

Informe final* del Proyecto KU012
Taller de planeación de expertos para la creación de una iniciativa de gestión de mar profundo

Responsable: Dra. Elva Guadalupe Escobar Briones
Institución: Universidad Nacional Autónoma de México
Instituto de Ciencias del Mar y Limnología
Dirección: Circuito Exterior Ciudad Universitaria, Copilco Universidad, Coyoacán, México, DF, 04510, México
Correo electrónico: escobri@mar.icmyl.unam.mx
Teléfono, fax 56225841 Fax: 56 16 07 48
Fecha de inicio: Febrero 28, 2013
Fecha de término: Junio 3, 2013
Principales resultados: Reunión Académica, Informe final.
Forma de citar el informe final y otros resultados:** Escobar Briones, E. G. 2013. Taller de planeación de expertos para la creación de una iniciativa de gestión de mar profundo. Universidad Nacional Autónoma de México. Instituto de Ciencias del Mar y Limnología. **Informe final SNIB-CONABIO. Proyecto No.KU012.** México, D.F.

Resumen:

La Universidad Nacional Autónoma de México (UNAM) y Scripps Institution of Oceanography (SIO) de la Universidad de California San Diego (UCSD) colaboran para llevar a cabo un taller de planeación de expertos para la creación de una Iniciativa de gestión de mar profundo. La meta de esta iniciativa es la de avanzar en una serie de retos y poder dar solución a través de investigación socioecológica y un marco en la toma de decisión para mantener las funciones y servicios del mar profundo para las generaciones futuras. La iniciativa enlazará las instituciones oceanográficas más importantes, centros de economía y políticas, apoyos nacionales de diversos países, museos, organizaciones intergubernamentales e interesados. La iniciativa de gestión del mar profundo permitirá (1) integrar ciencia de estado del arte, estrategias de modelado e instrumentos políticos en manejo ambiental y económicamente sustentable de regiones clave del mar profundo; (2) proveerá un marco internacional para el desarrollo de metas comunes, intercambio de información generada por la investigación científica y usar métodos de evaluación consistentes entre científicos, sectores de la industria, el público en general y otros grupos interesados; y (3) crear una disciplina integrada enfocada en la gestión de mar profundo con expertos en ciencias naturales y sociales entrenados a encontrar soluciones y avanzar en la toma de decisiones multisectorial.

-
- * El presente documento no necesariamente contiene los principales resultados del proyecto correspondiente o la descripción de los mismos. Los proyectos apoyados por la CONABIO así como información adicional sobre ellos, pueden consultarse en www.conabio.gob.mx
 - ** El usuario tiene la obligación, de conformidad con el artículo 57 de la LFDA, de citar a los autores de obras individuales, así como a los compiladores. De manera que deberán citarse todos los responsables de los proyectos, que proveyeron datos, así como a la CONABIO como depositaria, compiladora y proveedora de la información. En su caso, el usuario deberá obtener del proveedor la información complementaria sobre la autoría específica de los datos.

Deep Ocean Stewardship Initiative (DOSI) Experts Planning Workshop

Summary.

Twenty-eight invited participants from 14 countries met from April 15-17, 2013 in Mexico City to discuss research, management and decision - making needs required to maintain the integrity, functions and services of the deep ocean for future generations. The group agreed that expanding human activity in the deep ocean has created an urgent need to engage experts in biology, law, policy, economics, business, regulation and conservation in stewardship issues. Three days of deliberations produced a core set of themes and action items to launch a **Deep-Ocean Stewardship Initiative (DOSI)**. DOSI is envisioned as gathering expertise across disciplines, jurisdictions and sectors to foster discussion, provide guidance and facilitate communication for the following priority elements:

- (1) Identify and develop comprehensive, ecosystem-based management practices for deep-ocean environments subject to human extraction, harvest, disposal and contamination.
- (2) Define and address knowledge gaps relevant to effective deep-sea stewardship, including those associated with changing climate, cumulative human impacts, and external costs of resource use.
- (3) Ensure appropriate representation of the deep sea in global ocean assessments and global environmental governance and management.
- (4) Develop criteria for deep-sea institutional and corporate social responsibility (e.g., transparency, data collection, data sharing and compliance) by working with industry, states, civil society, and scientists.
- (5) Strengthen capacity, provide training, and raise public awareness of current opportunities and impacts associated with human activities in the deep sea.
- (6) Provide a centralized location for information about ongoing deep-sea stewardship activities across multiple sectors, jurisdictions and disciplines.

The meeting was co hosted by the Instituto de Ciencias del Mar y Limnología (CMARL), Universidad Nacional Autónoma de México and the Center for Marine Biodiversity and Conservation, Scripps Institution of Oceanography, with funding from the Kaplan Foundation, INDEEP (Fondation Total), the National Commission for Knowledge and Use of Biodiversity (CONABIO, Mexico) and La Comisión Nacional de Áreas Naturales Protegidas (CONANP, Mexico).

DOSI intends to expand and form linkages with many other groups engaged in deep-sea stewardship. DOSI activities and future fundraising will be guided by a steering committee and theme-based working groups. Proposed action items and products include a policy paper, ISA-sponsored and regional workshops on ecosystem-based management of seabed mining, a mining economics workshop, student projects, special sessions at meetings highlighting DOSI issues, industry-science collaborations, a brief for the Global Ocean Commission, GIS inventory of mining proposals, gap analyses of deep-ocean assessments, legal analyses, a survey to enhance industry engagement, joint industry-policy seminar series, online courses, video library, book, and App to raise awareness, a DOS bibliography and a centralized communication hub.

Deep Ocean Stewardship Initiative (DOSI)
April 15-17, 2013; Mexico City



OSI Participants (left to right): Row 1 Verónica Aguilar Sierra, Ana Luisa Figueroa, Elva Escobar, Lisa Levin, Eva Ramirez-Llodra, Frida Armas Pflirter, Kathryn Mengerling; Row 2 Paul Tyler, Hiroyuki Yamamoto, César Sánchez Ibarra, Kristina Gjerde, Bronwen Currie, Jennie Dean, Ana Lara-Lopez, Alfonso Ascencio, Tracey Sutton, Cindy Van Dover; Row 3 Michael Lodge, Ursula Witte, Dale Squires, Maria Baker, Andrew Sweetman, Lenaick Menot, Jeff Ardron, Christian Neumann, Tony Koslow, Aquila Tawake, Paul Holthus.

The Workshop Deliberations:

An experts planning workshop was held April 15-17, 2013 at the Universidad Nacional Autónoma de México (UNAM) to develop an international **Deep-Ocean Stewardship Initiative (DOSI)**. The workshop was co-hosted by the Instituto de Ciencias del Mar y Limnología (CMARL) at UNAM, the Center for Marine Biodiversity and Conservation at Scripps Institution of Oceanography (SIO), University of California San Diego and the International Network for Scientific Investigation of Deep-sea Ecosystems (INDEEP). Support for the workshop was provided by the Kaplan Foundation, INDEEP (funded by Fondation Total), the **National Commission for Knowledge and Use of Biodiversity** (CONABIO, Mexico) and La Comisión Nacional de Áreas Naturales Protegidas (CONANP, Mexico). Twenty-eight invited participants (**Appendix I**) from 13 countries met, with expertise spanning the disciplines of deep-sea biology, law, policy, economics, business and conservation biology.

Participants were asked to consider the socio-ecological, ecosystem-based research, management and decision-making needs required to maintain the functions and services of the deep ocean for future generations. DOSI will seek to promote efforts that integrate state-of-the-art science, modeling, legal and policy instruments to achieve environmentally and economically sustainable management of key deep-sea ecosystems and resources within and beyond areas of national jurisdiction. The intent is to foster an international forum for the development of common goals, exchange of research information and use of consistent methods and terminology among scientists, industry, regulators, civil society and other stakeholders. DOSI activities will facilitate communication among and training of experts in the natural and social sciences to seek solutions and advance multisectoral, transdisciplinary decision-making. Raised global awareness of the issues and capacity to address them are considered fundamental to achieving long-term goals.

Summary of Proceedings.

April 15: After welcome, introductions and discussion of meeting objectives, we summarized results of a questionnaire provided to participants before the meeting. The topics addressed in the survey included issues, regions, and habitats of highest stewardship priority, key tools, strategies, needs and information gaps (**Appendix IIa, b**).

A series of brief plenary overview presentations were given in the fields of biology, jurisdiction, law and policy, economics, stakeholder engagement and organizations involved in deep-ocean activities. Each presentation was followed by group discussion. A final afternoon plenary discussion was held to initiate a list of high-priority issues for the initiative to consider.

April 16: The participants reviewed the prior day's list of high-priority issues, combined similar themes, and added additional themes to create a series of five breakout discussion groups that incorporated most of the key issues as determined by the group. In the end, the group focused on five core issues:

- (1) Ecosystem-based planning for seabed mining activities,
- (2) Representation of the deep sea in global ocean assessments,
- (3) Transparency, compliance and the engagement of industry in deep-sea stewardship,
- (4) Distinctive features of the deep sea and consequences for management, and
- (5) Raising awareness and capacity building for deep-sea stewardship

The participants discussed topics 1-3 in the morning and 4 and 5 in the afternoon, with self-assigned participation. Each group was asked to (a) identify key issues, (b) define one or more initiative goals, (c) identify approaches (d) define action items and (c) name potential partners, funders, and venues. The breakout groups then presented their ideas to the entire group in morning and afternoon plenary discussions.

