IOC/INF-1286
Paris, 19 June 2011
English only

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

INFORMATION DOCUMENT

PROGRESS REPORT ON THE IMPLEMENTATION OF THE OCEAN SCIENCES SECTION WORK PLAN (2009–2011)

Summary. This document reviews the progress of the IOC Science Section work plan which was presented and approved by the 25th IOC Assembly (IOC/INF-1259). It highlights the activities where we were most successful, reviews the current stage of main OSS programmes and discusses the expectations for the next biennium, when the IOC Medium-term Strategy 2008-2013 will reach its end. Most of the targets for the period covered in this report (Jan2009/May2011) were achieved and where necessary the plan was adjusted in order to fulfill the objectives on time.

The OSS was successful in pursuing the functions of coordinated science innovation and management, science synergy, scientific services, outreach and capacity building (as defined in document IOC/INF-1259). In terms of resources, the section was reinforced with new staff, but recent changes could result in a reduction of capacities and therefore in a new re-structure of duties.

Introduction

1. The Medium-term Strategy for 2008-2013 (34 C/4) sets out the strategic vision and programmatic framework for UNESCO's action over these six years in all its domains of actions at the global, regional and country levels. This Medium-term Strategy defines a common framework for all UNESCO Sectors and was followed by sectoral plans such as the IOC Medium-term Strategy 2008-2013, which identifies 4 High-level Objectives (HLO) in accordance with UNESCO strategy and within the IOC mission statement.

2. During the 24th and 25th sessions of the IOC Assembly, the Ocean Sciences Section (OSS) presented a perspective on how the current scientific programmes under the OSS contribute to the different IOC HLOs and a work plan to be developed from 2009-2013 respectively. At the 25th session, the Assembly requested the Executive Secretary to report on progress in the implementation of the work plan at its 26th Session.

3. The current progress report is part of the regular cycle of management and it reviews the progress on the IOC Science Section work plan (IOC/INF-1259). It provides an overall summary of the progress made in each HLO, highlights key outputs and activities to illustrate how this progress was achieved. It also reviews the current stage of main OSS programmes and discusses the expectations for next biennium, when the IOC mid term strategy 2008-2013 will reach its end. The process included a review of human resources allocated to the OSS and a summary of extrabudgetary funds obtained from donors and member states.

4. Beyond the principal goal, this review has many other benefits, including: (i) it will help us to identify gaps, (ii) prioritize activities to the end of 2013, (iii) fostering the development of clear, appropriate, measurable outcomes, (iv) rationalizing resources to support science and (v) make required adjustments to cost plans.

5. As with the work plan (IOC/INF-1259), the present report includes several tables featuring an "at-a-glance" summary to help the reader more easily evaluate overall progress made in each HLO, and also an Annex 1 that details the activities, actions and benchmarks for the reporting period.

Implementation of the science work plan: period 2009-2011

6. The IOC Ocean Science Section work plan adopted in 2009 (IOC/INF-1259) was organised around the IOC Mission, the high level objectives for the period 2008-2013 and the priority areas of research determined by the *ad hoc* Advisory Group for the IOC Ocean Sciences Section (climate change, ocean health and coastal research, assessment and management and modelling). The focus of the work plan intended to make all science efforts as extensive and global as possible and in line with the functions of promoting science innovation and management, science synergy, scientific services, outreach and capacity building as defined in document IOC/INF-1259.

7. The concrete activities of the OSS carried out during 2009-2011were clustered around the HLOs and the priority areas of research (climate change, ocean health, tools for management) and activities included promotion and coordination of funded programmes (science innovation and management), stimulating co-operation between researchers and organisations to explore new directions and emerging issues (science synergy) and providing scientific criteria for ecosystem management (scientific services). OSS was also at the forefront of many important international developments and events (guidelines, publications, symposia, etc.) (outreach), and also contributed to build scientific capabilities in the developing world, especially in Africa, in line with UNESCO's priorities (capacity building). All these take place in a wide range of scientific areas.

8. The biennium witnessed significant progress of the OSS work plan objectives as detailed in Annex 1. Concrete examples of highlights achievements, emerging issues, outreach, etc, are given in the following sub-sections.

i. Highlights of achievements and progress made within the 2009 work plan

9. The biennium has seen a maturing of the relationship between programmes coordinated by IOC and communication with decision makers that resulted such as the establishment of the Global Assessment as a regular process connecting observations, prediction and information in a single process. Efforts during the biennium included support for work on new frameworks of cooperation and also witnessed significant influence in the scientific community by the introduction of new concepts, guidelines and the coordination of successful programmes.

10. It is unfeasible to summarise here all the activities where we got recognition; the five that are listed below were especially important for IOC due to the potential implications for our future work or for other reasons.

- **GLOBEC** was initiated by the Scientific Committee on Oceanic Research (SCOR) and the Intergovernmental Oceanographic Commission (IOC) of UNESCO in 1992, with the aim to advance our understanding of the structure and functioning of the global ocean ecosystem, its major subsystems, and its response to physical forcing so that a capability can be developed to forecast the responses of the marine ecosystem to global change. GLOBEC has officially concluded its timeline in 2010 and now we have the complete figure: a community of practice involving 1800 scientist, more than 3000 papers published in peer review journals, a conceptual approach to marine ecosystems and scientific legacy that still continues in 25 countries, etc. GLOBEC was recognised by the sponsoring organizations (SCOR, IGBP and IOC) as a very successful project and an inspiration to others.

