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English only

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

INFORMATION DOCUMENT

REVISED PLAN FOR THE INTERSECTION OF UNESCO/IOC PROGRAMMES RELATED TO NUTRIENTS[1]

Full version

An IOC Nutrients and Coastal Impacts
Research Programme (N-CIRP)

Summary. The IOC Assembly at its 25th Session through Resolution XXV-9 adopted a work plan for an integrative activity at the intersection of IOC programmes related to nutrients, with focus on coastal eutrophication and the linking of nutrient sources to coastal ecosystem effects and management. The Assembly also requested stakeholder involvement to broadening the evaluation of scientific tools required to meet the global, regional and local challenges of nutrient pollution in coastal and marine environments.

This document summarizes the results of the stakeholder engagement and presents a revised plan for an IOC integrative activity at the intersection of IOC programmes related to nutrients, with focus on coastal eutrophication and the linking of nutrient sources to coastal ecosystem effects and management. A short version of this document (IOC-XXVI/2 Annex 10) was translated and presented to the 26th Session of the Assembly (Paris, 22 June–5 July 2011).

[1] Prepared by the IOC Steering Committee on Integrated Coastal Research Related to Nutrient Pollution chaired by J. Harrison and A.F. Bouwman.

Background

1. The IOC Executive Council, at its 41st Session (24 June–1 July 2008), called for the development of a work plan and a funding strategy for integrated coastal research through a dialogue between the Secretariat, Global NEWS, the GEOHAB SSC and interested Member States and agencies. A work plan (IOC-XV/INF-1261) for an integrative activity at the intersection of IOC programs related to nutrients, with focus on coastal eutrophication and the linking of nutrient sources to coastal ecosystem effects and management, was adopted by the 25th Session (16-25 June 2009) of the Assembly through Resolution XXV-9. Such an activity addresses several of IOC's high level objectives as enumerated in their medium-term strategy, including: 1) safeguarding the health of ocean ecosystems, 2) supporting management procedures and policies leading to the sustainability of coastal ocean environment and resources, and 3) mitigation of the impacts of and adaptation to climate change and variability. The Assembly established a steering committee for the integrative activity with the name Global **N**utrient **E**xport from **W**ater**s**heds **2**, **U**ser **S**cenario **E**valuation (NEWS2USE), and requested the Committee to finalize the Work Plan, including a stakeholder engagement phase to evaluate options for integrated coastal research related to nutrient pollution.

2. The Assembly requested particular attention to (i) ensuring complementarity with the SCOR–LOICZ Working Group 132 on Land-based Nutrient Pollution and the Relationship to Harmful Algal Blooms in Coastal Marine Systems; (ii) the planned stakeholder workshop as a first next step, and (iii) broadening the evaluation of scientific tools required to meet the global, regional and local challenges of nutrient pollution in coastal and marine environments.

3. This document summarizes the results of the stakeholder engagement efforts regarding broadening the evaluation of scientific tools required to meet the global, regional and local challenges of nutrient pollution in coastal and marine environments. In addition, this document provides an update on the NEWS2USE work plan regarding complementarity and collaboration with other activities and groups including the SCOR–LOICZ Working Group 132 on Land-based Nutrient Pollution and the Relationship to Harmful Algal Blooms in Coastal Marine Systems.

2. Stakeholder engagement and developments

4. A number of steps have been taken to engage stakeholders since the 2009 meeting of the IOC Assembly.

2.1. A NEWS2USE Steering Committee

5. A NEWS2USE Steering Committee (SC) was formed in 2009, comprised of 21 individuals from a diverse range of backgrounds, institutions, and nations. This group included participants from the 2009 planning meeting as well as 8 additional individuals, selected for their ability to represent a particular region or type of institution or to provide additional scientific expertise (Appendix A). The Terms of Reference of the NEWS2USE Steering Committee are listed in Appendix B. Although an in-person stakeholder meeting including all SC members was not feasible for various (including financial) reasons, subsets of the SC have met opportunistically on various occasions, and there has been regular exchange amongst SC members and other individuals via email and telephone. The purpose of this communication has been to assess interest in a programme like NEWS2USE while continuing to define the focus and priorities of an international cooperative science programme intended to deliver improved tools for management of coastal nutrient loading. In addition to formal and informal consultation with members of the SC, a formal request for feedback was delivered to 16 additional stakeholders, representing a cross section of government and non-government agencies, industry groups, and academic institutions (Appendices C and D).