April 17: Participants engaged in morning deliberations to develop a DOSI mission

statement, and to review, combine and expand the list of DOSI goals developed on Day 2. We identified volunteers for a DOSI steering committee and a DOSI student project committee, then discussed other initiative activities such as vehicles for engaging others in DOSI, possible partner organizations, special sessions at meetings, and linkages to other organizations and efforts. We met again in the five breakout groups formed the previous day to solidify action items and to identify leaders, participants, time frames and possible funding sources. A plenary discussion was held to review these with the entire group and to allow additional cross-group participation in specific action items. These action items represent the DOSI desired outcomes (DOSI-DO), an initial series of activities that the DOSI initiative will seek to support and fund.

The Outcomes:

The text below reflects a vision for DOSI, created by meeting participants. We anticipate that as global participation in DOSI increases, this dynamic initiative will host an expanded set of goals.

Mission Statement

DOSI seeks to integrate science, technology, policy, law and economics to advise on ecosystem-based management of resource use in the deep ocean and strategies to maintain the integrity of deep-ocean ecosystems within and beyond national jurisdiction.

DOSI Leadership:

Lisa Levin (Center for Marine Biodiversity and Conservation, Scripps Institution of Oceanography, USA)

Elva Escobar (Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México)

Maria Baker (International Network for Scientific Investigation of Deep-sea Ecosystems, National Oceanography Center, UK)

DOSI Steering Committee:

Jeff Ardron (Institute for Advanced Studies in Sustainability, Potsdam, GERMANY)

Kristina Gjerde (IUCN, POLAND)

Tony Koslow (Scripps Institution of Oceanography, USA)

Kathryn Mengerink (Environmental Law Institute, USA)

Lenaick Menot (IFREMER, FRANCE)

Christian Neumann (GRID- ARENDAL, NORWAY)

Linwood Pendleton (Duke University, USA)

Tracey Sutton (Virginia Institute of Marine Sciences, USA)

Andrew Sweetman (International Research Institution of Stavanger, NORWAY)

Cindy Van Dover (Duke University, USA)

Ursula Witte (University of Edinburgh, Scotland, UK)

Hiroyuki Yamamoto (JAMSTEC, JAPAN)

Volunteers for Student Project Committee:

Jeff Ardron, Cindy Van Dover, Elva Escobar, Tracey Sutton, Kathryn Mengerink, Paul Tyler (University of Southampton, UK)

Deep-Ocean Stewardship Priorities Identified by DOSI:

1. Identify and develop ecosystem-based management practices for deep-sea environments subject to human activities including (a) seabed mining, (b) energy extraction, (c) biological resource harvest and (d) cable and pipelines, waste disposal, contamination and other offshore activities. DOSI efforts will identify special features of the deep sea that call for distinct management approaches, articulate these approaches, work to translate management lessons across sectors and systems, and recommend strategies that account for and mitigate external costs (including environmental impacts) to optimally manage living and non-living resource use in the deep sea.
2. Identify and address knowledge gaps relevant to effective deep-sea stewardship including the effects of external stressors such as changing climate and cumulative human activities.
3. Ensure appropriate representation of the deep sea in global ocean assessments and global environmental governance and management..
4. Develop criteria for deep sea “institutional and corporate social responsibility” (e.g., transparency, data collection, data sharing and compliance) for the deep sea by working with industry, states, civil society, and scientists.
5. Strengthen capacity, provide training, and raise public awareness of current opportunities and impacts associated with human activities in the deep sea.
6. Provide a centralized location for information about ongoing deep-sea stewardship activities across multiple sectors, jurisdictions and disciplines.

DOSI Action Items:

Proposed action items associated with the DOSI priorities are summarized in Table 1. These involve a broad spectrum of activities: working group tasks, assessments, surveys, briefs, international and regional-scale workshops, joint seminars, scientific publications, courses, outreach materials, and development of new partnerships and funding sources.

Highlights from the list of action items include:

Priority 1: Ecosystem-based management in the deep sea

- Prepare a brief to the Global Ocean Commission outlining priority issues for the deep sea.
- Produce a policy paper that identifies special features and associated management needs of the deep sea.
- Student projects that examine existing management practices, marine spatial planning tools, cost-benefit analyses, technology needs and consumer behavior relevant to the deep sea.

Ecosystem based management for seabed mining

- Conduct a workshop to provide guidance on EIA development, with attention to defining significant impact and performing cumulative impact assessment.
- Development of an R&D plan to support improved deep-sea management in a collaboration between industry and research communities.
- Propose (to the ISA) and convene an international workshop focused on developing a decadal vision for ecosystem-based management in The Area.
- Contribute to regional-scale environmental management workshops for the South Pacific, Benguela Current, mid Atlantic, South Atlantic, and other regions.
- Prepare and publish a legal analysis of competence of ISA for protection of the environment
- Perform a GIS inventory of current deep-sea mining proposals within and beyond areas of national jurisdiction
- Hold a workshop on economic tools and benefit-cost analyses for environmental management of deep-seabed mining

Priority 2 and 3: Knowledge Gaps and Global Ocean Assessments:

- Identify major ocean assessments, their scope, how the deep-sea is included, and the active contributors.
- Evaluate the adequacy of deep-sea representation based on a DOSI survey
- Through a workshop and brief, organize deep-sea inputs to assessments, conduct a gap analysis and develop recommendations to rectify gaps.

Priority 4: For transparency, compliance and industry engagement:

- Perform a survey focused on evaluating effects of industries with the aim of engaging industry (e.g. through World Ocean Council and regulatory institutions) to help increase ocean observations and data sharing.
- Host joint seminars with industry, policy makers and scientist on cross-cutting issues

Priority 5: Awareness raising and capacity building:

- Develop web based courses on deep-sea ecology and short courses that examine deep-sea stewardship issues.
- Develop online video library of deep-sea settings and organisms
- Write 'Deep-ocean for Dummies',
- Compile a deep-sea bibliography
- Enhance and develop new deep-sea Apps for outreach

Priority 6: Facilitate communication and networking:

- Provide a centralized location for information about ongoing deep-sea stewardship activities across multiple sectors, jurisdictions and disciplines.
- Hold multidisciplinary sessions on DOSI themes at national and international meetings.

Approaches to Global Engagement:

The workshop participants agreed by consensus to form and pursue a Deep-Ocean Stewardship Initiative. The group suggested that a summary of DOSI activities and a call for engagement and expanded membership will be posted through the following organizations with an interest in deep-ocean stewardship issues e.g.: INDEEP, InterRidge, World Ocean Council, International Seabed Authority, Relevant United Nation Environment Programme Groups, International Oceanographic Commission, Global Partnerships for Oceans, Relevant UN FAO bodies, Future Earth Initiative, Deep-Sea Conservation Coalition, The Economics of Ecosystems and Biodiversity, Global Oceans Biodiversity Initiative, The Group on Earth Observations Biodiversity Observation Network, UN Division of Ocean Affairs and the Law of the Sea, The Oceanography Society, The Ocean Health Index and many others (see Appendix III).

The workshop participants endorsed the value of sponsoring special sessions on multidisciplinary/multisector deep-ocean stewardship at multiple international, national and local meetings. Suggested venues (and participants who will investigate) included the Deep-Sea Biology Symposium, Portugal (Summer 2015 Maria Baker), Oceanology Conference, London (Industry/Technology, April 2014, Andrew Sweetman), UNGA BBNJ Working Group, New York (Aug. 2013, Kristina Gjerde), AAAS, Chicago (Feb. 2014, Lisa Levin and Kristina Gjerde) Oceanography Society Meeting, International Marine Protected Areas Conference 3, Marseille, France (Oct. 2013, Jeff Ardron), Linwood Pendleton), Oceans 2013, San Diego (Sept. 2013, Lisa Levin), Ocean Sciences Meeting, Hawaii (Feb. 2013, Craig Smith), International Marine Claims Conference, Ireland (Sept. 2013, Linwood Pendleton), Ocean Business 14 (April 2014, NOC – Paul Tyler), Ocean Business (NOC – Paul Tyler), Global Forum for Oceans and Coasts, Law of the Sea Institute, RFMO meetings (Dale Squires) and ICES (Tony Koslow).

Future workshops are encouraged to engage early career scientists (e.g. via New Horizons in Science), industry stakeholders, NGOs, and government regulators. Potential venues include the Aspen Institute and the next World Ocean Council Summit (contact: Paul Holthus).

New Linkages: An important outcome of this workshop was the introduction of deep-sea experts across disciplines and the creation of potential new partnerships and lines of communication among organizations. Examples include (1) a collaboration to engage industry through the World Ocean Council (Holthus) in a seminar series run by the Environmental Law Institute (Mengerink), and (2) formulation of a brief from DOSI to the Global Ocean Commission that summarizes special features of the deep sea and offers recommendations for actions.

Rationale for DOSI Priorities –

Priority 1. Identify and develop ecosystem-based management* practices for the deep sea. Identify unique features, management needs and approaches in the deep sea. Translate lessons across sectors and systems.

The deep sea includes the water column and seabed below 200 meters in depth, occupies 90% of the marine environment, and functions as the regulatory body of the biosphere, e.g. buffering bio-geochemical circulation, regenerating of nutrients and much more. A variety of unique features of this extreme, enormous, and three-dimensional environment drive the need for specialized approaches to management. Furthermore, the deep sea spans areas within and beyond national jurisdictions leading to complex governance frameworks. Past, present, and emerging human pressures on the deep sea drive the need for action. This DOSI challenge will promote improved policies and management including consideration of sector-specific and cumulative impacts, as well as sector-specific and multi-sector solutions. Of particular importance are considerations of how to ensure cross-sector protection of habitat, improvement of environmental impact assessment, and develop approaches to avoid and minimize impact of human activities.

1A. Contribute to a strategy for ecosystem-based management of deep seabed mining.