- The establishment of a **UN Regular Process for Global Ocean Assessment** is one of the major overall achievements of chapter 17 of Agenda 21 'to promote the sustainable utilization and conservation of the marine environment and its resources, both in the oceans and in coastal areas'. The UN Regular Process was formally approved by the UNGA in 2010 after many years of work and coordination by IOC, UNEP and DOALOS.

- The **Blue Carbon concept** was introduced quite recently (2009) by UNEP, FAO, IUCN and IOC and it was very easily assimilated by the scientific community and also by the decision-makers. Blue carbon concept emphasizes the ability of marine and coastal ecosystems to sequester carbon. These ecosystems, which are dominated by marine vegetation such as mangrove forests, seagrass, brackish marshes and salt marshes, are believed to be able to complement the role of forests (Green Carbon) in taking up carbon emissions through sequestration. This new concept was incorporated in the agenda of Rio+20 linked to the green and blue economy.

- The **Marine Spatial Planning**: a step-by-step approach toward ecosystem-based management guideline was published in 2009 and very soon got the recognition of decision makers as an outstanding product of IOC. This guideline is considered a standard reference for MSP and was translated to several different languages: Russian, Chinese, Vietnamese and is being translated to Spanish and Portuguese. IOC continues as a leader in the promotion of methodologies for a better management of coastal areas.

- The creation of new framework structures of cooperation like **WAMS** (World Association of Marine Stations) is an achievement in line with chapter 17 of Agenda 21 'Strengthening international and regional cooperation and coordination'. This world association has the potential to become a keystone in a global network of marine stations, uniting the existing marine stations and their regional networks, and create opportunities for expanded

collaborations all over the world. IOC has been in the origin of WAMS and would like to use WAMS as a strategic framework for capacity development.

ii. Responding to emerging issues

11. The IOC planning process involves recognizing trends in sciences, promoting marine science innovation, and assessing key emerging issues. This special attention to planning and forecasting of new developments in ocean sciences is essential to pave the way, engage and prepare IOC towards the future and therefore to react in due time to new elements that threaten the marine and coastal environment or require a coordinated approach such as: marine debris, geo-engineering, biodiversity of deep seas and the conservation and sustainable use of marine genetic resources, renewable energies, marine noise, etc. to cite some of the topics that are currently being debated by DOALOS (ICP 2011, work doc A/66/70/Add.1).

12. Capacity of IOC to address such emerging issues is limited due to different causes, but because of its strategic value, the OSS has included as part of the work-plan some actions in geo-engineering, biodiversity of deep seas and marine plastics/microplastics that are being successfully undertaken.

13. **Geoengineering** is an emerging umbrella issue that incorporates a number of important developing activities. Geo-engineering is at such a nascent stage that its precise definition, or the scope of activities which may be considered to be geo-engineering, continues to be deliberated upon. Generally, geo-engineering is the deliberate, large-scale alteration of the global climate system with the goal of mitigating the impacts of climate change. Geo-engineering activities are seen as controversial and in need of legitimate scientific research owing to a lack of information regarding the effectiveness, possible benefits and potential undesirable impacts of individual activities. Moreover, the science itself and governance of many geo-engineering activities is also poorly understood.

IOC Action	Indicators of performance/ Course of action
IOC with the UNESCO SC convened an international expert meeting in November 2010 on geo-engineering science and associated governance issues	A policy brief on Geoengineering Techniques is *in press* (UNESCO-SCOPE series). A peer review paper on geoengineering will be submitted to Environmental Development Journal by August 2011 A new international work-shop will be organized by the end of 2011 (IOC+UNESCO SC+ Royal Society of London). Conclusions and final Report to be completed in 2012.
IOC provided a scientific summary of the state of knowledge on Ocean Fertilization to the Parties of the London Convention-London Protocol	Wallace, W, CS Law, PW Boyd, Y Collos, P Croot, K Denman, PJ Lam, U Riebesell, S Takeda, & P Williamson. 2010. Ocean Fertilization: A Scientific Summary for Policy Makers. IOC/UNESCO, Paris (IOC/BRO/2010/2), 20pp.

14. Human activity and its footprint are moving progressively into deeper waters and there is a need to close the knowledge gap concerning especially **vulnerable deep-sea ecosystems**. The open ocean beyond the 200 nm limit comprises approximately 50% of the Earth's surface. In the open ocean and deep-sea, there exists a variety of habitats and features of scientific and economic interest, including hydrothermal vents, polymetallic nodules, gas hydrates, transboundary fish stocks, and deep-sea coral reefs. Our knowledge of this life in the deep-sea environment is limited and no complete catalogues of the species or habitats present in these environments exist. Further work must be done soon so that potential high-seas Marine Protected Areas can be identified and monitored before damage to these fragile ecosystems occurs.