6. Although many members of the SC were satisfied with the work plan and expressed excitement about moving forward with the proposed work, the Assembly requested "broadening the scientific tools required to meet the global, regional, and local challenges of nutrient pollution in coastal an marine environments."

7. Although the original NEWS2USE work plan was broadly inclusive of existing regional and global modeling tools, and included development of new models, this new development will be strengthened through collaboration with other programmes and activities (see section 2).

8. The SC has also actively sought to broaden the focus and perceived focus of the NEWS2USE models. In addition to changing NEWS2USE's name to "Nutrients and Coastal Impacts Research Programme (N-CIRP)," the programme has been broadened. In addition to the original core elements of NEWS2USE, which focused on coastal marine ecosystem effects, N-CIRP also include foci on issues such as consequences of ecosystem changes for tourism, interactions between climate, nutrients, and coastal dynamics, and elements such as institutions and governance. In the original work plan, NEWS2USE (now N-CIRP) addressed the need for more quantitative analysis of impacts due to nutrient loading and changing nutrient stoichiometry in coastal ecosystems. The original work plan described a strategy to explore relationships between nutrient inputs, coastal chlorophyll, the occurrence of harmful algal blooms (HABs) and hypoxia, and related effects on coastal fish and fisheries, as well as the impact of climate change, with the ultimate goal of developing novel datasets and innovative, predictive models, which would be shared with scientists, managers, and policy-makers from regions experiencing (or likely to experience) negative impacts due to changes in coastal nutrient loading.

