, its mission statement, its key performance areas and core values have been endorsed by the ministers of the three member states. The Ministers have requested the transfer of responsibilities from the UNDP to the BCC secretariat over an 18 month period. The next step will be to review, assess and revise

the BCC science program and strategy for training and capacity building, and to review and finalize a regional aquaculture policy.

2.3. The Western Indian Ocean sustainable Ecosystem Alliance: Towards an Adaptive Management and Governance System

David Vousden indicated that the ASCLME project received USD \$12.2 million support from the GEF and that the project is expected to be completed in mid-2012. The GEF has requested an extension until 2013 to fall in line with the Southwest Indian Ocean Fisheries Project (SWIOFP). The ASCLME is promoting the development of an effective monitoring and early warning mechanism for ecosystem variability and climate change, building on the baseline surveys and appropriate modular indicators. The project also aims to translate the outputs from such monitoring into policy and management level priorities. A Western Indian Ocean Alliance is being developed to sustain LME project goals and ensure long-term political 'buy-in' to the ecosystem-based approach. It will update the Marine Ecosystem Diagnostic Analysis (MEDA) and the project Transboundary Diagnostic Analysis (TDA) on a regular basis. Data collection and analysis has allowed each participating country to develop a MEDA. The long-term monitoring of ecosystem indicators will provide a 'fine-tuning' process for the adaptive management strategies being used. The four principle project activities dealing with community-based issues include (i) a coastal livelihoods assessment, (ii) a cost-benefit analysis of the ecosystem goods and services, (iii) the mapping of coastal and near-shore critical habitats for management purposes, and (iv) a set of community pilot demonstrations. A comprehensive, coordinated and sustainable inshore monitoring network system has been developed that is expected to provide linkages with the offshore ecosystem monitoring network.

Twenty oceanographic cruises have been conducted since 2008 on three vessels. The proposed Annual Alliance Cruise will maintain existing moorings, and expand the tide gauge network and Acoustic Doppler Current Profiles (ADCP) network. A long-term monitoring network will place inshore and near-shore transects opposite low cost internal wave mooring lines. A Causal Chain Analysis was conducted as part of the MEDA-TDA process. Indicators addressing national and regional issues were identified in an Indicator Workshop focusing on socioeconomics, governance, and science. The ASCLME and SWIOFP will create a single SAP for Ocean-Based Activities. The Western Indian Ocean Lab (WIOLab) has completed a SAP for land-based activities. Partnerships in the region are focused on issues such as offshore and near-shore monitoring of climate change and ecosystem variability, mapping critical habitats, data modeling and analysis. This allows for policy and management strategies to be based on shared data. The project seeks to further advance the ecosystem-based approach to fisheries, the role of tourism, and the source and mitigation of marine-based pollutants.

2.4 The GCLME SAP Process and the Guinea Current Commission

Christian Susan, representing the United Nations Industrial Development Organization (UNIDO), discussed the status of the Guinea Current LME (GCLME) project, which includes 16 coastal countries. A Working Group met in Brazzaville in January 2011 to discuss different options for the establishment of a Guinea Current Commission (GCC). One option is to establish the GCC as a Committee within the Abidjan Convention. The Abuja Declaration and Osu Declaration supporting the Commission were announced in 2006 and 2010 respectively. Another option is to establish the GCC based on an agreement between the Abidjan Convention and regional fisheries commissions within the region. Another option is the establishment of the GCC as an independent commission through a protocol to the Abidjan Convention. UNEP and UNIDO are to submit reports to the GCLME countries for further consideration of these options. The UNEP Executive Director and the UNIDO Director General met in January 2011. Both supported the idea of an agency meeting to recommend the best two options. The IGCC Secretariat agreed to assist member states to organize national consultations on the options.

3.0 ADVANCING SUSTAINABLE DEVELOPMENT IN LMES DURING CLIMATE CHANGE

3.1 Accelerated Warming and Emergent Trends in the World's Large Marine Ecosystems

Kenneth Sherman, Director of the NOAA Large Marine Ecosystem Program, discussed accelerated warming and emergent trends in LMEs. Sherman identified the 15 fastest warming LMEs and indicated that 61 of the 63 LMEs are warming. Accelerated warming trends strengthen thermocline formation in the water column and as a result expand the stratified ocean. Increased stratification decreases nutrient mixing and leads to reduced levels of primary productivity in warmer latitudes. In contrast, the warming of sub-Polar waters extends annual plankton production and increases the pelagic fish spawning biomass. The increasing trends in fisheries catches and the smaller average sizes of fish landed in warmer water LMEs, suggest the need for precautionary fisheries catch limits in these regions where productivity is likely to decline. Also, the demand for fish-based protein is high and growing and needs to be sustained in these warm water LMEs with poor food security.

Data series collected off the coast of Ghana in the Guinea Current LME from 1966-1995 showed a significant decline in zooplankton biomass, which is related to increasing SST trends and an overall reduction in upwelling intensity. The greater strengthening of the thermocline and reduced nutrient mixing lowers phytoplankton and zooplankton production. Based on this analysis, it was concluded that the fisheries are significantly influenced by climate warming. *Sardinella* are a commercially important species that was found to be directly affected by the decline of zooplankton abundance.

Two regional workshops (in 2005 and 2010) assessed national strengths and highlighted the need for augmenting productivity assessments.

Dr. Sherman announced the availability from the LME Program Office of a new publication entitled “Sustainable Development of the World’s Large Marine Ecosystems during Climate Change – a Commemorative Volume published by IUCN to Advance Sustainable Development on the Occasion of the Presentation of the 2010 Göteborg Award”.

3.2 Fisheries Trends in LMEs

Daniel Pauly, of the University of British Columbia Fisheries Centre, discussed fisheries in LMEs. Global fisheries landings have been declining since the late 1980s. Catch intensity and primary production required by marine fisheries has significantly increased between the 1950s and today. Fisheries have expanded to deeper water and have shifted southward. Data collected in 1950-2000 indicate that as the biomass percentage present in the Exclusive Economic Zones (EEZs) has decreased, so has the intensity of predation. Pauly indicated the LME scale is ideal for performing comparative studies of global fisheries, and that LMEs provide the right framework for reporting marine ecosystem changes. A global increase of jellyfish populations is expected, based on a detailed analysis of LMEs in the present day. There is a correlation between increasing levels of carbon dioxide and global surface temperature warming. An increase in global surface temperature has resulted in pole ward shifts in the distribution range of marine species. The Sea Around Us Project website presents downloadable data on national and global fisheries catches. The Project is looking to collaborate with any interested group on issues of ecosystem science in LMEs.