Given accelerated interest in deep seabed mining, there is need for a strategic vision within the International Seabed Authority that looks to future protection and preservation of the marine environment while enabling use of seabed resources. Elements of this strategic vision go beyond current ISA requirements and include consideration of cumulative impacts, economic incentives, resource use conflicts, technology to serve environmental management, monitoring and enforcement strategies, criteria for scientific areas of particular interest, and confounding effects of external anthropogenic inputs (stresses from climate change, fishing, ocean acidification, etc.). A DOSI subgroup will work with the ISA to bring together multidisciplinary, international, cross-sectoral experts and other stakeholders to recommend a 5- or 10-year strategy for environmental management within the International Seabed Authority and in so doing inform national government strategies. Objectives include enabling application of best available science and technology that allow resource use while protecting and preserving the marine environment and promotion of cooperation among contractors and between contractors and the scientific community and civil society.

1B. Promote strategies for environmental biological resource management in the deep sea. Standing stocks and production of many neritic biological resources have decreased in the last half century due to overharvesting and cumulative habitat degradation. In an effort to find more exploitable resources, fisheries have extended into deep-sea habitats, often beyond national jurisdiction. Advances in technology have enabled increasing access to deep-sea biological resources, often before adequate science-based management plans are considered or implemented. The effects in some cases (e.g., orange roughy) have been catastrophic. DOSI will act to coordinate planning across multiple management regimes, as this presents a significant challenge that must be overcome to achieve sustainable use of deep-sea biological resources that are generally

slower to recover from disturbance and harvest than their neritic counterparts. DOSI will promote a precautionary approach to deep-sea management implemented via international cooperation; this is critically needed as the demand for deep-sea biological resources increases.

1C. Balance the sustainability and value of living and non-living resources in the deep sea. For sound ecosystem-based management to occur it is important to consider and internalize the external costs of deep-sea industrial activities including environmental degradation and alteration. Although there is no developed field of deep-sea economics and econometrics, a need for this expertise is emerging rapidly. Expertise in this field will ensure that decision-making for conservation and management of living and non-living resources involves assessment and consideration of direct and external costs and benefits, an appropriate regulatory environment, and fair use and payment for these resources. Humanity's costs of resource utilization in the deep sea extend well beyond the direct costs incurred by industry and include the unpriced costs of environmental damage, degradation, restoration, and cleanup – costs that should be borne by all elements of the production and consumer chain. Net benefits to society are over-estimated when external costs are not incorporated into project evaluation and decision-making. Failure to value and price all costs of resource use (for example, inaccurate transfer pricing, improper valuation of exchange rates, and failure to account for external benefits of the unexploited resource), overestimates net benefits of exploitation to society. Benefits and costs that are inadequately accounted for will hamper development of a regulatory regime that guides resource utilization toward full economic, social, and ecological efficiency over the lifetime of mineral concessions. DOSI will help to focus the attention of economists and decision makers on the need for development of novel 'frontier' theory to ensure that economically, socially, and ecologically efficient resource use ensues and that benefit payments and sharing are based on best economic theory.

1D Develop a strategy for ecosystem-based management of contamination, waste disposal, transport and input to the deep sea. The accumulation of waste in marine habitats derived from human activity is an issue of increasing concern for scientists, governments and society. Although the remoteness of the deep ocean makes direct observations difficult and sparse, there is increasing evidence for the presence of human-derived waste (e.g. litter, mine tailings) litter at the deep seafloor as well as in the stomachs of deep-sea pelagic and benthic fauna. The London Convention on the Prevention of Marine Pollution by Dumping of Wastes has been in force since 1975, but illegal dumping of litter, together with the advection of waste from coastal areas and river discharges, is still a major problem, resulting in approximately 6.4 million tonnes of waste entering the oceans each year (UNEP, 2009). Countless numbers of plastic bags used widely around the world on land end up in the deep sea. Although the impacts are still poorly understood, accidental and intended waste disposal can cause physical damage to sessile species, smother benthic habitats leading to, suffocation and starvation and be a source of persistent organic pollutants and micro and nano-plastics, as well as affect the fishing industry, causing net and catch damage.

This DOSI subgroup will bring together a global network of interested cross-sectoral stakeholders (scientists, governments, NGOs, industry and the civil society) to address the issues of disposal, transport and accumulation of human-derived waste in the

deep ocean, its impact on habitats and fauna, and provide advice to managers. Objectives include the gathering of all current information on human-derived waste in the deep ocean, to be fed to all national and international groups involved in addressing these issues (e.g. EU-Marine Strategy Framework Directive; UNEP's Marine Litter Global Initiative) and increasing awareness with society to promote and advance the development of management regulations

Priority 2. Consider present and future uses of the deep sea in light of interactions between a changing climate and cumulative human activities.

Rising CO₂ and particulate (black carbon) emissions are leading to a warmer ocean that holds less oxygen (termed deoxygenation) and has a lower pH (termed acidification). These climate variables are changing in the deep ocean, often in realms characterized by extreme constancy. Multiple stresses imposed by climate change in the deep ocean will influence the distributions of organisms and resilience of ecosystems to disturbance. For example, pH and aragonite saturation state reductions will slow coral recovery from trawl damage and oxygen declines at bathyal depths will reduce assemblage resilience following disturbance from mining or oil spills. Shifting circulation carrying warmer waters may release methane, a potent greenhouse gas, through dissociation of gas hydrates, exacerbating warming. DOSI will focus attention and promote research on how stress imposed by changing climate variables in the deep ocean will interact with the cumulative impacts of fishing, mining and energy extraction, and what the consequences will be for provision of ecosystem services.

Priority 3. Ensure sound representation of the deep sea in global ocean assessments and global environmental governance and management. Identify and address knowledge gaps.

Long considered too inaccessible to be significantly influenced by human activities, the deep ocean is now recognized to be impacted by a growing number of activities, including dumping and pollution, fishing, and oil and gas extraction. Within only a few decades of their inception, deep-water fisheries have depleted deep-water fish stocks worldwide and severely impacted seamount and cold water coral habitats. Looking to the future, the effects of climate change, including acidification and deoxygenation, appear poised to increase dramatically. The key deep-sea habitats (e.g. abyssal plains, hydrothermal vents and cold seeps, coldwater corals, and the deep water column) have distinct faunas with widely divergent ecological and life-history characteristics; some are targeted for seabed mining. Most, however, are notably diverse, with low productivity and high vulnerability to human disturbance. There is therefore, urgent need to properly assess the state of deep-ocean ecosystems, and establish a deep-ocean observation network to acquire proper baseline and time series data to assess natural cycles and anthropogenic change.

This DOSI initiative seeks to ensure that assessment and management of the deep ocean are based on comprehensive input from the scientific community, including natural and social scientists. This sub-group will seek to ensure that the full range of deep-water ecosystems is assessed, with consideration of regional differences and of past, present, and anticipated future impacts of major stressors, including potential synergisms. This subinitiative also seeks to identify major gaps in scientific understanding that limit

current assessments and to indicate how monitoring and research may rectify such gaps for future assessments and management. A key objective is to coordinate interactions within the community of deep-sea experts through dedicated workshops leading to syntheses that can be input to current assessments and management.

Priority 4. By working with industry, states, civil society, scientists and regulatory authorities, improve: i) transparency; ii) data collection and sharing; and iii) accountability and compliance of deep-sea activities

Many regulatory processes concerning the deep sea allow only limited participation and observation from civil society, and hence decision-making can, at times, appear mysterious and opaque from the outside. Furthermore, because compliance is seldom reported, it is very difficult to ascertain how effective existing rules and regulations have been in meeting their objectives. Data, particularly those collected by deep-sea stakeholders, can be difficult to attain. Detailed information on the spatial-temporal distribution of human activities in the deep sea (e.g. fisheries) is sometimes considered to be proprietary, and is not shared. DOSI will work with industry, states, civil society, scientists and regulatory authorities to address these inter-related issues, so as to improve public access to information and data, transparency of decision-making as well as human activities occurring in the deep sea, their accountability to civil society, and reporting on their compliance.

Priority 5. Strengthen capacity, provide training and raise awareness of current opportunities and impacts associated with human activities in the deep sea.

Capacity building is underpinned by information flow, education and communication. Information flow is supported by the establishment, maintenance and dissemination of local, regional and global databases. Fundamental to this aim is the quality of the database. This will involve accurate information assembly and compilation, analysis, so to define, for example, biogeographical patterns. Accurate databases can be used as baselines against which human impact in the deep sea can be measured. Such databases can be used in education, as can be dedicated bibliographic databases. Education is necessary as the knowledge of the deep sea is very limited except by those directly working in this environment. Industry and policy makers need to be informed of basic parameters of the deep sea at least. Because knowledge is weak there is often a lack of interface among scientists, industry, stakeholders and policy makers. This limited interface is compounded by the number of steps between information providers and policy/law makers. Education is also the fundamental basis of outreach. The public has an insatiable appetite for the natural world and the deep sea has gained considerable ground in the public's perception. Raising awareness can range in form from bespoke educational courses for stakeholders to the use of modern social media such as a dedicated app, Twitter and Facebook to spread knowledge to the widest audience, particularly in layman's terms. This DOSI subgroup will seek to (i) improve knowledge of the deep sea to all stakeholders including inter alia professional scientists, industry, economists and lawyers by the provision of dedicated training courses (ii) develop better

lines of communication among all stakeholders and (iii) increase awareness of the deep sea amongst the world population by using modern social media.