IOC Action	Indicator of performance/ Course of action
IOC has auspiced the pilot project: "Biodiversity and distribution of megafaunal assemblages in the abyssal nodule province of the eastern equatorial Pacific".	Conclusions published in: Tilot, V. 2010. Biodiversity and distribution of faunal assemblages vol 3: Options for the management and conservation of the nodule ecosystem in Clarion Clipperton fracture Zone. IOC Technical series No. 69, 117 pp. Task completed in 2010

15. **Marine plastics** are both a symptom of unsustainable development practices and a challenge for achieving sustainable development. Its presence in the oceans is a result of anthropogenic activities, both on land and at sea. Attention has been drawn to high levels of accumulation of plastics and other marine debris in high seas convergence zones, also known as "ocean gyres", but the presence of plastic pellets in beaches around the world is also a cause of concern. As plastics are fragmented, they form smaller particles called microplastics, which have direct effects on wildlife.

IOC Action	Indicator of performance/ Course of actions
IOC with GESAM and partially funded by SIDA and the EU has organized in June 2010 an international workshop on: Micro-plastic particles as a vector in transporting persistent, bioaccu-mulating and toxic substances in the oceans.	The workshop was very well attended by scientist, industry and policy makers and the conclusions were reported in: GESAMP. 2010. Proceedings of the GESAMP International Workshop on plastic particles as a vector in transporting persistent, bioaccumula-ting and toxic substances in the oceans. Bowmer, T. and Kershaw, P.J. (Eds.). GESAMP Rep. Stud. No. 82, 68pp. IOC and UNEP will lead a group under the coordination of GESAMP. This group will work during 2012-2013 and will be sponsored by several UN agencies and by Plastic Europe.

iii. Outreach to different communities and conferences

16. Outreach and communication is a key function of IOC to (i) promote and increase the general awareness of the benefits of oceanographic research and (ii) guarantee that new findings, methods and models are delivered at global scale in timely manner. OSS has developed a wide range of outreach activities, from own web-sites and newsletters addressed to specialist, to more basic products and publications directed towards a more general audiences; these include: guidance and tools (knowledge management), publications (from scientist to general public) and symposia and conferences.

17. **Knowledge products** help to inform stakeholders on practice in the establishment of guidelines and good practices. Since 2009 IOC has been very active in producing guidelines and other manuals, some of them being now considered to be the standard references in their fields (e.g. Marine Spatial Planning: a step-by-step approach toward ecosystem-based management).

IOC Action	Indicator of performance/ Course of actions
Publication guide on Hazard Awareness and Risk Mitigation in Integrated Coastal Area Management. 2009.	Endorsed by WMO Widely circulated, and included by a number of countries as resource in national preparedness strategies. A new project will start in 2011 focusing on mitigation and adaptation to coastal hazards.
Publication of Marine Spatial Planning Guide. A Step-by-step Approach. 2009. 99 pp. (English). ICAM Dossier No. 6. 2009	One of the most quoted recent IOC publication. Translated in Spanish, Russian, Chinese, Vietnamese, Portuguese by and at the request of MS. A new guide is in preparation focusing on the evaluation of the MSP process.
Publication of Global Open Oceans and Deep Seabed (GOODS) Biogeographic Classification. 2009	Submitted to the Convention on Biological Diversity to provide scientific information for defining ecologically sensitive areas in the high seas. Quote in the UN Secretary General 's Report on oceans
Manuals & Guides No. 55, Microscopic and molecular methods for quantitative phytoplankton analysis. 2011	Description of standard and new methologies for phytoplankton analyses demanded by the scientific community

18. **Publication of research articles** in scientific journals are the natural channel to communicate new achievements, findings and reviews of certain topics that need to be discussed among the scientific community, but IOC has also a compromise with the wider public to make the marine knowledge available to the policy makers and the entire society. Some of the OSS publications (aimed to the great public and policy makers) were very welcomed, translated to different languages and reprinted several times.

IOC Action	Indicator of performance/ Course of actions
Ocean acidification	The proceedings of the International Symposium The Ocean in a High-CO_2 World II were published in *Biogeosciences* (6), 2009. A scientific summary for policy makers was published in 2009 and reprinted several times in English, Spanish and French.
Ocean Fertilization	A Scientific Summary for Policy Makers on Ocean Fertilization was published in February 2011 (Wallace, W, CS Law, PW Boyd, Y Collos, P Croot, K Denman, PJ Lam, U Riebesell, S Takeda, & P Williamson. 2010. Ocean Fertilization: A Scientific Summary for Policy Makers. IOC/UNESCO, Paris (IOC/BRO/2010/2), 20pp). This was a major contribution to awareness raising and information on ocean acidification.
Volume of *Oceanography*	To celebrate the IOC 50 anniversary. Compiles a set of articles describing IOC activities. 3 Articles were leaded by IOC OSS staff
Special GEOHAB	Journal of Marine Systems, Volume 83, Issues 3-4, Pages 105-298 (November 2010), with 17 papers reviewing current abilities to model HABs

19. Scientific **Conferences and Symposia** constitute an effective and practical manners for the scientific community to communicate progress in their research field, discuss applications of new technological developments, exchange experiences, identify synergies, find new research directions and ideas, and make new liaisons. In the period 2009-2010 IOC has financed and collaborated in many initiatives promoted by third parties, but the short-term objective is to consolidate the "Effects of Climate Change in the World's Oceans" and the "The Ocean in a High-CO_2 World" as 2 flagship symposia of IOC (both are convened every 4 years and next edition will be in 2012), which will join the HAB Conferences which is already a reference in its field (cosponsored by the IOC for 25 years).