3.3 Best Practices in Assessment and Management in the Barents Sea and Norwegian Sea LMEs during Climate Change

Hein Rune Skjoldal, of the Norwegian Institute of Marine Research in Bergen, presented the dynamics and management of the Barents Sea and Norwegian Sea LMEs. The 2008 UNEP LME report indicates that the number of collapsed fish stocks has been rapidly increasing. About 80 percent of the stocks are commercially exploited, while the remaining 20 percent is classified as overexploited. Aggregated spawning stocks of important ground fish species in the Barents Sea and Norwegian Sea LMEs have increased their biomass from 1985 to 2010. Aggregated spawning stocks of important pelagic species have also increased, based on data and time series collected over the period of 1985-2010. Catch history can be misleading because it does not take into account the effects of natural environmental variations or of management actions.

3.4. Effects of Climate Change on the Agulhas and Somali Currents LMEs

David Vousden, program manager of the Agulhas and Somali Currents LME (ASCLME) project, indicated that marine ecosystems are already showing signs of

anthropogenic impacts including those from climate change. These include range shifts, with species moving both pole wards and to deeper waters; changes in water column stratification and significant de-oxygenation; the increased frequency of harmful algal blooms; shifts in species composition in phytoplankton and zooplankton communities; smaller individual species; and changes in diversity and species richness. Species acting as invasives are creating negative impacts on LMEs. Regions with naturally high environmental variability appear to be equally vulnerable to change and are not necessarily pre-adapted. This is leading to changes in fleet structure and fishing fleet operations. There are management implications for the harvesting of 'shifting biomass', especially across jurisdictional boundaries. Synergistic effects such as the increased frequency of extreme events and temperature changes, may prevent the fisheries biomass from rebuilding even with a reduction in fishing effort. Increasing sea temperatures will likely result in ecosystem shifts, affecting species distribution. This has already been observed in a number of areas, with range expansions of tropical species, and range contractions of temperate and cold water species. There is also an increase in the risk, frequency and severity of coral bleaching. Ocean warming has occurred from the surface to a depth of about 100 meters, the zone in which most marine life thrives.

The Agulhas Current LME, particularly the region to the southwest of Madagascar, is warming particularly fast relative to global mean increases. Sea level rise is not globally uniform. Many important coastal cities are low-lying, but Mozambique is considered to be at highest risk in the region. The small island developing states (SIDS) are particularly vulnerable. It will be important to monitor significant habitats like mangroves, coral reefs, sea grasses, and low lying coastal wetlands, and understand the effects of El Niño (dry and warm) and La Niña (wet and cool) ocean conditions. Oceans play an important role in the distribution of rainfall across the West Indian Ocean, particularly on the east coast of Africa. Sea surface temperatures are a key indicator for monitoring drought and heavy rain conditions in this region. Sardine, anchovy, rock lobster and horse mackerel have shifted their distributions southwards and eastwards (van der Lingen et al. 2006; Cockcroft et al. 2008). In the 1980s and 1990s, anchovy and sardine were concentrated on the west coast (Barange et al. 1999). However, in 1996, anchovy spawners shifted in distribution from the western Agulhas Bank to the central and eastern Agulhas Bank (van der Lingen et al. 2002). By 1999, the proportion of sardine biomass located to the east of Cape Agulhas exceeded that on the west coast, and by 2004, sardine were found solely in the east (van der Lingen et al. 2005). In effect, a critically important living marine resource shifted from the Benguela Current LME to the ASCLME.

3.5 Advancing Sustainable Development during Climate Change within the UNDP LME Portfolio

Andrew Hudson, Principal Technical Advisor for International Waters at the UNDP/GEF, issued a challenge for future focus on GEF-supported LME projects and asked for feedback from the LME project experts. He indicated that the LME projects have produced a wealth of good scientific studies, but that the information is often

unavailable on the project website. LME science has been very strategic. He encouraged exchange of comparative studies of the effects of climate change among GEF projects. A stated goal of the UNDP is to advance sustainable development in LMEs.

3.6 Monitoring Climate Change in African LMEs through the GOOS-Africa Network

Justin Ahanhanzo, Team Leader and Coordinator of Africa's Global Ocean Observing System (GOOS), discussed the monitoring of climate change in African LMEs through the GOOS-Africa Network system. The system aims to address regional capacity needs, highlight the importance of socioeconomic benefits, and strengthen regional coordination efforts amongst the African LMEs, leading to the establishment of an African LME Association. The Canary Current LME (CCLME) is a major boundary current upwelling system that yields highly productive fisheries in West Africa. The Guinea Current LME (GCLME) has both upwelling and tropical systems and experiences pressures from the densely inhabited coastal communities. The Benguela Current LME (BCLME) is a highly dynamic and productive upwelling system that experiences harmful algal blooms. The Agulhas-Somali Current LME (ASCLME) is a diverse LME. In response to climate change, Africa's LMEs will experience coastal flooding, a rise in sea level, the depletion of fisheries stocks, and an acceleration of coastal erosion. Sea level rise poses a significant threat to the great harbor cities of Africa. Protection of these areas will be difficult and expensive. A risk assessment needs to be carried out and effective policies put in place. In December 2011, the 17th United Nations Climate Change Conference took place in Durban, South Africa and included the LMEs/GOOS-Africa Advocacy group.

4.0 LME PROJECT PROGRESS

4.1 FAO Portfolio Overview of GEF LME Projects

Merete Tandstad, Fisheries Resource Officer at FAO, briefed the group on the LME projects supported by the FAO. The Bay of Bengal LME project is currently in its third year. The countries have formulated a TDA and a report on ICM best practices as well as a resource management policies and reviews of small pelagic fisheries. The countries have established Marine Protected Areas (MPAs). In addition, a joint management initiative was formed between islands of the Myeik/Mergui Archipelago in Myanmar. Key ecosystem indicators have been selected for the purposes of development, and the project has also begun the planning process for oceanography and pollution management. A mid-term evaluation of the project was conducted in 2011. Training was provided in communication, scientific writing and presentations. Assistance was provided to develop national plans for the pollution and ecosystem health module of the Bay of Bengal LME Project. Training was also provided for

integrated coastal management and for the protection of marine areas. An EAF training course was developed and tested for the hilsa fishery.

A major component of the Mediterranean Sea LME Project is MedLMEFish, which is streamlining EAF into fisheries management, reducing by-catch of vulnerable species, and participating in the management of MPAs. The first training workshop for streamlining EAF into fisheries management took place this year. A technical meeting was also held to identify the main areas where by-catch is a major issue. A first workshop was also held, to include fisherman participation in MPA management. In the Caribbean Sea LME, an integrated assessment of shared stocks of shrimp and groundfish was conducted with six participating countries. An integrated assessment of the shrimp and groundfish fisheries in the North Brazil Shelf to the east of the Caribbean Sea LME included ecological, socioeconomic, and governance considerations. In the Canary Current, Guinea Current, and Benguela Current LMEs, surveys aboard the *R/V Nansen* have been conducted throughout the past three years.