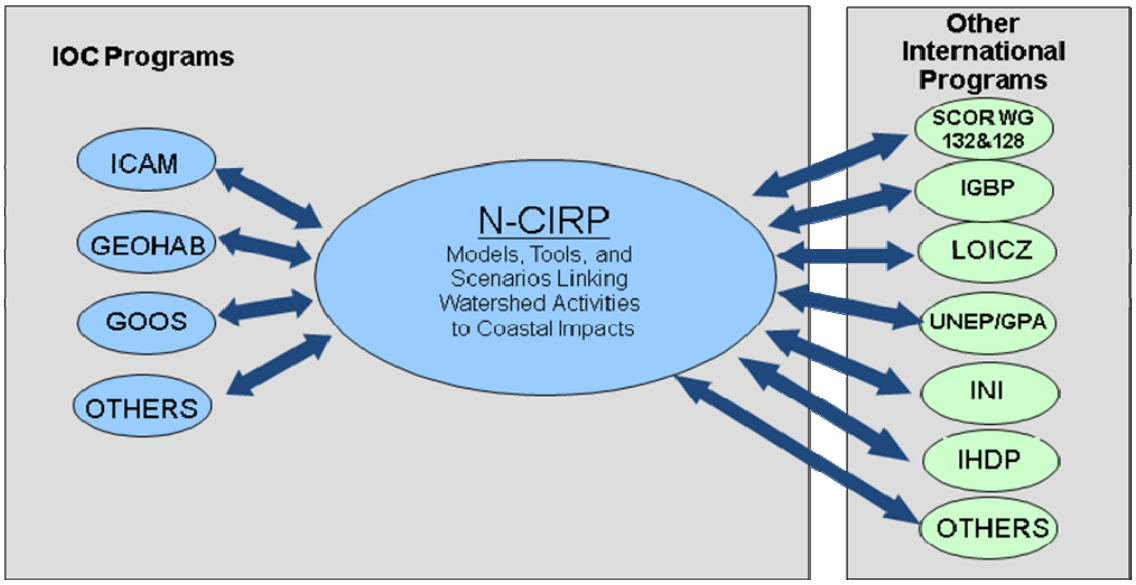

Figure 1. *A conceptual framework demonstrating how N-CIRP will interact in mutually beneficial ways with multiple IOC and non IOC programmes. IOC programmes with which N-CIRP will help unify include Global Ocean Observing System (GOOS), the Global Ecology and Oceanography of Harmful Algal Blooms (GEOHAB) program, the Integrated Coastal Area Management (ICAM) program. Non-IOC programmes with which N-CIRP will interact directly with, or indirectly include, the International Geosphere Biosphere Programme (IGBP), including its core project Land-Ocean Interactions in the Coastal Zone (LOICZ), the SCOR/LOICZ Work Groups 132 and 128 on HABs and hypoxia, respectively, the UN Environment Programme Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (UNEP/GPA), the IGBP-sponsored International Nitrogen Initiative (INI), and the International Human Dimensions Programme (IHDP). Depending on the group, interactions with other entities will include sharing personnel, sharing data, formal and informal scientific collaboration, co-hosting/co-funding workshops and open science meetings, outreach, identification of stakeholder groups, publication, peer review, dissemination of results in less formal venues.*

9. In section 3 of this document a number of activities are listed which serve as a basis for this work. The issue of climate change (both decadal and long-term global warming) and its associated impacts on the proliferation of HABs, development of hypoxia, and fisheries, is a cross-cutting issue relevant to IPHAB, LOICZ, ICES and PICES.

10. Draft additional elements of a broadened approach include (in random order):

1. Regional case studies
2. Crosscutting : Climate change
3. Sustainability issues of coastal ecosystem effects and management
4. Human Health issues of coastal ecosystem effects and management
5. Socioeconomics
    a. Costs and benefits
    b. Tourism
    c. Aquaculture & agriculture
    d. Fisheries
    e. Nutrient trading
    f. Geo-engineering
6. Institutions and Governance
    a. Social equity
    b. Management, Frameworks and Directives
    c. Transboundary (legal) issues

11. Although many of these elements were included in the NEWS2USE work plan, they will now be further elaborated as the programme develops in consultation with the group of stakeholders which is now organized under the umbrella of “Nutrients and Coastal Impacts Research” where NEWS2USE is a main research component.

12. The project “Global foundations for reducing nutrient enrichment and oxygen depletion from land based pollution, in support of Global Nutrient Cycle” developed by UNEP and IOC in collaboration is currently being reviewed by the Global Environment facility (GEF) and is expected to be launched in the course of 2011. It provides a mechanism for the implementation of some limited parts of the original NEWS2USE work plan. The overall objective is to provide the foundations (including partnerships, information, tools and policy mechanisms) for governments and other stakeholders to initiate comprehensive, effective and sustained programmes addressing nutrient over-enrichment and oxygen depletion from land based pollution of coastal waters in Large Marine Ecosystems. The project consists of four components: (A) a fully established Global Partnership on Nutrient Management; (B) quantitative analysis of relationship between nutrient sources and impacts to guide decision making on policy and technological options; (C) establishment of scientific, technological and policy options to improve coastal water quality policies in LMEs and national strategy development – the development of a ‘Policy Tool Box’; (D) pilot testing of quantitative modeling outcomes from B and best practice measures/options from ‘Policy Tool Box’ developed under C in development of nutrient reduction strategies in main demonstration area and additional sites. The science component B was designed to support the NEWS2USE work plan, with a focus on global relationships between nutrient loading of coastal marine ecosystems on the basis of primarily the Global NEWS models and scenarios. Component C will contribute to the toolbox development envisaged in the NEWS2USE work plan, and component D is a demonstration region, which fits with the element of regional case studies as proposed by the stakeholder consultation of NEWS2USE. The IOC has committed to co-financing the Project with 48.000 USD/year 2011-2014. The GEF is requested to co-fund the component implemented by the IOC with 550.00 USD. The total GEF contribution to the budget is USD 1,718,182 (41.74%), total co-financing is USD 2,398,165 (58.26%) giving a total of USD 4,116,347 (100%).