IOC Action	Indicator of performance/ Course of actions
Global Oceans Conference 2010	The Conference brought together over 850 experts from 80 countries representing all sectors of the global oceans community: governments, international agencies, nongovernmental organizations, industry, scientific groups, academia, and museums and aquaria. The conference outputs are: • Conference Summary Report (IISD Reporting Services) • Co-Chairs' Concluding Statement • Policy Briefs on: > Oceans and Climate Change > Marine Biodiversity and Networks of MPA > Improving Governance
HAB	The series of 'International Conference on Harmful Algae' have been cosponsored by the IOC for 25 years and the Secretariat has been part of the organizing committees for the past 15. The conferences are organized by the International Society for the Study of Harmful Algae (ISSHA).
Effects of Climate Change in the World's Oceans	12 international research programmes and organizations have joined as co-sponsors/funding agencies To be celebrated in May 2012. Yeosu (Korea)
The Ocean in a High-CO_2 World	Third Symposium sponsored by IOC, SCOR and IGBP To be celebrated in September 2012. Monterey (USA)

iv. International cooperation and capacity development

20. IOC promotes international cooperation and capacity development at the institutional level to enhance the international cohesion in science and development. Both are cross-cutting issues that embrace different HLOs and sections in IOC.

21. OSS maintains relationships with a wide compendium of UNESCO Sectors, UN Agencies, International Councils (ICES, PICES), global programmes (IGBP), NGOs (ICSU, SCOR, IUCN, CI), among others, with the spirit of contributing to a better science and governance for ocean sustainability. The biennium witnessed increasing coherence in coordination among partners at global, regional and national level, among the many examples we highlight the following:

Organization(s)	Action of cooperation
UN-Oceans	Establishment of two new Task Forces: Climate Change (lead agency UNEP) and Ocean Outreach (lead agency IOC) Review of UN Oceans work in progress. To be completed by the end of 2011

ICES-PICES	Cooperation with ICES on two working groups and cooperation with PICES on HAB capacity development. Cooperation with both in the organization of the International Symposium on Effects of Climate Change in the World's Oceans
ICSU	ICSU has launched the "ICSU visioning process: Grand challenges in Global sustainability research" and IOC as organized the second meeting in UNESCO and has had a proactive participation in the entire visioning process
SCOR	IOC has continued the longstanding partnership with SCOR in coordination international HAB research through the joint research programme GEOHAB and IOCCP.

22. In terms of Capacity Development, the OSS embraces the IOC principles and it is understood in a wide sense, e.g. the assessment of policy makers in best practices and alternatives to the management of marine ecosystems by their member states, as well as transferring scientific knowledge to less developed countries to improve their capabilities for economic development, social well-being and human quality of life. Many of these were the actions of OSS capacity development during the biennia including:

Area	Action on capacity development
Training Courses	Ten HAB CD courses implemented in 2010-2011 Marine Spatial Planning (Europe, Mediterranean, Black Sea) Development of Indicators for ICAM (Uruguay, CPPS region, PERSGA Region, Mediterranean) Coastal Adaptation Techniques (West Africa)
Transference of knowledge and technology	Adoption and strengthening of regional strategies and action plans in Climate Change in Africa and coastal management in Iberoamerica
New frameworks of cooperation	The establishment of WAMS (World Association of Marine Stations) is an achievement in line with chapter 17 of Agenda 21 'Strengthening international and regional cooperation and coordination'.
User engagement and communities of practice	The LME CoP will establish a global support network for the GEF LME and ICM projects and practitioners and provide leadership and coherent development assistance to States to increase their capacity to address climate variability and change and incorporate ICM. IndiSeas was created to evaluate the status of the world's exploited marine ecosystems subject to multiple drivers in a changing world in support of an Ecosystem Approach to Fisheries.

23. In summary, the OSS activities on international cooperation and capacity development were re-enforced in the biennium mainly by forging partnerships and by establishing international platforms.

v. Deviations and revision to work plan

24. The OSS workplan is comprehensive and also comprises priorities and activities identified and developed as activities under each of the focus issues. At the overall level of focus issues two issues identified in the workplan were deferred in the current biennium:

- **Upwelling systems**. In the current scenario of climate change there are controversial hypotheses on future trends for declining or strengthening the intensity as well as the seasonality of upwelling systems. In the work plan it was proposed to convene an expert

group to resolve this controversy. The topic is of interest for CLIVAR and some approaches were explored, however the decision was postponed until 2012.

- **Dead zones.** This is an emerging issue that we could not initiate during the biennium due to the lack of human and financial resources. We hope to explore it in 2012-2013.

25. At the level of activities identified and developed under each of the main focus issues a much larger number of initiatives and activities were not followed-up due to lack of funds and limited staff resources. This includes activities for which extra-budgetary funds were sought but not received:

- **Harmful algal event data compilation** and an integrated HAB information system as part of IODE has been set as a priority with the HAB and IODE programmes. The system has not been developed as foreseen during the biennium due to lack of financial resources; efforts to secure funding will continue in 2012-2013.