4.2 The APEC LME Project

Marie-Christine Aquarone, Deputy Director of the NOAA LME Program, presented a summary of phases 1, 2 and 3 of the Asia-Pacific Economic Cooperation (APEC) LME Project. APEC is a forum for facilitating economic growth, trade, investment, and cooperation throughout the Asia-Pacific region. The APEC Member Economies account for approximately 41 percent of the world's population, 55 percent of world GDP and 49 percent of world trade. The APEC region includes 21 Member Economies and 27 APEC LMEs. The APEC LME Project aims to assist countries in the community to assess and manage APEC LMEs and their goods and services, provide legal and administrative support for ecosystem-based management practices, and focus on the economic benefits of sustainable development of marine resources. The 27 APEC LMEs make a significant economic contribution to the economic sectors of transport, energy production, mining, tourism and fisheries.

The accomplishments of the APEC LME Project to date are the designation and mapping of LMEs in the APEC region. In 2009, Korea hosted an APEC workshop, whose participants agreed to seek funding for two pilot projects, one for the Indonesian Sea LME, the second for the Pacific Central American LME. Korea indicated its willingness to host APEC-LME workshops. In a 2006 publication, Hoagland and Jin provided economic sector activity indices, including socioeconomic activity, shipping and offshore oil, fisheries and aquaculture, and tourism, for all of the LMEs in the APEC Region. Phase 2 of the APEC LME Project has just been completed and has identified ecosystem indicators, and inventoried best practices. A Desktop Report was completed at the end of 2010. There are impacts of accelerated warming on fisheries biomass yields and on socioeconomic benefits in the APEC region. Model predictions of nutrient over-enrichment affecting the APEC LMEs are showing significant increases. The Asia-Pacific region is in a warming trend, with the exception of the California Current and Humboldt Current LMEs.

4.3 The IUCN Perspective on Community-based Advances in LMEs

Aurelie Spadone, representing the IUCN Global Marine and Polar Program, discussed IUCN activities related to LMEs. The IUCN has 1,156 member organizations in 140 countries and has approximately 11,000 voluntary scientists and experts grouped in 6 commissions. These commissions include the Species Survival Commission (SSC), Work Commission on Protected Areas (WCPA), Commission on Environmental Law (CEL), Commission on Education and Communication (CEC), Commission on Environmental, Economic and Social Policy (CEESP), and the Commission on Ecosystem Management (CEM). The IUCN is the world's largest global environmental network and its mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. The IUCN Global Marine and Polar Program employs 34 staff in 10 countries. In the southern Indian Ocean Project the IUCN aims to improve marine resource conservation and management in the high seas. The first cruise, which took place at the end of 2009, focused on pelagic surveys. A second cruise, planned for the end of 2011, will focus on benthic surveys. A taxonomic workshop was held in 2010. In June 2011, the IUCN hosted a governance workshop in close collaboration with the Agulhas-Somali Currents LME (ASCLME) Project in Grahamstown, South Africa. The Global Ocean Biodiversity Initiative (GOBI) aims to identify Ecologically or Biologically Significant Areas (EBSAs) in the ocean. It conducts regional work in collaboration with the CBD and plans to have workshops in the near future focused on the Caribbean Sea and mid-Atlantic, South Western Pacific, and North East Atlantic. GOBI hosted a Pelagic Workshop in May 2011 in Canada.

In November 2010, the IUCN and National Resources Defense Council (NRDC) hosted a workshop that identified EBSAs of Vulnerability in the Arctic Marine Environment. The workshop produced a series of maps depicting 77 Arctic marine EBSAs and 13 "Super EBSAs." The 77 Arctic marine EBSAs are depicted in three maps covering different geographical regions of the Arctic. Regarding the Mediterranean Sea LME Project, a major issue is loss of biodiversity. In the region of the Sargasso Sea, a Sargasso Sea Alliance was established in 2010 that aims to protect the unique and vulnerable Sargasso Sea ecosystem. It includes parts of the Bermudan EEZ and a large area that is beyond national jurisdiction. The Sargasso Sea Alliance is a collaborative partnership between the Government of Bermuda and a group of scientists, international marine conservation groups, and private donors. The IUCN is also working with UNEP and Conservation International on nature-based solutions for mitigating climate change and to increase awareness of the importance of the absorption and storing of carbon in coastal ecosystems. A new report has been published on science and policy guidance on the role of marine and coastal ecosystems in climate change mitigation and adaptation. Mangroves have been identified by the IUCN and RAMSAR as having high potential and priority. Senegal and India have initiated major mangrove restoration projects that are presently at the pilot project phase

and will need to be scaled up. The IUCN is also a partner in a private sector Livelihoods Initiative that began this year. More than EUR 22 million has been raised, and the Livelihoods Initiative hopes to raise another EUR 10 million for these projects. The 8th issue of the IUCN Global Marine and Polar Program's annual newsletter, MARINE NEWS, has been published and can be viewed on the IUCN website.

4.4 Report on the Transboundary Waters Assessment Program (TWAP)

Julian Barbieri and **Sherry Heileman** gave an overview of the Transboundary Waters Assessment Program (TWAP) medium size project, developed over a period of 18 months. The project aims to provide a conceptual framework or methodology, core indicators, assessment approaches, and institutional arrangements. It includes an indicator-based methodology for the assessment of five transboundary water systems (e.g. open ocean, LMEs, rivers, lakes, groundwater). The partnership among agencies concerned with international, transboundary waters are to provide institutional arrangements and conduct a global assessment of transboundary waters. The assessment would identify transboundary water bodies needing attention and prioritize interventions and the allocation of resources. The partners are: IOC-UNESCO (for LMEs and open ocean); UNESCO-IHP (for groundwater); UNEP-DHI/SIWI (for river basins); and ILEC (for lakes). Some of the issues cutting across the transboundary water systems are nutrients, mercury, and vulnerability to climate change. Some of the common features of TWAP methodologies are the 5-module LME approach and the identification of indicators of environmental status, stress, socioeconomic condition, and governance. TWAP methodologies use already existing data and information. They consider the impairment of ecosystem services and human vulnerability, examine the interlinkages among transboundary water systems, and identify transboundary hotspots. TWAP will operate on two levels. Level one is a baseline comparative assessment of the current state of the ecosystem, using selected indicators and projections, where possible, to the years 2030 and 2050. It will also develop an appropriate scoring and ranking system. Level two will identify a set of transboundary waters assessment best practices, in selected regions from the developed world and the developing world. It will conduct an advanced assessment of selected transboundary water bodies, based on available data from ongoing monitoring and assessment programs. Level two activities will depend on the availability of funds.

TWAP methodologies consider the impairment of ecosystem goods and services, human vulnerability, interlinkages amongst the water systems, and between humans and natural systems. Ecosystem productivity (primary productivity/chlorophyll a, SST) will be assessed by NOAA/URI. For the Fish & Fisheries module, the University of British Columbia's Sea Around Us Project will evaluate reported landings, the value of landings, MTI & FiB, stock-status plots, and ecosystem carrying capacity (ecological footprint of fisheries). For pollution and ecosystem health, indicators for nutrients, mercury, persistent organic pollutants (POPs), and shipping density will be investigated

by the IGBP, Pellet Watch, and GESAMP. Regarding habitats, UNEP-WCMC will investigate change in protected area coverage, change in the extent of mangrove habitat, seamounts at risk, reefs at risk, and deltas at risk (in collaboration with IGBP/LOICZ).