2.2. Global Partnership on Nutrient Management

13. A wider group of stakeholders is the Global Partnership on Nutrient Management (GPNM), which was established in 2009 to bring stakeholders together. GPNM was launched to promote sustainable consumption and use of nutrients, notably nitrogen and phosphorous to ensure food security and environmental sustainability. It provides a mechanism for dissemination of results to relevant user communities, as well as a forum for discussion of community priorities and needs. The International Nitrogen Initiative (INI) has played a pivotal role in project development and leading governments have also been consulted. The scope of the GPNM is wider than nutrient reduction in coastal areas, but project configuration and the partners now involved have benefitted from this broader partnership work and stakeholder engagement. In particular, the project development has benefitted from government, scientific representatives, the fertilizer industry representatives, and UN agencies working through the partnership to address potential obstacles to co-operation. As a result, stakeholders whose focus was less inclined towards the coastal areas have joined the project as partners, and demonstrated a willingness to co-operate around a shared agenda of more effective nutrient management in relation to the coastal areas. Key has been recognition that there are win-win benefits from such co-operation for countries and stakeholders. The strengthening of GPNM is one of the objectives of the GEF project "Global foundations for reducing nutrient enrichment and oxygen depletion from land based pollution, in support of Global Nutrient Cycle".

3. Complementarities and collaboration with other activities and groups

3.1. SCOR–LOICZ Working Group 132 on Land-based Nutrient Pollution and the Relationship to Harmful Algal Blooms in Coastal Marine Systems

14. The work of SCOR–LOICZ Working Group 132 will be completed in 2011, and publication is expected in 2012. A key question being addressed by the work group, which builds on and contributes to the IOC programme on Global Ecology and Oceanography of Harmful Algal Blooms (GEOHAB) (Figure 1), relates to the coastal environment. To analyse the impact of differences in the type of coastal system on the proliferation of HABs, the work group uses information on nutrient retention within different coastal types. The work group further analyzed data on HAB occurrences with two approaches. Firstly, regional time series of HABs and nutrient loading have been collected in different parts of the world, i.e. South America, Gulf of Mexico, U.S.A. East coast, Gulf of Oman, and Hong Kong. The purpose is to study relationships between nutrient loading and the occurrence of HABs on the basis of detailed spatial and temporal information on environmental conditions. Secondly, simulations with the POLCOM-ERSEM Global coastal ocean model have been made for NW European shelf & Baltic Sea, Benguela upwelling, Humboldt current, Indonesia and South China seas, Yellow sea and sea of Japan, California current system, Bay of Bengal, Mauritania upwelling. These simulations are based on Global NEWS data and include 20 year hindcast, 20 year pre-industrial (~1860), and 20 year future climate simulations (~2080-2100). These simulations are currently being evaluated and will be used to develop relationships between nutrient loading of coastal marine ecosystems and production and proliferation of HABs. An important product of the SCOR workgroup is work on the nutrient dynamics in global aquaculture systems (fish, shellfish, aquatic plants). Aquaculture has been identified as an important contributor to nutrient loading (fed aquaculture), nutrient distortion and nutrient removal (aquatic plants), particularly in Asia. These results will be fully integrated in N-CIRP, as indicated in the work plan endorsed by the IOC assembly in 2009.

3.2. SCOR–US-NSF Working Group 128 on Natural and Human-Induced Hypoxia and Consequences for Coastal Areas

15. The work of SCOR–US-NSF Working Group 128 has synthesized the state of the science for the following aspects of coastal hypoxia: (a) prevalence and spatio-temporal variability; (b)

natural and human causes; (c) effects on coastal biogeochemistry and ecology; and (d) resistance, resilience and recovery of ecosystems. The work group also identified gaps in understanding of hypoxia, made recommendations for future research, and determined the requirements for observing and modelling hypoxia and its impacts in coastal systems. The major conclusions were that current knowledge and previous experiences illustrate a need to develop new observational tools and models to support integrated research of biogeochemical dynamics and ecosystem behaviour that will improve confidence in remediation management strategies for coastal hypoxia. The work has been summarized in a series of articles in a special issue of the journal Biogeosciences (7). The work group results will be taken forward in the proposed activities in the N-CIRP work plan.