Capacity for managing human activities affecting deep ocean ecosystems is limited in terms of awareness, information, knowledge and available expertise. Depending on the actor (from political decision-maker to the general public), geographic region and theme, needs for building capacity differ. Generally however, any form of capacity building needs to be underpinned by good scientific information and expertise, education and communication. Fundamentally, general awareness of deep-ocean issues among decision makers and industry stakeholders is an impediment to generating adequate support for the protection of deep ocean ecosystems. This can be overcome by transforming available expertise on deep-ocean ecosystems and management into easily understandable, attractive information packages in print and web material. Particularly in developing country contexts, the access to relevant data and information is a critical need that cannot be met by existing resources. Here, the support from the science community to collate and share available data and information through online databases can be a highly valuable contribution to enabling national authorities and regional and international organizations to take appropriate planning and management decisions. DOSI will gather the technical and scientific knowledge and expertise to turn data and information into good management practices for a range of audiences: early career scientists, management practitioners and regulators, and to train professionals in the private sector industries affecting the deep ocean on the specific characteristics of deep-sea ecosystems and the management of their use. Online courses that cover the broad spectrum of deep-ocean stewardship, and bespoke courses for key stakeholders can strengthen the audiences' capacity for protecting the deep ocean.

Priority 6. Provide a centralized location for information about ongoing deep-ocean stewardship activities across multiple sectors, jurisdictions and disciplines.

There are currently many different groups focused on various aspects of deep-sea stewardship (see Appendix III; please note that this is a work-in-progress and is not yet a comprehensive listing). They include intergovernmental panels, RFMOs, NGOs, state regulatory agencies, and various commissions and informal groups. Some focus on specific industry sectors or exploitation activities (mining, bottom fishing, etc.). There is a need for enhanced communication, coordination and in some cases partnerships across these groups. DOSI seeks to facilitate these activities, by collecting and posting information, and enabling communication among representatives of the natural and social science disciplines, environmental groups, business, and government.

NEXT STEPS FOR DOSI:

The DOSI Leadership and Steering Committee will work to coordinate DOSI activities. There are natural alliances with INDEEP, as many of the biological DOSI participants are part of INDEEP. A number of the DOSI goals are shared with INDEEP Working Group 5. Thus INDEEP has agreed to work with CMBC and CMARL to develop a DOSI webpage within the INDEEP site, distribute information about DOSI and help expand

participation. INDEEP and CMBC will serve as communications hubs until a DOSI secretariat can be formed. A high priority will be to develop a full initiative proposal for submission to the Kaplan Foundation and other possible funders. This proposal will seek to promote the DOSI priorities and action items proposed in Table 1 and outlined above. A short position paper identifying the need for DOSI, the importance of integrating natural science, economics, business and policy to tackle the issues, and outlining the initiative form is being prepared.

**For purposes of this report we will refer to ecosystem-based management as seeking to manage marine resources in ways that protect ecosystem health while providing the ecosystem services needed by people. Rather than focusing solely on a single species or resource, MEBM incorporates science and balances the demands of user groups in a manner that produces management strategies that are more likely to be sustainable than traditional approaches. (<http://webservices.itcs.umich.edu/drupal/mebm/?q=print/69>)*

We refer to the precautionary principle as: *'Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing measures to prevent environmental degradation'.*

Table 1. Summary of Deep Ocean Stewardship Initiative Action Plans						
Theme/ Action	Timeframe	Format	Leader	Participants	Venue	Potential Funding Sources
Priority 1. Identify and develop management practices and policy for the deep sea. Identify unique features, management needs and approaches in the deep sea. Translate lessons across sectors and						
Improve deep ocean policies and decision-making by issuing a policy paper that identifies unique features and the management needs that should accompany them	2013	Policy Publication	Katheryn Mengerink (requires funding)	Kristina Gjerde, Cindy Van Dover, Jeff Ardron, Tracey Sutton, Tony Koslow, Dale Squires, Ursula Witte, Lisa Levin, Elva Escobar		
Work with graduate students to identify and summarize management practices that are relevant for the deep sea	TBD	Student Project	Student Committee			
Examine and identify marine spatial planning tools for deep sea	TBD	Nicola Clark				
Conduct a cost-benefit analysis for deep sea based on proposed/emerging activities	TBD	Student Project	Student Committee			
Technology ideas that could be examined by business schools (engineering programs?)	TBD	Student Project	Student Committee			
Behavior influence on consumers of deep sea products and resources (Gneezy)	TBD	Student Project	Student Committee			
Host a working group to examine and develop guidance on EIA development, including consideration of what is a "significant impact" and how to conduct a cumulative impact assessment	2014	Workshop				
Develop an R&D plan to support improved deep sea management in a collaboration between industry and research community (including science, economics, and management).	2014?	Report				
Priority 1a. Environmental Planning for deep-sea mining (Area focus).						
Priority Issues Brief to the Global Ocean Commission	Draft: May 1; Final June 1	Electronic Document	Cindy Van Dover	Kathryn Mengerink, Dale Squires, Kristina Gjerde, Jennie Dean, Andrew Sweetman, Lisa Levin, Cristian Neumann, Elva Escobar		None Required
Policy brief to ISA/LTC/Council proposing Strategy Workshop	Draft: May 1; Final June 1	Submit via France	Cindy Van Dover	Lenaick, Alfonso, Kristina, Andrew, Frida, Michael, Elva, Jeff, Dale	Jamaica	ISA, Norwegian Research Council (\$45K), Nippon foundation, UK Seabed Resources, Lockheed martin, US BOEM
Regional Scale Workshops: South Pacific	Aug.-Sept. 2013		Aquila Tawake	TBD	Fiji	
Regional Scale Workshops: Benguela Current	ASAP		Bronwen Currie, Andrew Sweetman, Lisa Levin	TBD	Namibia	
Regional Scale Workshops: mid Atlantic	2014?		Andrew Sweetman, Lenaick Menot	TBD	TBD	EU
Regional Scale Workshops: South Atlantic	2014?		Frida Armas, Alfonso Ascencio	TBC	TBD	
Legal analysis of competence of ISA for protection of environment	Jan. 2014	Publication	Frida Armas	Elva Escobar		
GIS Inventory of current mining proposals – EEZ plus the ISA database		Student Project/paper	Student Committee			
Priority 1 d. Develop strategies to optimally manage renewable and non-renewable resource use in the deep sea that account for and mitigate external costs (environmental degradation).						
Workshop on economic tools and benefit-cost analyses for environmental management of deep-seabed mining	2013	Workshop	Dale Squires Joshua Graf Zivin	Selected Economists	SIO/IRPS (UCSD)	ISA
Priority 2. Encourage stewardship of the deep sea in the context of present and future uses in light of the cumulative human activities in synergy with climate change.						
Combine forces with CLIDEEP - An INDEEP WG 4 ACTIVITY.	2013		Andrew Sweetman	Lisa Levin, Kristina Gjerde, Elva Escobar, CLIDEEP members		
Create a subgroup that examines the intersection of future climate change and use of the deep sea.	TBD		TBD			
Priority 3. Representation of the deep sea in global ocean assessments.						
Identify major ocean assessments in near future (e.g. WOA & TEEB, GOC, IPBES)	2013	Electronic List	Maria Baker and Tony Koslow	Paul Tyler, Ursula Witte, Tracey Sutton, Elva Escobar, Ana Figueroa (Paul Snelgrove)	INDEEP Post	INDEEP Office
Identify how assessments are defined & scope of deep sea inclusion including active contributors	2013	Workshop	Elva Escobar	Tony Koslow (WOA), Christian Neumann, Ursula Witte (TEEB)		
Evaluate adequacy of deep sea representation in process (topics & expert representation), based on survey of DOSI	2013	Workshop	Tony Koslow	Maria Baker, Paul Tyler, Ursula Witte, Tracey Sutton, Elva Escobar, Ana F		
Organize information for input to assessment based on workshop & brief	late 2013	Workshop	Ursula Witte Maria Baker	Tony Koslow, Paul Tyler, Tracey Sutton, Elva Escobar, Ana F		INDEEP
Develop gap analysis as part of assessment with recommendations on rectifying the gaps	2014	Workshop	Tony Koslow	Maria Baker, Paul Tyler, Ursula Witte, Tracey Sutton, Elva Escobar, Ana F	Link to WOC Smart Oceans Program	

Appendix 1. Deep Ocean Stewardship Initiative Workshop Participants List .

Name	Affiliation	Country	email address	Current DOSI Role
Elva Escobar	UNAM	USA <i>México</i>	escobri@cmarl.unam.mx	Co-Lead / Steering Com
Lisa Levin	Scripps Institution of Oceanography	USA	llewin@ucsd.edu	Co-Lead / Steering Com
Maria Baker	Univ. of Southampton, INDEEP	UK	mb11@noc.soton.ac.uk	Co-Lead/Steering Com
Jeff Ardron	Institute for Advanced Studies in Sustainability	GERMANY	jeff.ardron@iass-potsdam.de	Steering Com/ Student Com
Kristina Gjerde	International Union of Concerned Scientists	POLAND	kristina.gjerde@eip.com.pl	Steering Com
Tony Koslow	Scripps Institution of Oceanography	USA	jkoslow@ucsd.edu	Steering Com
Katheryn Mengerink	Env. Law Institute	USA	kmengerink@ucsd.edu	Steering Com/ Student Com
Lenaick Menot	IFREMER	FRANCE	Lenaick.Menot@ifremer.fr	Steering Com
Christian Neumann	Grid Arendal	NORWAY?	Christian.Neumann@grida.no	Steering Com
Linwood Pendleton	Duke University	USA	linwood.pendleton@duke.edu	Steering Com
Tracey Sutton	Virginia Institute of Marine Sciences	USA	tsutton@vims.edu	Steering Com/ Student Com
Andrew Sweetman	International Research Institution of Stavanger (IRIS)	NORWAY	Andrew.Sweetman@iris.no	Steering Com
Cindy Van Dover	Duke University	USA	clv3@duke.edu	Steering Com/ Student Com
Ursula Witte	University of Edinburgh	SCOTLAND	u.witte@abdn.ac.uk	Steering Com
Hiroyuki Yammamoto	JAMSTEC	JAPAN	kyama@jamstec.go.jp	Steering Com
Verónica Aguilar Sierra	Conabio Participant	MEXICO	vaguilar@xolo.conabio.gob.mx	Participant
Frida Armas Pfirter	Austral University	ARGENTINA	frida_armas@yahoo.com	Participant
Alfonso Ascencio	Secretaría de Relaciones Exteriores Consultoría Jurídica	MEXICO	alfonsoa@sre.gob.mx	Participant
Bronwen Currie	NATMIRC, Swakopmund	NAMIBIA	a_b_currie@yahoo.co.uk	Participant
Jennie Dean	Global Ocean Commission Rep	UNITED KINGDOM	Jennie Dean <jdeanGOC@gmail.com>	Participant
Ana Luisa Figueroa.	Directora de la Reserva de la Biosfera Islas del Golfo de Cal	MEXICO	afiguero@conanp.gob.mx	Participant
Paul Holthus	World Ocean Council	INT. STAKEHOLDER	paul.holthus@oceanconcil.org	Participant
Ana Lara Lopez	Coffey Consultants	Australia	alaralopez@ucsd.edu	Participant
Michael Lodge	International Seabed Authority	JAMAICA	mlodge@isa.org.jm	Participant
Eva Ramirez	Institut de Ciències del Mar, CSIC, Barcelona	SPAIN	ezr@cmima.csic.es	Participant
Dale Squires	Scripps Institution of Oceanography	USA	Dale.Squires@noaa.gov	Participant
AkuilaTawake	SOPAC	TONGA, W. Pacific	akuila@sopac.org	Participant
Paul Tyler	Southampton University	UK	pat8@noc.soton.ac.uk	Student Com