4.5 Deepwater Horizon Impact on Gulf of Mexico LME Project Implementation

Antonio Diaz de Leon discussed Gulf of Mexico LME goods and services at risk from energy production and climate change. He described some of the drivers of ecosystem change, for instance economic growth, increase in population, urban development, industrial development, maritime development including ports and harbors, food production, energy requirements, resource needs, and natural processes in the Gulf of Mexico LME. Other sectors under consideration for ecosystem-based spatial planning include transport, agriculture, fish, petrochemical industries, tourism, cities, and ports. Of particular concern in the GEF-supported, U.S.-Mexico joint Gulf of Mexico project is the restoration and sustainability of depleted fisheries, control of nutrient over enrichment pollution, acidification, biodiversity conservation, and habitat restoration. Twenty main watersheds are draining water into the Gulf of Mexico LME at a rate of $10.6 \times 10^{11} \text{ m}^3 \times \text{year}$. Ecosystem productivity is estimated at $300 \text{ gC/m}^2/\text{yr}$. The coastal population of the Gulf of Mexico LME is estimated at 55 million - 40 million live in the coastal states of the U.S. and 15 million along the Mexican coastline.

The total annual estimated value of goods and ecosystem services in the Gulf of Mexico LME is estimated at USD 423 billion, including fish and fisheries, recreational fisheries, oil and gas, maritime industries, tourism and mining. The oil and gas industry infrastructure includes refineries and platforms. In 2004, Hurricane Ivan destroyed 7 platforms, damaged 24 more and damaged 102 pipelines. In 2005, Hurricanes Katrina and Rita destroyed 100 platforms and 558 pipelines. There were 575 spills. The BP blowout at the Deep Horizon platform was 4.9 million barrels of oil, lasting from April to September 2010. The effects are being assessed by both the U.S. and Mexico. Oil spills and the dead zone in the Gulf of Mexico represent a double challenge with regard to mitigation actions. There are also areas threatened by sea level rise. Areas most threatened are: the northern areas of Tamaulipas, the Southern tip of Veracruz, the Deltaic plain Grijalva-Usumacinta system in Tabasco, and the coastal areas of Campeche, Yucatan and Quintana Roo. The Gulf of Mexico LME is in the path of major hurricanes. Floods have also led to loss of land. Floods are caused by heavy rain and headwater deforestation. The overarching goals of the GEF-supported LME project are to: develop a unified approach for the future condition of a Gulf of Mexico LME that is economically and ecologically sustainable; adopt science-based indicators of changing ecosystem conditions to systematically chart progress towards that vision; establish an ongoing process to assure the best science, most effective policies and most efficient actions to realize that common vision.

5.0 AFRICA LME PROJECT CAUCUS

5.1 Introduction

Leading scientists from the African LMEs presented their work and discussed the outcome of their successful African Caucus meeting which met prior to this meeting here in Paris.

5.2 The Benguela Current LME

Nico E. Willemse provided an update and tracked the progress being made in the Benguela Current Large Marine Ecosystem (BCLME) project. The Benguela Current LME Commission is making progress in relation to the SAP and the five LME module methodologies.

5.3 Outcome of Africa Caucus Meeting of July 11, 2011

Stephen 'Max' Donkor, Regional Coordinator of the Interim Guinea Current Commission for the Guinea Current LME (GCLME) project, presented an overview of the LME Community of Practice. He also described the draft protocol on land-based sources of pollution for the GCLME and described options under consideration for ensuring positive complementary cooperation with tenants of the Abidjan Convention.

David Vousden promoted the establishment of an LME Alliance as an alternative to an ecosystem-based fisheries commission for LMEs in the Western Indian Ocean. Steven Donkor, Christian Susan, and Justin Ahanhanzo also discussed the progress made in the Guinea Current LME. The African LMEs are ahead of other mega regions in establishing continent wide linkages among GEF LME projects.

5.4 Status of the Canary Current LME Project

Birane Sambe, Regional Coordinator of the Canary Current LME (CCLME) Project, provided an update on the progress being made by the project. Seven West African countries are participating in the CCLME project – Cape Verde, Gambia, Guinea, Guinea-Bissau, Morocco, Mauritania, Senegal. The project goal is to reverse the degradation of the Canary Current Ecosystem caused by overfishing, habitat modification, and changes in water quality through an ecosystem-based management approach. The CCLME Project aims to understand, and reach consensus on, the priorities to include in the project Transboundary Diagnostic Analysis (TDA). The inception workshop for the project was held in November 2010. Following TDA and SAP training in Senegal, the countries prepared a project TDA. Another component of the project is to carry out policies and management actions based on good science. The project will address the major transboundary concerns regarding the decline of marine living resources. Knowledge gaps needing to be filled are the identification of critical

habitats, and issues of biodiversity and water quality. The UNEP World Coastal Monitoring Centre (WCMC) is expected to collaborate and provide financial support for mangrove mapping activities and capacity building. A meeting for the development of a regional mangrove conservation plan was attended by the CCLME Regional Coordination Unit, UNEP, UNEP-WCMC, IUCN, and Wetlands International in Dakar, Senegal in May 2011. The meeting produced a work plan and a budget and was successful in allocating tasks amongst the countries and agencies.

A meeting of a climate change working group was held in Senegal in May 2011. Project focal points and Technical coordinators have been nominated in each of the 7 countries. The Regional Coordination Unit (RCU) supported the organization of an FAO Working Group meeting on the assessment of small pelagic fish off the coast of Northwest Africa. The meeting took place in Gambia in May 2010 and again in Morocco. “Nansis training” in collaboration with the EAF-Nansen Project, took place in October 2010. The first CCLME survey was held off of the Cape Verde islands in June 2011, and an acoustic survey was conducted in Senegal and Guinea in June and July, 2011.

6.0 LMEs AND THE COMMUNITY OF PRACTICE

6.1 Toward a Large Marine Ecosystem-based Sustainability Science Knowledge Network

Suzanne Lawrence discussed new partnerships for the GEF IW LME Community of Practice. She described sustainability science as problem-driven research and a new field of science that was introduced at the Challenges of a Changing Earth 2001 Congress in Amsterdam. Partners include the International Council for Science (ICSU), the International Geosphere-Biosphere Programme (IGBP), the International Human Dimensions Programme on Global Environmental Change (IHDP), and the World Climate Research Programme (WCRP). The goal is to advance a basic understanding of the dynamics of human-environment systems; facilitate the design, implementation, and evaluation of practical interventions that promote sustainability in significant places and contexts; and improve linkages between relevant research and innovation communities on the one hand, and relevant policy and management communities on the other. She provided potential funding partners, including the Partnership for International Research and Education (PIRE), active in community-building.