3.3. GlobalNEWS

16. Recent IOC Global NEWS group results have been published in 13 papers in a special issue of the journal Global Biogeochemical Cycles, as synthesized by Seitzinger et al. [, 2010 #10579]. As stated in the original NEWS2USE work plan, Global NEWS will be one of the tools that will be considered in Phase I of the project, and the work plan includes the comparison of models and application of more mechanistic approaches to modelling river nutrient export in later phases. A recent initiative in this respect is the application of the process-based model "Riverstrahler" in North-West Europe and a Pan-European application. Results are encouraging, since Riverstrahler has been shown to be a generic model that can even be applied to coastal marine ecosystems. An important task of N-CIRP is to identify similar models for river nutrient transport and retention.

3.4. Land Ocean Interactions in the Coastal Zone (LOICZ)

17. A related, synergistic effort to collate information on coastal nitrogen loading, hypoxia, and fisheries has been proceeding since 2009, supported by LOICZ and with direct involvement of at least three NEWS2 USE (Now N-CIRP) SC members (Denise Breitburg (chair), John Harrison, and Robert Diaz) and funding from LOICZ, NOAA (US) and the Smithsonian Institution. This effort has resulted in the development of a database with information from 80 globally distributed coastal areas where Ecopath models have been applied. Coastal systems included in this database have associated information on nitrogen loading from Global NEWS and LOICZ, extent, severity, and type of hypoxia, primary production, fish biomass by species type, and landing data by species type, as well as many additional physical characteristics such as water residence time, maximum and average dept, system type, and system surface area. Early results indicate a predictive relationship between N loading and primary production (Figures 2 and 3). Additional analysis of this dataset is on going. This dataset which is still in development will be available for the N-CIRP effort, and may be used as the foundation for development of a more comprehensive database and modelling

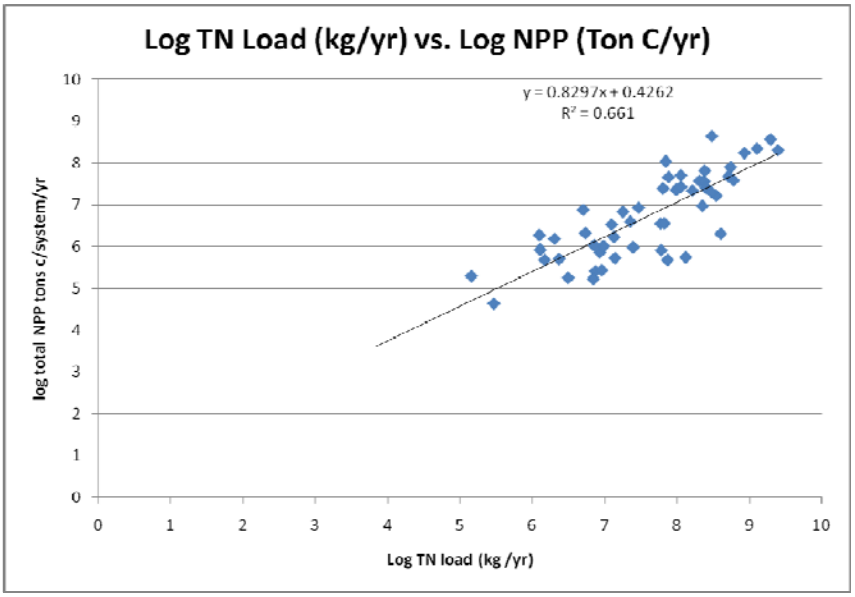

Figure 2. *The relationship between total nitrogen (TN) loading and net primary production in sites where Ecopath models have been run.*