- **Capacity development at the regional level** in HAB observations and mitigation has not been provided to the extent requested by Member States due to lack of financial resources; efforts to secure funding will continue in 2012-2013.

- **To address Integrated Coastal Research** it was foreseen to have organized an international workshop on 'Nutrients and Coastal Impacts Research', but this was not feasible due to lack of financial resources.

26. Among the programmes that need to be reviewed two are of special importance for IOC and will be of interest to debate their continuation as part of the OSS work plan; these are ICAM and GEOHAB.

- Since the inception of **ICAM** in 1997, the field and application of ICAM have evolved substantively, and it is therefore timely to assess the present and future needs of IOC Member States in this area in order to define a new strategic orientation to the Programme. This issue will be discussed as point 8.2 in the agenda of the XXVI Assembly.

- Under the current terms of reference **GEOHAB** is scheduled to sunset in 2013. GEOHAB provides a unique ability to address underlying scientific questions and concerns related to harmful algae and their science based management. Recognizing that to fully realize the benefits of the accumulated investments in GEOHAB and to address any new priorities identified by the IOC in collaboration with SCOR and other relevant organizations, it would be desirable to extend specific GEOHAB Core Research Projects and framework activities beyond 2013. The IOC Intergovernmental Panel on Harmful Algal Blooms (IPHAB) has requested the GEOHAB SSC to summarize GEOHAB contributions, successes, and yet to be achieved objectives as part of a 10-year synthesis as well as to evaluate the need for new scientific foci in consultation with SCOR. This assessment shall provide the basis for a proposed revised Science Plan and outline of an implementation plan for GEOHAB beyond 2013. Pending a satisfactory revised Science Plan and outline of an Implementation Plan, IPHAB anticipates recommending to the Twenty-seventh Session of the IOC Assembly that GEOHAB continue beyond 2013 and that SCOR should be invited to continue as co-sponsor.

27. Finally it must be mentioned the needs and challenges that the WSSD Rio+20 is demanding. We have to be aware that responding to this challenge could result in a revision of priorities on other areas along the new biennium.

Rationalizing resources to support sciences

i. Human Resources

28. During the 24th Assembly it was raised the concerns about the limited staffing of the Ocean Science Section (IOC-XXIV/2 Annex 6). Whereas the list of activities required of the section was growing, the staffing situation of the OSS had been stagnant (2 core professional staff) over the previous 3 biennia (2002-2007). In 2008, a new Head of Section (P5 grade) was recruited, starting in his functions at IOC HQ in January 2009.

29. Steps towards the recruitment and management of human resources relative to workforce needs and identified functions also began in early 2009. Preliminary discussions began on a profiling exercise to review the current human resources structure and ensure its alignment to the global work plan to be carried out in 2010-2013. A fixed staff post (P4) on HAB was consolidated in 2009. In addition two P4 post funded by NSF and UNESCO FITOCA funds (Funds-in-Trust Overhead Costs Account) were recruited in March and May 2009 respectively. Finally in January 2011 a new professional (P3) funded by NSF completed the P-staff of the OSS. For the HAB programme local staff at the HAB Science and Communication Centers in Copenhagen and Vigo provide services to implementation of CD and regional HAB activities. To this staff posts a variable number of additional consultants and temporary posts were occasionally financed from regular and extrabudgetary sources to perform the tasks included in the work plan.

30. Currently (May 2011) we are searching for different options to replace the ALD who has completed a period of 2 years funded with Fitoca funds.

31. Regarding the administrative staff the reorganization of the IOC-AO resulted in the transfer of a G-5 post form the OSS to the IOC-AO. At present, the OSS only has one G staff and therefore needs to be reinforced to guarantee the internal organization, paperwork, management and relationships with other UNESCO departments.

32. Even if the P staff situation has improved since 2008, the need to reinforce the OSS staff (both G and P) and reach a critical mass of high quality professionals continues as a priority due to the constant increasing demand of duties and competences in ocean sciences demanded by the Member States. In this regards, Member States are encouraged to provide staff secondments in order to fully achieve the IOC High Level Objectives.

ii. Management of finances: Regular Budget and Extrabudgetary resources

33. The biennial (2010-2011) Regular Budget to implement the OSS work plan amounted to USD 815,600. These limited resources were often the biggest obstacle to the establishment and maintenance of effective activities and actions.

34. To better address the priorities of the Medium-term and Biennial Strategy, the OSS has elaborated a number of proposals for extrabudgetary funding which were submitted to open calls of different international funding agencies and donors amounting to a total of $5.9 millions. Next table shows the Funding proposals approved or submitted since 2009 and covering activities planned for one or more biennia in the current Medium-term Strategy (2009-2013).