6.2 Towards Management of a Sustainable California Current LME – Assessing Ecosystem Health and Forecasting Climate Impact

Harold Batchelder, of Oregon State University, described the California Current LME as an example of an eastern boundary upwelling system. Observations have been made for more than 50 years and several sites such as Newport, Oregon and Monterey,

California have records going even further back in time. Range radar provides real-time observations of surface currents on an hourly and daily basis.

Data collected in 2002-2006 in the northern part of the LME indicated an occurrence of inner shelf hypoxia during late summer months. Integrated ecosystem assessments (IEAs) are a tool using statistical analysis and ecosystem modeling to integrate social, economic, and natural science data and information. IEAs are a useful product for stakeholders and managers who rely on scientific support for policy and decision making, and for scientists who want to enhance their understanding of ecosystem dynamics. IEAs are also a process that involves stakeholders as they address critical management and policy questions, make quantitative assessments of ecosystem health, and evaluate management options. In the Puget Sound area, an EBM methodology and IEAs are being used to protect and restore ecosystem resources, prevent pollution at its source, and identify priority actions. It is building a system wide framework where goals are tied to actions. A West Coast Governors Agreement was signed in September 2006. It is a joint effort on the part of the three States of Washington, Oregon and California to help protect the goods and services of the California Current LME. The agreement strives to restore the health and resilience of marine and coastal ecosystems along the West Coast. The California Current LME supports a wide range of human activities. Information on best practices needs to be shared. A California Current best practices scoping workshop was held in September 2011. The American Geophysical Union will host an LME Best practices session at the Ocean Sciences meeting in February 2012.

6.3 MedPartnership Activities Related to Adaptation to Climate Change

Jose Luis Marin Bordes, Coordinator for the MedPartnership project of the International Hydrological Programme of UNESCO, discussed the MedPartnership, a strategic partnership for the Mediterranean Sea LME, and integrated approaches. The countries of the Mediterranean Sea LME have been working together for the past 35 years. Issues identified are related to the decline of biodiversity and fisheries, the decline in seawater quality, risks to human health from contaminated seafood and seawater, and the loss of groundwater-dependent coastal ecosystems. Marin Bordes recognized the importance of coastal aquifers in supporting ecosystems, of groundwater issues and their management, and of the need to integrate groundwater into coastal zone management. He presented several components of the ongoing MedPartnership Project. Current models will be used by the countries in the region to calculate the impacts of climate change in marine and coastal zones. There are significant increases in temperature in the LME, coupled with increased incidents of drought. Climatic variability and change will be integrated into national strategies to implement Integrated Coastal Management approaches (e.g. Integrated Water Resources Management (IWRM)) into the Strategic Action Plans and National Action Programs. Another project component is pollution from land-based activities including persistent organic pollutants. Nineteen percent of known Mediterranean species are under threat in the southern Mediterranean. Conservation of coastal and marine diversity is to be achieved through

the development of a Mediterranean Sea MPA network. The LME Project is also promoting the sustainable use of fisheries resources through the application of ecosystem based management approaches e.g. the Coastal Cities Pollution Control Project (Croatia), the Neretva and Trebisnjica Management Project (Bosnia & Herzegovina and Croatia), and the Greater Tunis Treated Wastewater Reuse Project (Tunisia).

6.4 Arctic LMEs

Gennady Matishov, of the Russian Academy of Sciences, and Head of the Murmansk Marine Biological Institute (MMBI), presented the work being developed to produce an Atlas of Arctic LMEs in partnership with the US National Environmental Satellite, Data, and Information Service (NOAA-NESDIS). The atlas will provide a database on the LMEs of the Russian Arctic region, including the Barents Sea, Kara Sea, Laptev Sea, East Siberian Sea, Chuckchi Sea, West Bering Sea, East Bering Sea and Sea of Okhotsk LMEs. For each LME, the atlas will provide a history of its exploration and a database on plankton, chlorophyll, primary productivity and fisheries. Nuclear icebreakers are used as ships of opportunity. In terms of climatic information and ocean productivity, the atlas will provide time series of data on temperature, salinity, oxygen, chlorophyll, and primary productivity for each LME (1930-2010), and annual patterns of fish migrations. The spatial and temporal distribution of fish is related to climate change. In the Arctic, a quantitative approach will be used in the Barents Sea LME, where an observed increase of red king crab (Kamchatka crab) is attributed to increased warming in the early 21st century, according to the findings of the MMBI. A West Bering Sea LME project is to be conducted by the Russian Federation and the USA. Financial support for the project will be provided to the Russian Federation by the GEF. The GEF supported project is expected to be in the TDA preparation phase in spring 2012.

7.0 ICES WORKING GROUP ON LME BEST PRACTICES

7.1 Introduction to the ICES Working Group on the LME Community of Practice

Michael O'Toole, Program Manager of the Sea Change Management Unit, Marine Institute, Ireland, reported on the ICES Working Group (WG) on LME Best Practices (WGLMEBP). The WG gave a presentation on LMEs at an ICES Meeting in Nantes, France in September 2010, and a thematic session on LMEs was held at the ICES Annual International Science Conference in Gdansk, Poland in 2011. ICES has a track record of more than 100 years of excellence in marine science and fisheries research; it provides expert scientific advice through an extensive network of marine scientists and managers; it has working groups on more than 120 specialized areas of marine science, and has a peer review system for its publications. ICES partners with international agencies and is prepared to serve as a link between LME research and

monitoring and ICES specialized working groups. ICES is included among institutions collaborating in the GEF LME Community of Practice (CoP) initiative. ICES participation will help strengthen and promote North/South cooperation in marine scientific research and management.

Training support is available from ICES in stock assessment, integrated ecosystem assessment, function and management, ecosystem modeling for fisheries management, evaluation of fisheries management strategies, fisheries advice for stakeholders, NGOs and policy makers, fisheries management to meet biodiversity conservation needs, trawl survey design and evaluation, approaches to the integrated assessment of status and trends in marine ecosystems, communicating science and scientific advice, the impacts of climate change on marine ecosystems, Bayesian inference in fishery science, harmful algal blooms, and tools in remote sensing, GIS, and climate change science. Most courses are designed to conduct training for 20 to 25 participants over a course of one week of instruction. All ICES training courses can be found at www.ices.dk/iceswork/training/.

7.2 The CoralFISH Project; Contributing to the Assessment of Interactions between Coral, Fish and Fisheries in the Deeper Waters of the Celtic-Biscay Shelf

Anthony Grehan, Senior Research Fellow in the Department of Earth and Ocean Sciences at the University of Ireland in Galway, described the ecology and conservation of cold water coral reefs and the sustainable management of deep sea resources. He currently coordinates the EC Framework 7 project. For a description of the CoralFISH Program, see the website at: www.eu-fp7-coralfish.net). The program promotes ecosystem-based management of corals, fish, and fisheries in the deep waters of Europe and beyond.