APPENDIX IIA

Deep-Ocean Stewardship Initiative – Pre Workshop Questionnaire

Your Name : _____

There is increasing interaction between human society and the deep ocean (>200 m). This workshop is intended to foster stewardship of the deep ocean by identifying key resources, sustainability issues and conservation priorities and developing an action plan in the form of a global initiative. We are considering areas *within and outside* national jurisdictions. Please take a few minutes to fill out this questionnaire. Please return responses to llevin@ucsd.edu and mb11@noc.soton.ac.uk Thank you.

- (1) Based on your own expertise, what do you see as the three largest problems or topics of concern in the deep ocean at present that require transdisciplinary solutions?**

- (2) For each of these three topics, in what geographic regions and jurisdictions (EEZ/ high seas) would you focus deliberations?**

- (3) What deep-sea environments or ecosystem services do you consider to be under greatest threat in the future?**

- (4) What knowledge gaps, policy shortcomings or information deficits need to be filled to make progress?**

- (5) Within your arena of expertise, what tools, strategies, regulations, policies or approaches can be employed to address deep-ocean stewardship needs?**

- (6) What technologies can be applied to address the issues?**

APPENDIX IIA

Deep-Ocean Stewardship Initiative – Pre Workshop Questionnaire

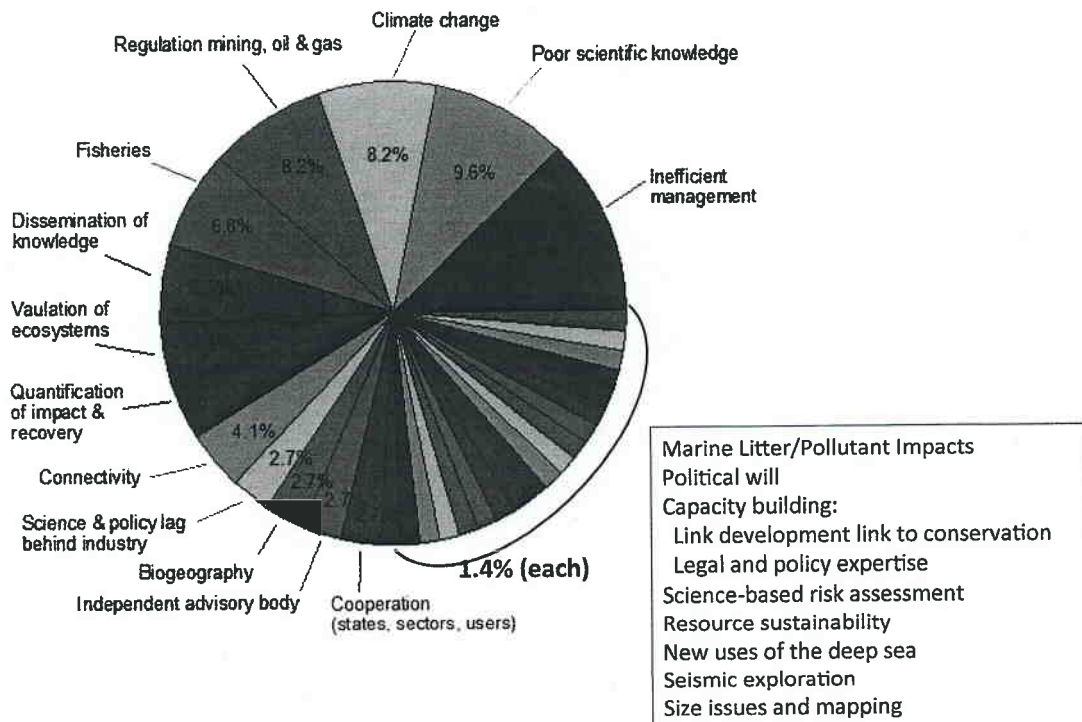
Your Name : _____

- (7) **What aspects of capacity building would you assign highest priority? In which regions?**
- (8) **Are you aware of examples of multi-sectoral conflict in the deep ocean? – ie interests in multiple deep-sea resources or services at the same general location, or partitioned in time or vertical zone? Please describe briefly.**
- (9) **What doesn't exist that requires conception, innovation, creation etc. to address the issues? (this could be technology, policy, political will, information or anything else).**
- (10) **What organizations, funding agencies, government entities, institutions, facilities or other resources can you recommend to help address the issues you raise.**
- (11) **What role would you like to play in developing a deep-sea stewardship initiative?** (This could range from leading a working group, writing papers, seeking funding, teaching a class in ???, conducting research on...???, providing outreach. etc.)
- (12) **Name others (with email address) that you believe would make valuable contributions to this initiative and should be contacted in the future.**

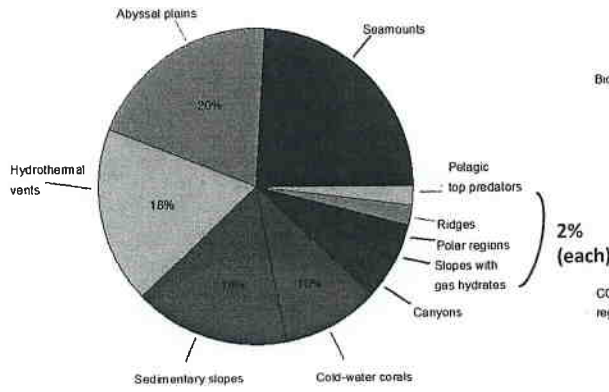
Deep-Ocean Stewardship Initiative Pre Meeting Questionnaire Summary

Thanks to Eva Ramirez and Maria Baker for
gathering and collating data

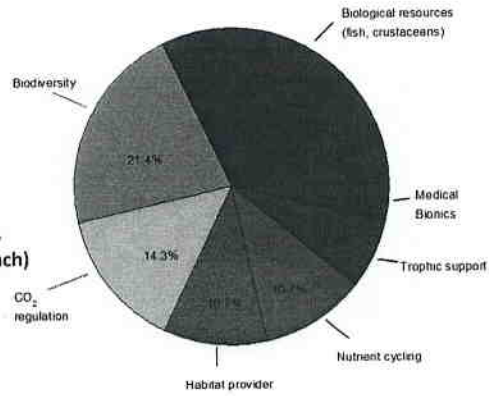
Major topics of concern that require trans-disciplinary solutions