Project/Activity	Funding agency	$ Amount (through IOC)	Duration	Status
Marine Spatial Planning	Gordon & Betty Moore	113,000	2009-2010	Approved
Transboundary Water Assessment Programme (TWAP)	GEF (MSP)	150,000	2009-2010	Approved
Adaptation to climate Change in Africa	GEF (FSP)	965,000	2008-2011	Approved
Marine Spatial Planning	Gordon & Betty Moore	380,000	2011-2012	Approved
PEGASO	EU FP7	300,000	2010-2013	Approved
IOCCP	NSF	750,000	2011-2013	Approved

ReCoHAB	KOIKA	455,000	2012-2013	Approved
Blue carbon-Blue forest	GEF (MSP)	~150,000	2012-2013	Submitted
LME Community of Practice	GEF (MSP)	~300,000	2012-2014	Submitted
Reducing nutrients enrichment and oxygen depletion from land based pollution	GEF (FSP)	~580,000	2012-2015	Submitted
Transboundary Water Assessment Programme (TWAP)	GEF (FSP)	1,800,000	2012-2015	Submitted

35. IOC is receiving regular contributions from a dozen of Member States and other agencies to support activities in HAB/GEOHAB, MSP, SPINCAM, the Regular Process, and IOCPP. The contribution of Flanders is especially acknowledged ($770,000 to finance SPINCAM activities for last and current biennium). Spain and Denmark funding is also remarkable as they support the centers of Vigo and Copenhagen.

36. Special initiatives such as the Plastics-Microplastics, Blue carbon and Geoengineering workshops, were mostly supported by the EC, SIDA, NASA, IUCN, CI and Gordon & Betty Moore Foundation.

37. In summary for the current biennium, the OSS has generated extrabudgetary resources at a level that exceed the ratio of 2.5:1 (EXB:RB), and above the average of IOC which was estimated approximately 1.5:1 over the period 2008-2010.

38. The estimated biennial (2012-2013) Regular Budget resources to implement the OSS work plan amounted to USD 740,600. Therefore, allocated resources will continue being a limiting factor to ensure that adequate funds are available for the planning, conduct, reporting, and dissemination and follow-up of activities in accordance with the work plan.

39. We expect that additional funds resources will be available during the next biennium as a concerted strategy in the submission of projects to external calls was chased (see previous table). A special mention should be made to the recent agreement with Brazil who will fund a 3-year project on Protection of ecosystems and Biodiversity in the South Atlantic ($6 millions 2012-2014).

40. During the next biennium, we also expect to increase the contribution from Member States, which have now direct access to the UNESCO Complementary Additional Programme (CAP). The proposals contained in CAP represent a first invitation to Member States to consider extrabudgetary contributions in a broader perspective than individual projects.

Conclusions

41. The IOC Ocean Science Section plays a lead role in creating the conditions for doing good science and building networks of scientific logistic facilities at global scale and regional scale. Since 2009 we have experience a significant progress of the OSS work plan objectives but there are still many things to do and we have adjusted the plan in order to fulfill the objectives on time.

42. Analysis of trends and emerging issues has become an essential tool for the preparation of research projects and OSS must kept proactive in identifying new challenging areas of research and in creating fora of discussion when needed. Moreover it is envisioned that this is a strategic direction to prepare the IOC to respond to the increasing demand of scientific and technical assessment on these emerging issues. Nevertheless, it is not easy to incorporate emerging issues in the IOC portfolio as our structures do not allow us to incorporate and react to these or other new challenges with the desirable energy and resources.

43. The end of a biennium is the point of departure for the next, which is upon us. The past biennium offered up lessons and experience that have prepared IOC-UNESCO, as this review of

the work plan attests, to take up the challenges of the Medium-Term Strategy 2008-2013 and beyond.

Annex 1

HLO 1: Prevention and reduction of the impacts of natural hazards	
Activity	Actions/Benchmark
ICAM	Reported in HLO4

HLO 2: Mitigation of the impacts of and adaptation to climate change and variability	
Activity	Actions/Benchmark
World Climate Research Program (WCRP) contributing to increasing the understanding of the ocean's role in climate change and variability	IOC-WCRP workshop on Regional Sea-Level: identifying challenges to address in observing, modelling and predicting WCRP progress in development of regional and decadal climate projections for the IPCC 5AR – greater utility as an input for adaptation IOC has attended the last 3 WCRP JSC meetings and hosted in IOC HQ 3 other technical meetings: SLR, Extreme events, CLIVAR
International Ocean Carbon Coordination Project	SOCAT provides an unprecedented global data set of ocean surface partial pressure of CO_2, which serves as a foundation upon which the community will build as new surface pCO_2 data become available and also provides a baseline for assessments of oceans' response to changing climate and increased levels of atmospheric CO_2. This compilation currently includes data from: • more than 10 countries • 1,859 cruises from 1968 to 2007 • 8.8 million quality-controlled measurements
Climate change adaptation for Africa and SIDS	The ACCC project coordinated by IOC has now entered its last year of implementation. All five countries (Senegal, Gambia, Cape Verde, Guinea Bissau, Mauritania) have developed a number of adaptation measures, working with local communities at the site level. ACCC Countries have requested IOC to assist with the development of a second phase and we are now in the process of approaching donors such as GEF and European Commission to identify future opportunities to continue this pioneer project.
Climate predictions through observations and process studies, at regional and global scales	An Ocean Acidification Summary for Policymakers from the Second Symposium on the Ocean in a High-CO2 World was printed in 2009 and is now available in English, French, Spanish and Portuguese. The Third Symposium on The Ocean in a High-CO2 World will be held in Monterey, CA, USA in September 2012 sponsored by the Intergovernmental Oceanographic Commission (IOC) of UNESCO, the Scientific Committee on Oceanic Research (SCOR), and International Geosphere-Biosphere Programme (IGBP). The symposium aims to attract more than 300 of the world's leading scientists to discuss the impacts of ocean acidification on marine organisms, ecosystems, and biogeochemical cycles. It will also cover socio-economic consequences of ocean acidification, including policy and management implications. IOC with the UNESCO SC convened an international expert meeting in November 2010 on geo-engineering science and associated governance issues. A policy brief on Geoengineering Techniques is *in press*