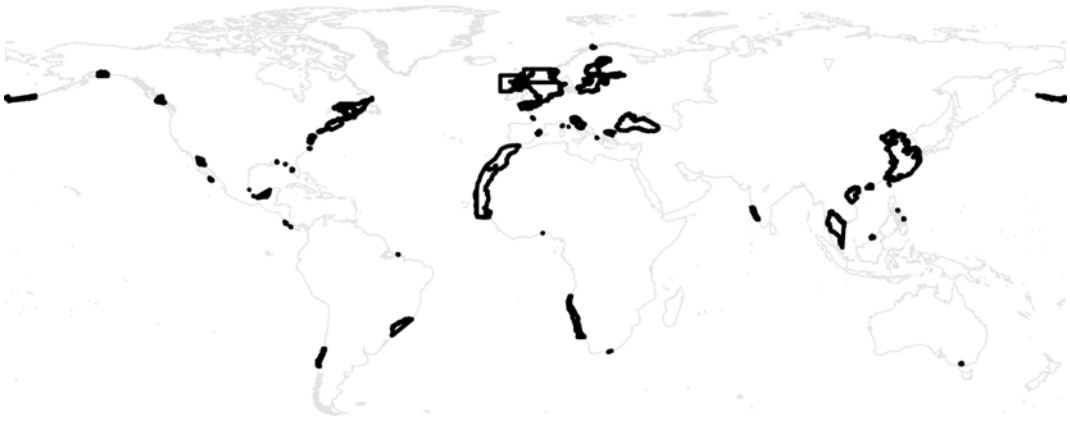

Figure 3. *Ecopath sites for which N loading, fishery, and hypoxia information is available.*

3.5. NEWS-DIN model

18. Another related, synergistic effor t to collect and evaluate in formation about watershed N inputs and to apply the NEWS-DIN model for th e conterminous US has been supported by US Environmental Protection Agency (US-EPA). In collaboration with Jan a Compton and the EPA Ecosystem Services Research Prog ram, Harri son co-super vises (with Compton) two National Research Council Post doctoral Fellows. One of these Postdoctoral Fellows is working to compile and evaluate information on N sources to the US, including inf ormation about natural and agricult ural N fixati on, synthetic fertilizer a pplication, manure app lication, ind ustrial (non fertilizer) N fixation, and atmospheric N deposition. The other NRC Postdoctoral Fellow is working to enhance the temporal and spatial resolution o f the NEW S-DIN model as well as comparing source attribution between various continental-scale N models.

4. Indicative timeline and required funding for the period 2012-2013 for further development of N-CIRP

19. Fall 2011: Re-composition of the Steering Committee for 2012-2013 to reflect revised programme plan. Terms of Reference revised as in Appendix E

20. 2012-2013: Operation of the Steering Committee: Co-ordination and consultation activities, including participation in GPNM workshops, participation as partner in the GEF project "Global foundations for reducing nutrient enrichment and oxygen depletion from land based pollution, in support of Global Nutrient Cycle," and coordination of activities with other relevant projects listed in section 2. Required funding for the biennium 2012-2013 including 48.000 USD/year co-financing of GEF Project is estimated at US $100,000 (IOC Regular Programme).

21. 2012: Workshop of Steering Committee and additional stakeholders to further elaborate the additional elements of a broadened approach identified by the stakeholder engagement. Apart from stakeholders consulted so far, the group will be extended to also include representatives of the European Union and other relevant organizations and potential funding agencies.The result of this workshop will be an elaborated work plan for the period 2014-2018, including the new elements, priorities, a plan of action, and budget, for endorsement by the IOC Assembly in 2013. Required funding for organizing and implementing this workshop is estimated at US $80,000. (to be identified extra-budgetary).

22. 2012: Preparation of brochure on the N-CIRP programme and of a review connecting the various fields of science covered by N-CIRP is estimated at $25,000 (to be identified extra-budgetary)

23. 2012-2013: Support for further development of Ecopath fisheries database to interface with nutrient modeling, estimated at US $40,000 (to be identified extra-budgetary).