7.3 Best Practices in TWAP for LME Assessment and Management

Kenneth Sherman, Director of the Large Marine Ecosystem Program, discussed best practices in TWAP for LME assessment and management purposes. He reviewed the framework of the LME approach to assessment and management of coastal marine goods and services. The areal extent of an LME is determined by four ecological criteria: bathymetry, hydrography, productivity, and trophodynamics. LMEs are global centers of efforts to reduce coastal pollution, restore damaged habitats, recover depleted fishery stocks, control coastal erosion, and expedite marine spatial planning. LME goods and services contribute \$12.6 trillion annually to the global economy. The GEF International Waters Operational Strategy supports the paradigm shift toward ecosystem-based LME restoration actions and TDA/SAP priority actions. Eighty percent of the world's average annual fisheries catches (in the last five years) are produced in the 64 delineated LMEs. An accelerated warming trend has been identified in 61 of the 63 LMEs. Adaptive ecosystem-based management was first initiated for the U.S. Northeast Shelf LME. This LME has a mean annual primary productivity level estimated

at about 350 grams of carbon per square meter per year. Estimates indicate the LME could support approximately 1 million metric tons of sustainable fisheries yield annually.

Dr. Sherman described the recovery of sea scallops in the U.S. Northeast Shelf LME. Dr. Sherman indicated that developing countries are initiating the LME methodology and implementing the 5 module approach (i) productivity, (ii) fish and fisheries, (iii) pollution and ecosystem health, (iv) socioeconomics, and (v) governance. There are presently 17 international LME projects funded by GEF at a level of \$3.1 billion. The LME movement includes 2,500 LME experts and practitioners, and is presently partnering with five UN agencies to provide scientific and technical support to 110 countries.

7.4 Status Report on the GEF LME Community of Practice (CoP) Project

Vladimir Mamaev, GEF Regional Technical Advisor for UNDP-Europe, reviewed the global Community of Practice (CoP) project, whose objective is to generate knowledge, build capacity, identify public and private partners, support South-to-South learning and improve the performance of International Waters projects through a Community of Practice for ecosystem-based management approaches to LMEs and their coasts. The project aims to enhance ecosystem-based management by providing training and educational opportunities for up to 10,000 LME practitioners. A new website will provide the means for capturing and sharing best practices amongst LME project practitioners and develop methodologies and tools to enhance the effectiveness of LME assessment and management. An LME/ICM Toolkit will be developed for adaptive ecosystem-based management, training, education, and best practices. The GEF advocates partnerships, project twinning and learning exchanges, workshops, training and outreach. The results coming from the LME/ICM projects should be published in peer-reviewed scientific, coastal and ocean management journals. The CoP project will be presented to the GEF Council meeting in May 2012, and other meetings in the course of 2012. The project is scheduled to begin in January 2013. The project draft is ready, and comments on the PIF have been received and are being incorporated.

7.5 Integrated Assessment: the Baltic Experience

Yvonne Walther, of the Swedish Board of Fisheries and member of the ICES Science Committee (SCICOM) described the process underway for developing the ICES Science Plan, including effective communication of research results; cross cutting activities in ICES; and cross disciplinary coordination of integrated ecosystem-based assessments within the science network. SCICOM reports are available at www.ices.dk/iceswork/scicom. Walther examined the LMEs of the Baltic Sea, North Sea, Celtic Biscay Shelf, sub Arctic areas, and Northwest Atlantic. In the Baltic Sea LME, Walther is involved in fish stock assessments and is participating in the process of assessing the stocks of cod, herring and sprat. Expert ICES groups are working on integrated ecosystem assessments. The ecosystem approach to assessment and management is included in the Baltic Sea LME BONUS Program. The Program results

are made available to ICES Advisory Groups and HELCOM. Accomplishments of the Baltic Sea LME Project and Baltic Programme for pollution and ecosystem health, contaminants, pathology and diseases can be applied in other north temperate LMEs.

7.6 Estimated number of LME Practitioners and goal of 10,000 Practitioners

Marie-Christine Aquarone, Deputy Director of the LME Program, is preparing outreach materials to be used in the GEF Community of Practice (CoP) project for the training of 10,000 practitioners by 2015. An LME practitioner is defined as (i) a person engaged in the recovery and sustainability of LME goods and services, (ii) is knowledgeable and engaged in the paradigm shift from a sector-by-sector approach to ecosystem-based management, and/or (iii) a person with an overall understanding of the transboundary nature of ocean productivity, fish and fisheries, pollution and ecosystem health, and socioeconomics and governance.

Outreach, education and training goals are to (i) define who the LME practitioners are, (ii) share knowledge, experience and lessons learned among LME practitioners, (iii) disseminate information, (iv) fulfill training needs, and (v) expand the network of LME practitioners. The project will involve 110 countries and 17 LME projects in Asia, Africa, Latin America and Eastern Europe. The community of LME practitioners includes scientists, researchers, technical experts, engineers, professionals, academics and students, the public, resource and ecosystem managers, government representatives, partnering agency officials at both the national and international level, and private companies.

Among the training tools for ecosystem-based management are fisheries carrying capacity, economic, and biogeochemical models including: Ecopath with Ecosim (fish & fisheries module), NEWS on the global watershed nutrient export model (pollution & ecosystem health module), a Red Sea economic valuation workshop (socioeconomics module), and a workshop in Newport on socioeconomics and governance. The DVD "Turning the Tide" has been shown in schools in the U.S. and in Ghana. Student reactions to the film have been posted on the LME website at www.lme.noaa.gov.

7.7 Training LME Practitioners

Werner Ekau, of the International Ocean Institute Center for Tropical Marine Ecology in Bremen, discussed the training of LME Practitioners. He provided examples of courses for training in fisheries. Dr. Ekau indicated that there is an increased demand for environmental scientists with a broad understanding of the sectors of administration and industry. Scientific capacity, especially in developing countries, needs to become more developed. The exchange of information between countries, levels and disciplines must be improved. The political will for action needs to be strengthened, based on new information and an increased awareness of environmental problems facing today's

LMEs. Short one to two week courses are required for short-term capacity development needs and goals. He gave the example of the BCLME's list of training courses. To further educate practitioners, he said three to six week courses should also be held. These courses will serve to strengthen local and national institutions to build a new generation of practitioners. Support for these courses could be made available by partnerships with Bachelor of Science or Master of Science study programs. Examples of specific courses include the International Ocean Institute's (IOI) Ocean Governance course offered at Dalhousie University, the IOI Regional Governance Course offered in Malta, the Marine Affairs Course at the University of Rhode Island, and the International Masters course in Aquatic Resources Management at Bremen. In the Benguela LME Region, support from the University of Namibia and the University of Angola in the Southern African region would help to establish short courses on special issues, and provide on-site training of scientists and technicians for research projects and oceanographic cruises, as would the University of Cape Town in South Africa and the University of Ghana.