	(UNESCO-SCOPE series). A new international work-shop will be organized by the end of 2011 (IOC+UNESCO SC+ Royal Society of London). Conclusions and final Report to be completed in 2012. IOC provided a scientific summary of the state of knowledge on Ocean Fertilization (note that this is a geoengineering technique) to the Parties of the London Convention-London Protocol.
Increase the understanding of the impacts of climate change and variability on marine ecosystems and their living resources	GLOBEC completed the timeline in 2010. The legacy includes a community of practice involving 1800 scientist, more than 3000 papers published in peer review journals, a conceptual approach to marine ecosystems and on-going projects that still continues in 25 countries. IOC adopted IndiSeas as a project and community of practice in support of an Ecosystem Approach to Fisheries. IOC hosted last year meeting and will do it again in December 2011. IOC has cosponsored two symposium on the Effects of Climate change on Fish and Fisheries held in Senday (Japan) in 2010; and the 5th Zooplankton Production Symposium held in Pucon (Chile) in 2011. IOC is co-working with JCOMM, in the International Workshop on Climate and Oceanic Fisheries, planned by October 2011 in Rarotonga (Cook Islands). The Second Symposium on The Effects of Climate Change in the World's Oceans will be held in Yeosu, Korea in May 2012 sponsored by the Intergovernmental Oceanographic Commission (IOC) of UNESCO, the International Council for the Exploration of the Sea (ICES), and the North Pacific Marine Science Organization (PICES). The symposium aims to attract more than 500 of leading scientists and has gathered the attention and support of 12 leading organizations and research programmes in oceanography and/or climate change.
Improve the understanding of climate and anthropogenic perturbations on coral reefs in the Asia and Pacific Region	GCRMN: 'Catchment Management and Coral Reef Conservation: a practical guide for coastal resource managers to reduce damage from catchment areas based on best practice case studies' by Clive Wilkinson and Jon Brodie has been published in April 2011 with case studies on WESTPAC area provided by IOC.

HLO 3: Safeguarding the health of ocean ecosystems	
Activity	Actions/Benchmark
Regular Process for Global Reporting and Assessment of the State of the Marine Environment	The Report IOC & UNEP: Assessment of Assessments – a blueprint for keeping oceans under permanent review was printed in 2009, and over the biennium, 8000 copies were disseminated through partners and their networks. UNGA endorsed Regular Process in 2010 UN-DOALOS serving as Secretariat for the Regular Process Establishment of a UN Group of experts to conduct RP in 2011 Regional Workshops to scope issues and existing data/information

HLO 3: Safeguarding the health of ocean ecosystems	
Activity	Actions/Benchmark
	in 2011 Deadline for 1st global assessment is 2014
Research & monitoring for the prevention of marine environmental degradation	IOC has provided critically-needed training on identification of HAB species for protection of public health and in support of critical research in Member States countries through implementation of ten training courses and training-through-research projects. Launched GEOHAB Research Plans for the Core Research Project in Fjords and Coastal Embayments, GEOHAB Asia, and the development of a plan for Benthic HABs. Supported the strengthening of the regional activities and networking in the Caribbean (ANCA), South America (FANSA), North Africa (HANA), and Western Pacific WESTPAC-HAB. Engaged close to 400 experts and stakeholder in HAB Programme working groups, task teams and steering committees and provided the IOC Harmful Algae News to 2000 subscribers and on-line. Continued development of the integrated IPHAB-IODE Harmful Algae Information System with links to OBIS and partnership with ICES and PICES. IOC has organized in June 2010 an international workshop on: Microplastic particles as a vector in transporting persistent, bioaccumulating and toxic substances in the oceans. The workshop was attended by scientist, industry and policy makers and the conclusions were reported in: GESAMP. 2010. Proceedings of the GESAMP International Workshop on plastic particles as a vector in transporting persistent, bioaccumula-ting and toxic substances in the oceans. Bowmer, T. and Kershaw, P.J. (Eds.). GESAMP Rep. Stud. No. 82, 68pp. IOC and UNEP will lead a group under the coordination of GESAMP. This group will work during 2012-2013 and will be sponsored by several UN agencies and by Plastic Europe.
Models for nutrient export from watersheds – user scenario evaluation (NEWS2USE): quantitative analysis of impacts of nutrient loading and changing nutrient stoichiometry in coastal ecosystems.	The Programme Plan has been broadened to include regional case studies, sustainability issues, human health issues, socioeconomics, institutions and governance. The Global Partnership on Nutrient Management (GPNM) - a global platform to steer dialogues and actions to promote effective nutrient management - was launched in 2010 in partnership with UNEP, UNDP, UN-HABITAT, FAO, IGBP and Governments. The Joint UNEP-IOC GEF Project “Global foundations for reducing nutrient enrichment and oxygen depletion from land based pollution, in support of Global Nutrient Cycle” has been submitted as a full GEF project with expected launch in 2011. Publication of recent Global NEWS results in 13 papers in a second Global NEWS-related special issue of ‘*Global Biogeochemical Cycles’.*
Combined effects of Climate Change and marine Pollution in the	In cooperation with the UNESCO office in Rabat, IOC is maintaining a decentralised activity in North Africa which was