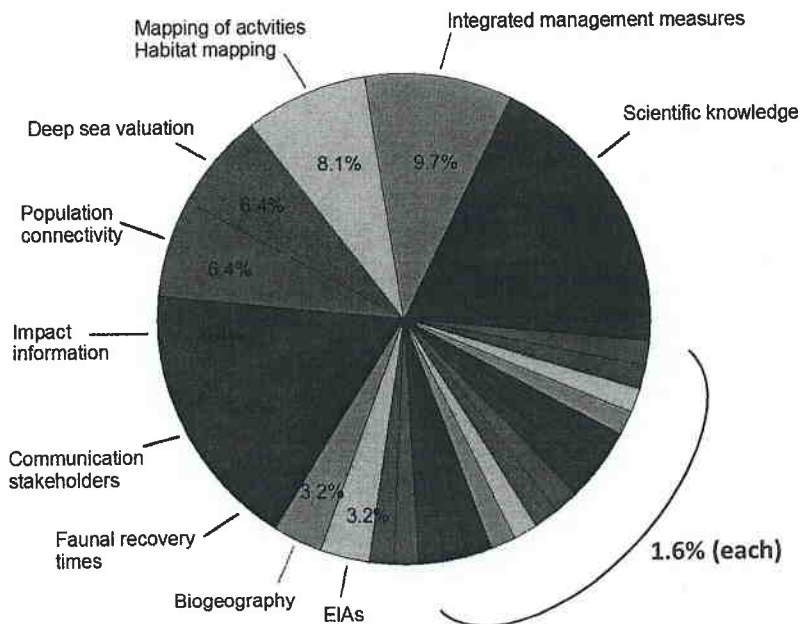
Environments under threat



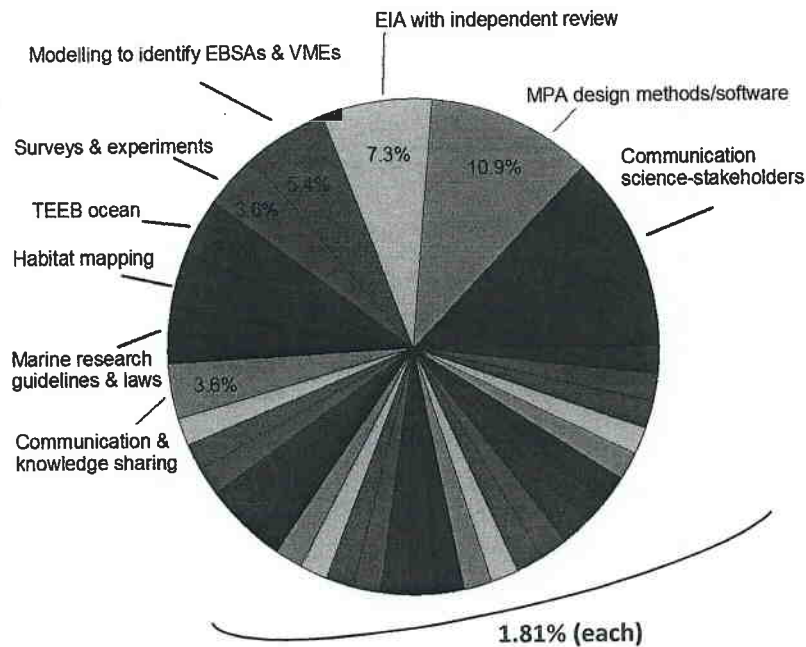
Services under threat



Information gaps and deficits



What can we do (tools and strategies) ?

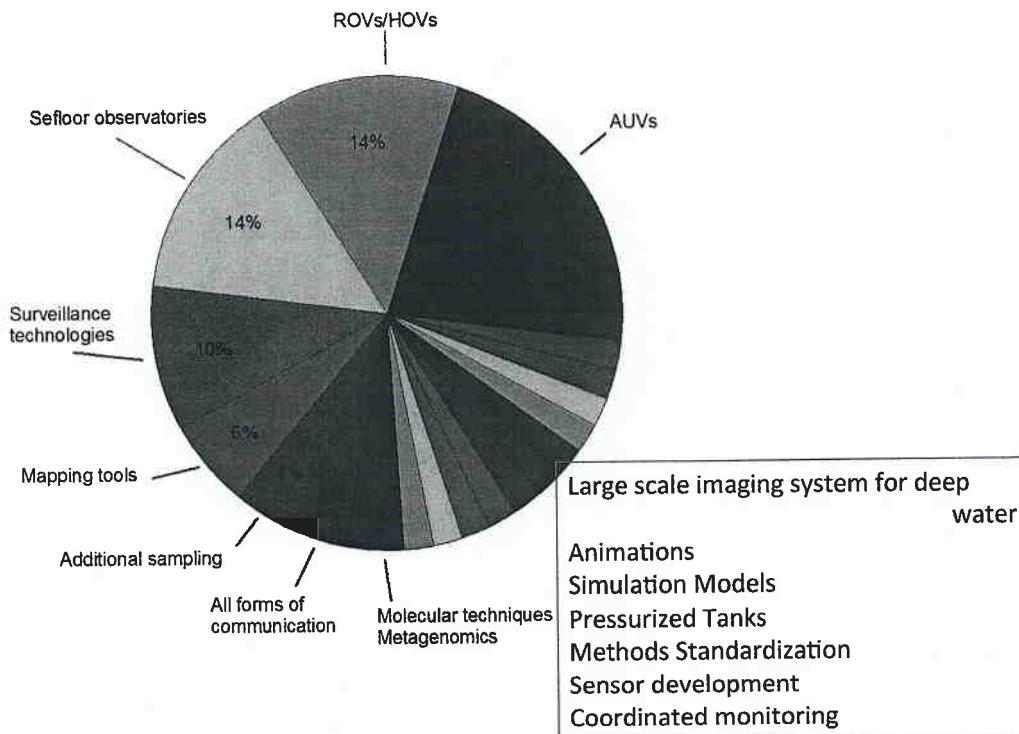


More tools and strategies

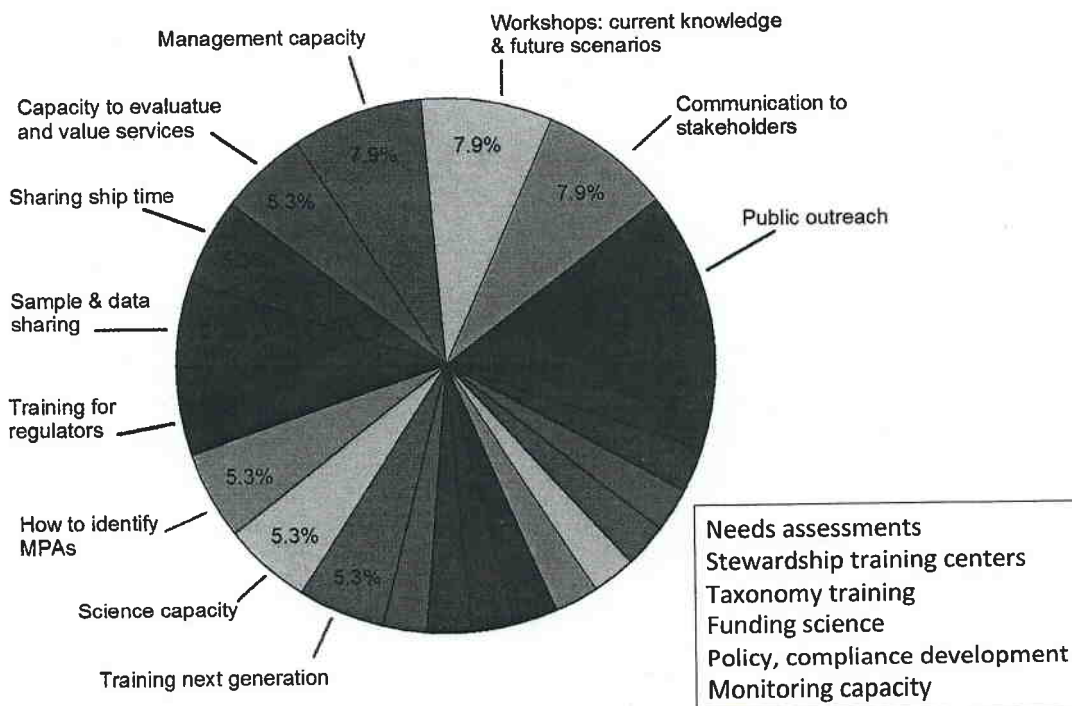
- Framework that links law, policy and management
- Examine individual laws/policies
- Remote mapping and photography
- Integration of scientists in exploitation domain
- Include seabed protection in living marine resource legislation
- Conservation initiatives in parallel to resource exploitation
- Law enforcement
- Identify social preferences
- Political and institutional understanding of deep-sea stakeholders
- Capacity building on EBM/MSP
- Valuation
- Precautionary principle
- Cumulative impact assessments
- Strategic Impact assessments for national policies
- MPA and non-extractive marine reserve systems
- Co-operative research
- Codes of conduct / Good practice guidelines
- Application of the mitigation hierarchy
- Biodiversity action plans
- Outreach to society
- Multidisciplinary approach (science, law, politics)
- Use of existing law within EEZs

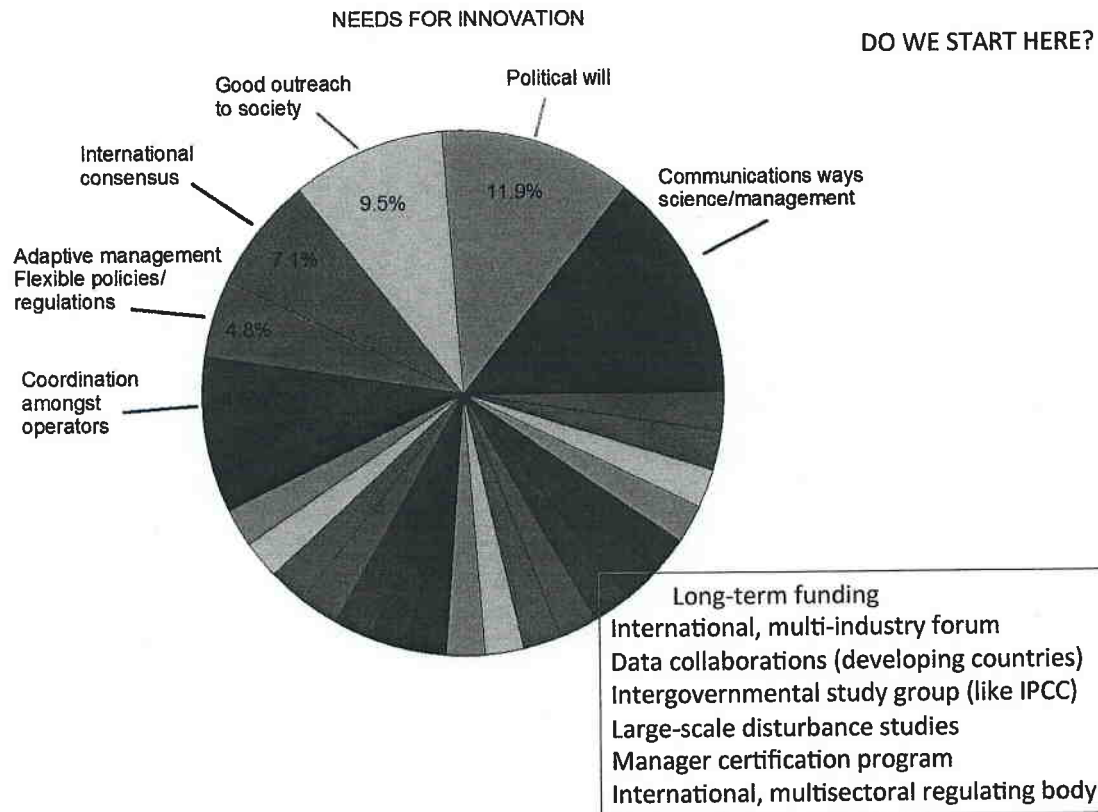
Need to continue bolster ISA and DSCC's efforts through UN. NGOs effective.
 Deep pelagic ecosystem quantification and modelling
 Real time monitoring