8.0 CONCLUDING DISCUSSION

8.1 Summary of the two-day Meeting

Professor Gotthilf Hempel provided a commentary on present and future needs during the proceedings of the consultative committee meeting. He noted that Ken Sherman connected the five modules to assessment strategies for addressing global climate change, integrated ecosystem-based coastal management and loss of biodiversity. He also pointed out the side effects and severity of global warming in different regions and said that the growing phenomenon of eutrophication has detrimental effects on marine food webs. In order to follow these effects on marine food webs, catch data must be accurate. Daniel Pauly, Dr. Hempel's former student, spoke on the poor-quality of official catch data collected from the countries where his Sea Around Us followers were. Pauly has invented an index of the rebuilding of stocks which demonstrates the positive development of well-managed stocks under stable environmental conditions. He provided indices on trophic levels and the sustainable quantity of primary production required for present and past fisheries. Pauly also presented a database mainly derived from literature and said that there is a need for far more fisheries assessment and management practitioners. Sherry Heileman outlined the Transboundary Waters Assessment Program, which relies on publicly available information provided by the Sea Around Us and other publications. GEF has created a revised project identification form (PIF) for a four year project, the Community of Practice (CoP) for all LME projects. The CoP project, as presented by Vladimir Mamaev, will consist of (i) networking, (ii) best practice development, (iii) capacity building, and (iv) communication and outreach. Each project component will be funded at a level of one million US dollars. Under the capacity building component, 10,000 practitioners are expected to be trained. The final version of the CoP PIF will include the potential role of ICES in advanced training and networking and in providing

management advice. No funding is expected before 2013. The IOC is interested in housing the project coordination unit.

Hashali Hamukuaya discussed the establishment of the Benguela Commission and the scientific surveys and research projects carried out partly in cooperation with partners from overseas. Qisheng Tang, from the Yellow Sea LME, indicated that the coastal waters off China are impacted by the interaction of fisheries, mariculture, eutrophication and climate change. Tang described efforts being made to further the development of more environmentally friendly mariculture. Hein Rune Skjoldal demonstrated the value of large data sets of Norwegian catch statistics. Long period fluctuations in biomass, age structure and catch data have occurred in the past 120 years in the Norwegian Sea LME. No continuous downward trend can be derived from those data. Skjoldal emphasized the need to put more effort into the integrated assessment of natural and human factors governing the outcome of fisheries. Gennady Matishov reviewed progress made in the development of an Atlas of the Arctic LMEs of Russia. The Atlas is an attempt to compile data for a coherent picture of dynamic systems in the Arctic.

A global community is needed to share experiences and expertise among LME projects and LME practitioners. There is also a need for new strategies for the collection of data and data analysis in order to disentangle variability at different scales of space and time. It is necessary to dig out existing data from literature and to gather reliable data collected over large time scales using advanced techniques for surveys and fixed stations at key positions. Networking is a useful tool to cope with the complexity of systems like LMEs, where scientists of different disciplines and other professionals have to address the interaction of humans and nature and its resources. Networking and sustainability science were outlined by Suzanne Lawrence. FAO and the IUCN described their role in LME research, governance and management. FAO has a great interest in LMEs and the ecosystem-based management of fisheries. The participants were reminded of the forthcoming theme session at the Science Conference of ICES in Gdansk in September.

In conclusion, the LME concept is seen worldwide as an important approach towards the sustainable management of resources at the margins of the ocean basins. There is a need for harmonizing activities within the worldwide LME movement in terms of capacity building, and creating new tools for monitoring and sustainable management. Beyond the seed money that will be provided by the GEF for the CoP project, more effort is required to pull together the vast but scattered potential of the various LME projects. The ICES Working Group on Best Practices will be of help in this direction. Some research scientists emphasized the stability and resilience of marine ecosystems, others their periodic fluctuations and stochastic events, and others saw the overriding role of global warming and "regime shifts." For two decades, climate change has been at the top of the scientific research agenda. However, the focus on global warming might soon be followed by a paradigm shift to other, more direct human impacts related to the rapidly growing human populations along the coasts worldwide.

Higher demands for mariculture but also for energy from the sea and for shipping, tourism, mining, and waste disposal, call for prudent coastal zone planning that has to build on good base line data and a better understanding of the underlying ecological processes. We need reliable data collected in a standardized format over a long period of time.

ANNEX I: Wendy Watson Wright – Opening Remarks

Dr. Wendy Watson Wright, Director General of the IOC-UNESCO, greeted the participants. She indicated that the IOC said is delighted to host, for the 13th time, the LME Consultative Meeting.

The meeting provides a way for scientists and practitioners within the LME community to communicate their work in various areas of the globe. The LMEs are also supported by the IUCN, NOAA, UNEP, UNDP, and the GEF. The IOC will continue its support for the LME programs and considers LMEs as effective building blocks for designing an integrated ocean assessment, as proposed under the UN Regular Process for the Global Assessment of the marine Environment. The UN Regular Process is gathering momentum, following the agreement it reached in New York at the end of June 2011. The UN Member States have come to an agreement regarding how to conduct the first cycle of the Regular Process. This will include the Ad Hoc Working Group of the Whole, which is made of all UN Member States. The purpose of the Ad Hoc Working Group of the Whole is to oversee the implementation of the Regular Process. The Regular Process will also include a group of experts, appointed by UN Member States, who will prepare the assessment report due at the end of 2014. It also includes experts who will support the development of the first integrated assessment.

To facilitate dialogue among the Group of Experts of the Regular Process, representatives and experts from UN Member States, and relevant intergovernmental organizations and regional level programs, workshops will be held. These Regional Workshops will be organized from mid-July of 2011 until April 2012. The IOC believes the participation of the LME projects will be critical in reflecting the available information and data collected and utilized by countries using the transboundary water management approaches. The IOC, in collaboration with the Regular Process Secretariat, the Division of Ocean Affairs and the Law of the Sea (DOALOS), and UNEP will continue to support the implementation of the Regular Process.

The GEF Transboundary Water Assessment Program (TWAP), is partially executed by the IOC and the International Hydrological Program of UNESCO, under the overall implementation of UNEP. It is a contributor to the Regular Process and to LME assessments. GEF has recently received a completed report from a GEF Medium Size Project which studied the indicator-based methodology for assessing the changing conditions of five different types of transboundary water systems. This approach will be used in conjunction with the five existing LME modules and will be applied to LMEs and will consist of populating a core set of status indicators. This will allow for global comparisons and prioritizations for interventions to be made, as well as financial allocations from GEF and other donors. This methodology will provide a forecast of the status of LMEs in 20 or 40 years from now. This project is also creating a link between institutions and will participate in and contribute to the conduct of a TWAP Global Assessment that GEF is considering funding. IOC believes this is an important partnership and it builds around an existing, successful network.

The IOC hopes that in November GEF will provide funding to the Full Size Project proposal that was submitted last March and is currently being considered for funding still by GEF. If the Full Size Project proposal is given funding by GEF it will help individual LMEs and national policy makers in assessing the overall health of their resources and anticipating future stressors of their marine ecosystems.