24. Budget required:

IOC Regular Programme: 100,000 USD

To be identified Extra-budgetary: 145,000 USD

Appendix A.

IOC Steering Committee for NEWS2USE 2010-2011 including stakeholders added in response to 2009 IOC Assembly request.

*SC members not present at 2009 meeting, added to increase diversity of SC perspectives and abilities.

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Appendix B

Terms of Reference of the
NEWS2USE Steering Committee on
Integrated Coastal Research Related to Nutrient Pollution

(i) Act as the intersection of and collaborate with IOC of UNESCO Programmes and activities related to nutrients (GEOHAB, ICAM, GOOS, LME).
(ii) Develop the NEWS2USE Science and Implementation Plans.
(iii) Coordinate and implement research in accordance with the NEWS2USE Science and
Implementation Plans.
(iv) Foster framework activities to facilitate implementation of NEWS2USE, including dissemination and information tools for research and management.
(v) Establish appropriate data management procedures, in close cooperation with IODE, to ensure access to, sharing of, and preservation of NEWS2USE data, taking into account the IOC Oceanographic Data Exchange Policy and the IOC Strategic Plan for Ocean Data and Information Management.
(vi) Collaborate, as appropriate, with the concerned intergovernmental and nongovernmental organizations (e.g., UNEP, SCOR), and their subgroups and related research projects (e.g., LOICZ, IMBER).
(vii) Review NEWS2USE progress over time and report regularly to the IOC and the global marine science research community on the state of planning and accomplishments of NEWS2USE, through annual reports, the NEWS2USE web site, an electronic NEWS2USE Newsletter, special sessions at scientific meetings, and other venues.
(viii) Interact with agency sponsors to stimulate the support of NEWS2USE implementation through various mechanisms (e.g., direct support of NEWS2USE initiatives and integration of the NEWS2USE approach in national programmes).

Appendix C

Stakeholders from whom feedback on NEWS2USE work plan was requested:

Mateete Bekunda- Professor and Dean of Faculty, Faculty of Agriculture, Makerere University, Uganda
Chuck Chaitovitz- Global Environment and Technology Foundation
Gregory Crosby- Agency Representative to the *USDA* Council for Sustainable Development
J.W. Erismann- ECN Extraordinary Professor Integrated Nitrogen Studies, Energy research Centre of the Netherlands
Rick Greene – US Environmental Protection Agency
John Holdren – US Office of Science and Technology Policy
Wahyu Indraningsih- Assistant Deputy for Sea and Coastal Degradation Control, Ministry of Environment, Indonesia

Hartwig Kremer- Chief Executive Officer - LOICZ IPO
John Lehrter - US Environmental Protection Agency
Jane Lubchenco – Secretary, US National Oceanographic and Atmospheric Administration
Steve Murawski –Director of Scientific Programmes and Chief Science Advisor for NOAA Fisheries Service
Shailesh Nayak - Secretary, Ministry of Earth Sciences, India
Angela Olegario – International Fertilzer Association
Ramesh Ramachandran – Institute for Ocean Management, Anna University, India

Stephen Ross - Research Associate Professor, University of North Carolina, Wilmington
Manbir Sachdev- Coordinator for the International Nitrogen Initiative's South Asian Regional Center
Kaj Sanders- Ministry of Environment (VROM), The Netherlands
Penjai Sompongchaiyakul- Assistant Professor, Biogeochemical and Environmental Change Research Unit, Faculty of Environmental Management, Prince of Songkla University
Wanda Zevenboom - RWS-Noordzee Directie Water en Scheepvaart

Appendix D

Letter requesting feedback from stakeholders:

Madam/Sir,

We are contacting you as a potential stakeholder for a proposed UNESCO-IOC programme focused on integrated coastal research. An initial work plan for this programme was conceived in response to the great and growing threat of coastal nutrient enrichment, which has been associated with many forms of coastal environmental degradation, including: increased frequency and severity of hypoxic and anoxic conditions, leading to fish kills, increased frequency and severity of harmful and nuisance algae blooms, and loss of biodiversity, among other effects. This work plan outlined an effort, provisionally called ***N****utrient* ***E****xport from* ***W****atersheds* ***2****,* ***U****ser* ***S****cenario* ***E****valuation* (NEWS2USE), to develop and implement an international, cooperative science programme focused on delivering improved tools for management of marine nutrient loading and for predicting benefits and consequences of a variety of nutrient management options on HABs, hypoxia and fisheries. This work plan was endorsed by the IOC Executive Council in July 2009 with the recommendation by IOC Member States that additional input from stakeholders be acquired in order to ensure broad and continuing support for integrated coastal research and to ensure that the tools developed by this group are as useful as possible to potential end-users.

We are soliciting your feedback as a potential end-user of the datasets and models that will be developed when such a programme goes forward and have attached a copy of the NEWS2USE work plan that was endorsed by the IOC Executive Council. The ultimate goal of this dialogue is an IOC-housed international cooperative scientific programme reflecting needs and priorities of stakeholders, from scientists to governments. The shorter-term goal is a revised proposal further defining the characteristics of such a program. Specifically, we are asking you for feedback regarding: 1) whether you or the agency you represent would use the output from an integrated coastal research programme such as the one described in the NEWS2USE work plan, 2) suggestions for refinement of the focus of such a programme through the establishment of programme priorities, and 3) whether you or an agency you represent would be potentially interested in providing funding or in-kind resources to support the proposed research and framework activities (e.g. Scientific and capacity building meetings and workshops) and support actions (e.g. logistical support, and database development, distribution, and support).

We would greatly appreciate any feedback or input you can provide, and look forward to incorporating your insight into our strategy as we move forward with this exciting research. As we must incorporate this feedback into a revised proposal to the IOC Executive Council by May 2011, your feedback would be most useful if received by March 31, 2011. Please send your feedback to John Harrison and Lex Bouwman at john_harrison@wsu.edu and lex.bouwman@pbl.nl, respectively, or by simply replying-all to this email. Thank you in advance for your time and thought on this matter, and we look forward to hearing from you.

Regards,

Lex Bouwman (Co-chair), Netherlands Environmental Assessment Agency

John Harrison (Co-chair), Washington State University, USA

Henrik Enevoldsen, IOC UNESCO

Attachments: "IOC INF1261Coastal_Eutrophication.pdf" and IOC_Stakeholder_Feedback_Request.pdf."

Appendix E

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Terms of Reference of the Steering Committee for the
IOC Nutrients and Coastal Impacts Research Programme (N-CIRP)

(i) Act as the intersection of and collaborate with IOC of UNESCO Programmes and activities related to nutrients (GEOHAB, ICAM, GOOS, LME).
(ii) Develop the N-CIRP Science and Implementation Plans.
(iii) Coordinate and implement research in accordance with the N-CIRP Science and Implementation Plans.
(iv) Foster framework activities to facilitate implementation of N-CIRP, including dissemination and information tools for research and management.
(v) Establish appropriate data management procedures, in close cooperation with IODE, to ensure access to, sharing of, and preservation of N-CIRP data, taking into account the IOC Oceanographic Data Exchange Policy and the IOC Strategic Plan for Ocean Data and Information Management.
(vi) Collaborate, as appropriate, with the concerned intergovernmental and nongovernmental organizations (e.g., UNEP, SCOR), and their subgroups and related research projects (e.g., LOICZ, IMBER).
(vii) Review N-CIRP progress over time and report regularly to the IOC and the global marine science research community on the state of planning and accomplishments of N-CIRP, through annual reports, the N-CIRP web site, an electronic N-CIRP Newsletter, special sessions at scientific meetings, and other venues.
(viii) Interact with agency sponsors to stimulate the support of N-CIRP implementation through various mechanisms (e.g., direct support of N-CIRP initiatives and integration of the N-CIRP approach in national programmes).

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