HLO 3: Safeguarding the health of ocean ecosystems	
Activity	Actions/Benchmark
Mediterranean Sea	concreted in the International Workshop “title” held in Rabat (Morocco, 8.06.2011) on “Le milieu marin et littoral méditerranéen: Changements climatiques et activités humaines ont-ils des impacts accélérateurs ?, which was attended by key scientist and political authorities in the region. The conclusions and report will be published by the end of 2011

HLO 4: Management procedures leading to the sustainability of coastal and ocean environment and resources	
Activity	Actions/Benchmark
Decision-support tools for improved integrated ocean and coastal management	IOC Marine Spatial Guidelines have been translated in Vietnamese by Vietnam Ocean Administration. A regional Training Course on the use of indicators for Integrated Coastal Area Management has been organized jointly with PERSGA (Red Sea/Gulf of Aden Regional Organization), IOC provided two lecturers. IOC participated in the LOICZ Strom Surges Congress and presented the IOC Guidelines on Coastal Hazards Mitigation. IOC is re-entering the EU-funded PEGASO project, and taking leadership on the workpackages related to the ICZM indicators, and Regional Marine Assessment for Med and Black Sea. A planning meeting was organized at IOC Secretariat in September 2010. IOC co-sponsored and participated in WHC organized Meeting of WHC Marine Sites and presented its work on Marine Spatial Planning. A work plan of joint activities between IOC and WHC has been defined for 2011. The SPINCAM Regional Project is advancing in its implementation. The 5 participating countries (Chile, Colombia, Ecuador, Panama and Peru) have advanced in defining a set of national and regional indicators for ICZM which will be represented in a web-based marine atlas. Technical discussions have been conducted to identify training needs of the countries to develop the web based marine atlas. The SPINCAM Steering Committee was organized on 10-12 November 2010, in Santa Martha, Colombia. The meeting examined the project progress and revised project strategy for the remaining of the project (ending in December 2011). Technical Support has been provided to USA State of Massachusetts and Canada British Colombia (First Nations Turning Point Initiative) in developing local MSP plans based on the IOC Guidelines. At least two provinces in North America have developed their own MSP plans based on IOC Guidelines. Vietnam is moving forward on the development of a national plan and has requested IOC 's assistance. Other countries such as Jordan, Costa Rica are requesting technical support and training for the MSP methodology. Based on this request, IOC submitted successfully a project proposal in October 2010 to develop a training module on MSP, jointly with IODE to be implemented in 2011. A MSP manual

HLO 4: Management procedures leading to the sustainability of coastal and ocean environment and resources	
Activity	Actions/Benchmark
	will be prepared to respond to the need of WHC marine sites. Korea has translated the Coastal Hazards Mitigation Guidelines. These have been disseminated through WMO Member States who co-sponsored the initiative. A specific regional training course for the East Atlantic and Med on the Coastal Hazards Mitigation has been planned in the EU-funded NEAMTIC Project, implemented by IOC. The course will take place in 2011
Science for ocean and coastal resource management & Facilitate the development and adoption of standards	IOC has created a Working group on Nutrient standards which is developing both reliable reference materials (International Intercomparison study) for use when measuring nutrients in seawater and procedures to implement an International Nutrients Standards Scale. Planning for this next IC study started at the first official meeting of the Group in Paris, France on 23-24 March 2010. A full report of that meeting was presented at the 43rd Session of IOC Executive Council June 2010. The Group will meet in 2011 to finalise the planning for the next inter-laboratory comparison study; there is the capacity to include about 70 laboratories. The work will be completed by 2012. IOC is working together with IUCN, CI, ESF and CBD and has a direct participation in the project GOBI in defining and assessing scientific criteria to establish MPAs. For example, we need to understand how the location, geographical extent and connectivity of key habitats and species may impact on their conservation needs and therefore on the choice of tools best suited to protect and enhance them.

Capacity Building: New frameworks of cooperation	
Activity	Actions/Benchmark
WAMS	The World Association of Marine Station was formally created in April 2010 during the meeting hosted by IOC in Paris A draft work plan will be presented at IOC XXVI Assembly
South Atlantic Cooperation	IOC-UNESCO is helping to organize oceanographic expeditions led by Brazil, in the framework of the Zone of Peace and Cooperation of the South Atlantic (ZOPACAS), an organization that includes all the 24 countries surrounding the South Atlantic Basin. The first activity of this South-South cooperation project took place in Paris last March 2011, when IOC-UNESCO hosted this first international expert meeting under the title “Understanding deep-water biodiversity in the South Atlantic”. Expert collaborating in the South Atlantic identified research and knowledge gaps in the South Atlantic processes, biodiversity and resources and prepared recommendations to be addressed during the upcoming ZOPACAS oceanographic expedition.