Last week the IOC completed the 26th session of the IOC Assembly and the Member States endorsed a revised strategy for the ICAM Program of the IOC. This revised strategy promotes an improved integration of area-based management tools that the Commission has been promoting for many years. Such area-based management tools include Integrated Coastal Area management, Ecosystem-Based Management, marine Spatial Planning, and the Large Marine Ecosystem Approach. It is timely that the ICM and LME communities gather to discuss ways to ensure that the ecosystem-based management approaches are in place and coherent. IOC will continue its work on marine spatial planning thanks to the support provided by the Moore Foundation. Under this new project, the IOC plans to review practical measures for improving spatial integration in the marine environment and focus on developing principles for monitoring and evaluating marine Spatial Planning. The IOC also plans to communicate these principles in a guidebook it will be developing for practitioners.

The UNDP and GEF provides the foundation for the development of an LME Community of Practice and the IOC is looking forward to continuing discussions on this topic which took place last year. Rio + 20 will provide a unique opportunity for promoting LMEs and will promote the assessment of progress on targets agreed upon at the 2002 World Summit on Sustainable Development, specifically on the ‘application of the ecosystem approach.’ Rio +20 will be an excellent way to showcase the achievements of the LMEs over the past decade and to propose new targets and specific priorities for consideration. The IOC and its UN partners, such as UNDP and UNEP, will play a lead role in highlighting ocean issues at Rio +20, both as a contributor of the UN-wide system and as an advocate for a stronger recognition of the ocean in the Blue-Green economy. The IOC looks forward to hearing the conclusions of the discussions taking place at this Paris meeting and encourages participants to call on the IOC Secretariat should they need any assistance.

**ANNEX 2: IOC-IUCN-NOAA Large Marine Ecosystem
13th Consultative Committee Meeting
Paris, FRANCE
12-13 July 2011
AGENDA**

DAY 1 - July 12, 2011

TIME	TOPIC	SPEAKER
9:00 am - 12:15 pm		
	IOC WELCOME	Wendy Watson-Wright Luis Valdes
	ADVANCING SUSTAINABLE DEVELOPMENT IN LMEs DURING CLIMATE CHANGE	
	Accelerated Warming & Emergent Trends in the World's Large Marine Ecosystems	Kenneth Sherman
	Fisheries Trends in LMEs	Daniel Pauly
	Effects of Climate Change on the Agulhas and Somali Currents LME (ASCLME)	David Vousden
10:30 am - 10:45 am	COFFEE/TEA	
	Report on the Meeting of the Transboundary Waters Assessment Programme (TWAP)	Julian Barbiere Sherry Heileman
	Advancing Sustainable Development during Climate Change within the UNDP LME Portfolio	Andrew Hudson
	GCLME NAPs, SAP and Best Practices; Outcome of Caucus on African LMEs; & Update on the Interim Guinea Current Commission (IGCC)	Stephen "Max" Donkor, Christian Susan
	Monitoring Climate Change in African LMEs through the GOOS-Africa network	Justin Ahanhanzo
12:15 pm - 1:30 pm	LUNCH	
1:30 pm - 5:00 pm	Topic - cont'd	
	Deepwater Horizon Impact on the Gulf of Mexico LME Project Implementation	Antonio Diaz de Leon, Porfirio Alvarez, & Bonnie Ponwith
	Toward a Large Marine Ecosystem-based Sustainability Science Knowledge Network	Suzanne Lawrence
	Towards Management of a Sustainable California Current LME - Assessing Ecosystem Health & Forecasting Climate Impact	Harold Batchelder

DAY 1 - JULY 12, 2011 (cont'd)

TIME	TOPIC	SPEAKER
	FAO Portfolio Overview of GEF LME Projects	Merete Tandstad
	Status of the Canary Current LME Project	Birane Sambe
	IUCN Perspective on Community based Advances in LMEs	Aurelie Spadone
3:15 pm - 3:30 pm	COFFEE/TEA	
	Socioeconomic & Sustainability Indices in LMEs	Jacqueline Alder
	Community-based Assessment & Governance in the Agulhas & Somali Currents LME Project	Magnus Ngoile
	MedPartnership Activities Related to Adaptation to Climate Change	Jose Luis Martin Bordes
5:00 pm	ADJOURN	



DAY 2 - July 13, 2011

TIME	TOPIC	SPEAKER
9:00 am - 12:00 pm	ADVANCING SUSTAINABLE DEVELOPMENT IN LMEs DURING CLIMATE CHANGE (cont'd)	
	Status Report on GEF LME Community of Practice (CoP) Project	Vladimir Mamaev
	Assessment & Monitoring of the Benguela Current LME in Support of the Benguela Current Commission	Hashali Hamukuaya
	Changing Conditions of the YSLME in Relation to Carrying Capacity for Sustainable Fisheries Yields	Qisheng Tang
10:30 am - 10:45 am	COFFEE/TEA	
10:45 am - 12:15 pm	Topic - cont'd	
	Best Practices in Assessment & Management in the Barents Sea and Norwegian Sea LMEs during Climate Change	Hein Rune Skjoldal
	Atlas Preparation for the Russian Arctic LMEs & Adjacent LMEs	Gennady Matishov
	APEC LME Project	MC Aquarone

DAY 2 - July 13, 2011 (cont'd)

TIME	TOPIC	SPEAKER
12:15 pm - 1:30 pm	LUNCH	
1:30 pm - 6:00 pm	ICES WORKING GROUP ON LME BEST PRACTICES	ICES Co-Chairs: Michael O'Toole, Jan Thulin
	Introduction & Overview	Jan Thulin Michael O'Toole
	The CoralFISH Project: Contributing to the Assessment of Interactions between Coral, Fish and Fisheries in the Deeper Waters of the Celtic-Biscay Shelf LME	Anthony Grehan
	Best Practices in TWAP for LME Assessment & Management	Kenneth Sherman
3:00 pm - 3:15 pm	COFFEE/TEA	
3:15 pm - 6:00 pm	BEST PRACTICES FOR CAPACITY BUILDING & MODELING FOR LMEs	
	Integrated Assessment: The Baltic Experience	Yvonne Walther
	Estimated Number of LME Practitioners & Goal of 10,000 LME Practitioners	MC Aquarone, Werner Ekau
	Summary	Gotthilf Hempel
	Discussion/ Planning Session on Best Practices in LMEs	Co-Chairs & ALL
	CONSULTATIVE COMMITTEE MEETING ON LMEs	
	Discussion/ Planning Session LME Consultative Committee 2011-2012	Chair & ALL
6:00 pm	ADJOURN	

ANNEX 3:

IOC/UNESCO-IUCN-NOAA Large Marine Ecosystem

13th Consultative Committee Meeting

12-13 July 2011 – Paris, FRANCE

Participant Contact List

(July 1, 2011)

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