TECHNOLOGIES NEEDED



CAPACITY BUILDING NEEDS





Multisectoral Conflicts

Within EEZ

- Oil (spill) vs fisheries (Gulf of Mexico)
- Phosphate mining vs fisheries (Namibia, New Zealand)
- SMS mining vs fisheries (closure) (Kermadec Arc)
- Diamond mining vs lobster fisheries (Namibia)
- Litter/Pollution vs fisheries (Mediterranean)
- Mining vs non-extractive development (Arctic)
- Zinc processing pollution vs fishing (Australia)
- Mining vs fishing (Papua New Guinea – expected)

Industry Conflicts with Conservation Actions

- Trawling vs Coral (Bering Sea)
- Seismic activities vs Tuna fisheries
- Cable Laying vs Long-term research
- Exploration vs conservation (Clarion Clipperton)
- Overlapping mandates (ISA, CBD, UN ABNJ, UNEP ABNJ)
- Mining vs Tourism (Pacific)

Within Sectors

- Trap vs Trawl Fisheries (Bering Sea)
- Gas Hydrate vs SMS mining (Arctic)

APPENDIX III. Deep-Sea Interest Groups/Conventions/Science Progs etc.

Full Name	Website	Country
Agence des Aires Marine Protégées	http://www.aires-marines.fr/	France
Agreement on the International Dolphin Conservation Programme (AIDCP) (sister organisation to IATTC)		
ALTER-Net	http://www.alter-net.info/	European
Arctic Council	http://www.arctic-council.org/	International
Belize Coalition to Save Our Natural Heritage		
Benguela Current Commission	http://www.benguelacc.org/	Angola, Namibia & South Africa
Bloom Association	http://www.bloomassociation.org/	France / Hong Kong
BluGenics	No website yet	European
British Ecological Society (Marine Environmental Policy Advisory Group)	http://www.britishecologicalsociety.org/policy/marine_environment.pl	UK
Bureau of Ocean Energy Management (BOEM)	http://www.boem.gov/	USA
Canadian Healthy Oceans Network (CHONE)	http://chone.marinebiodiversity.ca/	Canada
Centre for Environment, Fisheries & Aquaculture Science (CEFAS)	http://www.cefasc.defra.gov.uk/	UK
Centre for Marine Biodiversity and Conservation, Scripps Oceanography	http://cmbc.ucsd.edu/	USA
Challenger Society for Marine Science	http://www.challenger-society.org.uk/	UK
CITES (Convention on International Trade in Endangered Species of Wild Animals and Plants)	http://www.cites.org/	International
COLA (Citizens Organized for Liberty through Action)		
Commission for the Conservation of Southern Bluefin Tuna (CCSBT)		
Commission National for Knowledge and Use of Biodiversity, Mexico (CONABIO)	http://www.conabio.gob.mx/web/conocenos/quienes_somos_ingles.htm	Mexico
Committee for Conservation of Antarctic Marine Living Resources (CCAMLR)	http://www.ccamlr.org/	International
Commonwealth Secretariat	http://www.thecommonwealth.org/	International
Conservation International		
Consultative Group on Biological Diversity (CGBD)	https://cgbd.org/	USA/international
Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea (CCBSP) - RFMO		
Deep-Sea Conservation Coalition (DSCC)	www.savethehighseas.org/	International
Deep-Sea Labs around the globe (e.g. VIMS, SIO, NOC, UNAM, Tongji Uni, etc. etc.)		
Deep-Sea Mining Campaign	http://www.deepseaminingoutofourdepth.org/	PNG
Department for the Environment, Food and Rural Affairs (DEFRA)	http://www.defra.gov.uk/environment/marine/	UK
DIVERSITAS	http://www.diversitas-international.org/	International
EarthWatch	http://www.earthwatch.org/europe/area_oceans	International
Environment and Conservation Organisations of New Zealand (ECO)	http://www.eco.org.nz/	NZ
Equator Principles	http://www.equator-principles.com/	International
EU Marine Strategy Framework Directive (MSFD)	http://ec.europa.eu/environment/marine/	European
EurOCEAN	http://www.eurocean.org/	European
European Environment Agency (EEA)	http://www.eea.europa.eu/	European
European Marine Board (EMB)	http://www.marineboard.eu/	European
Federal Agency for Nature Conservation	www.bfn.de	Germany
Flora and Fauna International	http://www.fauna-flora.org/initiative/marine-conservation/	International
Fondation Total	http://foundation.total.com/	France
Food and Agriculture Organization of the UN (FAO) - Fisheries and Aquaculture	www.fao.org	International
Food and Agriculture Organization of the UN (FAO) - Regional Fisheries	http://www.fao.org/fishery/rfb/en	
Forum Fisheries Agency (FFA)	http://www.ffa.int/	Pacific Islands Region
Friends of the Earth	http://www.foei.org/en	International
Fundacao de Amparo a Pesquisa do Espirito Santo (FAPES)	http://www.fapes.es.gov.br/	Portugal
Future Earth Initiative (new 10 year programme) (Science and Technical)	http://www.icsu.org/future-earth	International
General Fisheries Commission for the Mediterranean (GFCM) - RFMO		
Genomic Standards Consortium (Biodiversity WG)	http://gensc.org/gc/wiki/index.php/Biodiversity_Working_Group	International
Geoscience Australia		Australia
Global Environmental Change Programmes (now Future Earth - see above)		
Global Environmental Facility (GEF)	http://www.thegef.org/gef/	International
Global Ocean Commission (GOC)	http://www.globaloceancommission.org/	International
Global Partnerships for Oceans	http://www.globalpartnershipforoceans.org/	International
GOBI	http://www.gobi.org/	International
Greenpeace	http://www.greenpeace.org/international/en/campaigns/oceans/	International
High Seas Alliance (formed 2011)	http://highseasalliance.org/	International
INDEEP - International Network for Scientific Investigations of Deep-Sea	http://www.indeep-project.org/	International
Indian Ocean Tuna Commission (IOTC)		
Industry Consultative Bodies (e.g. European RACs)		
Institute for Advanced Sustainability Studies (IASS)	http://www.iass-potsdam.de/	Germany
Institute for Ocean Conservation Science (IOCS)	http://www.oceanconservationscience.org/	USA
Institute for Sustainable Development and International Relations (IDDRI)	http://www.iddri.org/	France
Inter-American Tropical Tuna Commission (IATTC)		
Intergovernmental Oceanographic Commission (IOC) - UNESCO	http://ioc-unesco.org/	International
Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)	http://www.ipbes.net/	International
International Commission for the Conservation of Atlantic Tunas (ICCAT)		
International Council for Science (ICSU) (Also see Future Earth)	http://www.icsu.org/	International
International Council for the Exploration of the Sea (ICES) - WG Deep-Water	http://www.ices.dk	International
International Geosphere-Biosphere Programme	http://www.igbp.net	International
International Marine Minerals Society (IMMS)	http://www.immsoc.org/	International
International Maritime Organisation (IMO)	http://www.imo.org	International
International Panel on Climate Change (IPCC)	http://www.ipcc.ch/	International
International Programme on the State of the Ocean	http://www.stateoftheocean.org/	International

International Research Institute of Stavanger	http://www.iris.no/research/environment	Norway
International Seabed Authority (ISA)	http://www.isa.org.im/	International
International Tribunal for the Law of the Sea (ITLOS)	http://www.itlos.org/	International
International Union for the Conservation of Nature (IUCN) & commissio	http://www.iucn.org/	International
InterRidge - Biology Working Group	www.interridge.org	International (China Office)
IOBIS	http://www.iobis.org/	International
IPIECA - Oil and gas industry association for environmental and social is:	http://www.ipieca.org/	International
Japan Science Technology Agency (JST)	http://www.jst.go.jp/EN/	Japan
Joint Nature Conservation Committee (JNCC)	http://jncc.defra.gov.uk/	UK
Kaplan Fund	http://www.jmkfund.org/	USA
Locally-Managed Marine Area Network (LMMMA)	http://www.lmmanetwork.org/	Asia & Pacific
Madang Guidelines (Principles for the Development of National Offshore Mineral Policies)		SOPAC
Marine Alliance for Science and Technology for Scotland (MASTS) - Deep	http://www.masts.ac.uk/masts-research/research-forums/deep-sea-for	UK
Marine Conservation Institute (MCI)	http://www.marine-conservation.org/	USA
Marine Conservation Society (MCS), UK	http://www.mcsuk.org/	UK
Marine Litter in European Seas - Social Awareness & Co-Responsibility (http://www.marlisco.eu/	European
Marine Stewardship Council	http://www.msc.org/	International
MarineBio Conservation Society	http://marinebio.org/	USA
Median	http://median-web.eu/	Spain
MEDPLAN	www.medplan.org	European
Ministry of Fisheries and Marine Resources	http://www.mfmr.gov.na/	Namibia
Mision Blue	http://mission-blue.org/	International
Moore Foundation	http://www.moore.org/	USA
National Geographic	http://www.nationalgeographic.com/	USA/international
National Ocean Council	http://www.whitehouse.gov/administration/eop/oceans	USA
Natural Resources Defence Council	http://www.nrdc.org/oceans/	USA
Nature Conservancy	http://www.nature.org/	USA
NatureServe	http://www.natureserve.org/	USA
Nautilus Minerals Inc	http://www.nautilusminerals.com/	Canadian
Neptune Canada	http://www.neptunecanada.com/	Canadian
Neptune Minerals	http://www.neptuneminerals.com/	USA
Nippon Foundation	http://www.nippon-foundation.or.jp/en/	Japan
NOAA (Office of Ocean Exploraiton, National Marine Fisheries Service)	http://www.noaa.gov/	USA
North Atlantic Salmon Conservation Organisation (NASCO) - RFMO		
North-East Atlantic Fisheries Commission (NEAFC)- RFMO		
Northwest Atlantic Fisheries Organization (NAFO)- RFMO		
Norwegian Government	http://www.norway.org	Norway
Norwegian Research Council	http://www.forskningradet.no/	Norway
Noumea Convention		South Pacific
Oak Foundaiton	http://www.oakfnd.org/	Switzerland/international
Ocean Alliance	http://www.oceanalliance.org/	USA
Ocean Conservancy	http://www.oceanconservancy.org/	USA
Ocean Health Index (UNEP)	http://www.oceanhealthindex.org	International
Ocean Research and Conservation Association (ORCA)	http://www.teamorca.org/cfiles/home.cfm	USA
Oceana	http://oceana.org/en/eu/home	International
Oceans 5 Foundation	http://www.oceans5.org/	International
Oceans Inc.	http://www.oceansinc.org/	International
OSPAR (Regional Seas Org.)	http://www.ospar.org/	International
Pacific Marine Anlyais and Research Association (PacMARA)	http://pacmara.org/	USA
PharmaSea	http://www.pharma-sea.eu/pharmasea.html	European
Presencing Institute	http://vimeo.com/presencinginstitute	International
Regional Seas Programme	http://www.unep.org/regionalseas/	International
Royal Society Global Environmental Research Commission	http://royalsociety.org/about-us/governance/committees/gerc/	UK
Royal Society Science Policy Centre	http://royalsociety.org/policy/	UK
Rutgers Center for Deep-Sea Ecology and Biotechnology	http://deepseacenter.rutgers.edu/index.html	USA
Sargasso Sea Alliance	http://www.sargassoalliance.org/	Bermuda
Schmidt Foundation	http://theschmidt.org/	USA/international
Scientific Committee on Oceanographic Research (SCOR - ICSU)	http://www.scor-int.org/	International
Sea for Society	http://seaforsociety.eu/	European
SeaBiotech	http://spider.science.strath.ac.uk/seabiotech/index.php	European
SeaNet	http://seanet.org.nz	New Zealand
SeasAtRisk	http://www.seas-at-risk.org/	European
Secretariat of the Pacific Community (SCP)	http://www.spc.int/	Pacific Islands Region
Secretariat of the Pacific Regional Environemnet Porgramme (SPREP)	http://www.sprep.org/	Pacific Islands Region (Samoa)
SERPENT	http://www.serpentproject.com/	UK/international
Society of Marine Research and Conservation	http://www.smrindia.org/	India
South African National Biodiversity Institute (SANBI)	http://www.sanbi.org/	South Africa
South East Atlantic Fisheries Organisation (SEAFO) - RFMO	http://www.seafo.org/	International
South Indian Ocean Fisheries Agreement (SIOFA) - RFMO		
South Pacific Regional Fisheries Management Organisation (SPRFMO) - RFMO		
Southern Ocean Observing System (SOOS)	http://www.soos.aq	International (Southern Ocean)
SPC-EU Deep-Sea Minerals Project (2011-2014)	http://www.sopac.org/dsm/about-us.html	Fiji
Spiral (EU Funded Project)	http://www.spiral-project.eu/	European

APPENDIX IV

Full Name	Website	Country/Region
Agence des Aires Marine Protégées	http://www.aires-marines.fr/	France
ALTER-Net	http://www.alter-net.info/	European
Arctic Council	http://www.arctic-council.org/	International
Asia-Pacific Fishery Commission (APFIC)	http://www.fao.org/fishery/rfb/apfic/en	Asia & Pacific
Bay of Bengal Programme Inter-Governmental Organization (BOBP-IGO) (RFMO)	http://www.fao.org/fishery/rfb/bobp_igo/en	Bay of Bengal
Benguela Current Commission	http://www.benguelacc.org/	Africa - Angola, Namibia & South Africa
Bloom Association	http://www.bloomassociation.org/	France / Hong Kong
BluGenics	No website yet	European
British Ecological Society (Marine Environmental Policy Advisory Group)	http://www.britishecologicalsociety.org/policy/marine_environment.php	UK
Bureau of Ocean Energy Management (BOEM)	http://www.boem.gov/	USA
Canadian Healthy Oceans Network (CHONe)	http://chone.marinebiodiversity.ca/	Canada
Caribbean Regional Fisheries Mechanism (CRFM) - RMFO	http://www.fao.org/fishery/rfb/crfm/en	Atlantic - Caribbean
Centre for Environment, Fisheries & Aquaculture Science (CEFAS)	http://www.cefasc.defra.gov.uk/	UK
Centre for Marine Biodiversity and Conservation, Scripps Oceanography Institute	http://cmbc.ucsd.edu/	USA
Challenger Society for Marine Science	http://www.challenger-society.org.uk/	UK
CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora)	http://www.cites.org/	International
COLA (Citizens Organized for Liberty through Action)		
Comisión Permanente del Pacífico Sur (CPPS)	http://www.cpps-int.org/	Pacific - South
Comisión Nacional de Áreas Naturales Protegidas (CONANP)	http://www.conanp.gob.mx/	Mexico
Commission for the Conservation of Southern Bluefin Tuna (CCSBT)	http://www.ccsbt.org/site/	Pacific - South & Indian Ocean
Commission National for Knowledge and Use of Biodiversity, Mexico (CONABIO)	http://www.conabio.gob.mx/web/conocenos/quienes_somos_ingles.html	Mexico
Committee for Conservation of Antarctic Marine Living Resources (CCAMLR) - RMFO	http://www.ccamlr.org/	International
Commonwealth Secretariat	http://www.thecommonwealth.org/	International

Conférence Ministérielle sur la Coopération Halieutique entre les Etats Africains Riverains de l'Océan Atlantique (COMHAFAT)	http://www.atlafco.org	Atlantic
Consejo Nacional de Ciencia y Tecnología (CONACyT)	http://www.conacyt.mx/	Mexico
Conservation International	http://www.conservation.org	International
Consultative Group on Biological Diversity (CGBD)	https://cgbd.org/	International/USA
Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea (CCBSP) - RFMO	http://www.fao.org/fishery/rfb/ccbsp/en	Bering Sea
Deep-Sea Conservation Coalition (DSCC)	www.savethehighseas.org/	International
Deep-Sea Labs around the globe (e.g. VIMS, SIO, NOC, UNAM, Tongji Uni, etc. etc.)		
Deep-Sea Mining Campaign	http://www.deepseaminingoutofourdepth.org/	PNG
Department for the Environment, Food and Rural Affairs (DEFRA)	http://www.defra.gov.uk/environment/marine/	UK
DIVERSITAS	http://www.diversitas-international.org/	International
EarthWatch	http://www.earthwatch.org/europe/area_oceans	International
Environment and Conservation Organisations of New Zealand (ECO)	http://www.eco.org.nz/	NZ
Equator Principles	http://www.equator-principles.com/	International
EU Marine Strategy Framework Directive (MSFD)	http://ec.europa.eu/environment/marine/	European
EuroOCEAN	http://www.eurocean.org/	European
European Environment Agency (EEA)	http://www.eea.europa.eu/	European
European Marine Board (EMB)	http://www.marineboard.eu/	European
Federal Agency for Nature Conservation	www.bfn.de	Germany
Fishery Committee for the Eastern Central Atlantic (CECAF) - RFMO	http://www.fao.org/fishery/rfb/cecaf/en	Atlantic - Central Eastern
Flora and Fauna International	http://www.fauna-flora.org/initiative/marine-conservation/	International
Fondation Total	http://foundation.total.com/	France
Food and Agriculture Organization of the UN (FAO) - Fisheries and Aquaculture Dept	www.fao.org	International
Food and Agriculture Organization of the UN (FAO) - Regional Fisheries Bodies	http://www.fao.org/fishery/rfb/en	International
Forum Fisheries Agency (FFA)	http://www.ffa.int/	Pacific Islands Region
Friends of the Earth	http://www.foei.org/en	International

Fundacao de Amparo a Pesquisa do Espirito Santo (FAPES)	http://www.fapes.es.gov.br/	Portugal
Future Earth Initiative (new 10 year programme) (Science and Technical Alliance for Global Sustainability comprising International Council for Science, Int. Social Science Council, Belmont Forum, UNEP and UNESCO)	http://www.icsu.org/future-earth	International
General Fisheries Commission for the Mediterranean (GFCM) - RFMO	http://www.gfcm.org/gfcm/about/en	Mediterranean
Genomic Standards Consortium (Biodiversity WG)	http://gensc.org/gc_wiki/index.php/Biodiversity_Working_Group	International
Geoscience Australia	http://www.ga.gov.au/index.html	Australia
Global Environmental Change Programmes (now Future Earth - see above)		
Global Environmental Facility (GEF)	http://www.thegef.org/gef/	International
Global Ocean Commission (GOC)	http://www.globaloceancommission.org/	International
Global Partnerships for Oceans	http://www.globalpartnershipforoceans.org/	International
GOBI	http://www.gobi.org/	International
Greenpeace	http://www.greenpeace.org/international/en/campaigns/oceans/	International
High Seas Alliance (formed 2011)	http://highseasalliance.org/	International
INDEEP - International Network for Scientific Investigations of Deep-Sea Ecosystems	http://www.indeep-project.org/	International
Indian Ocean Tuna Commission (IOTC) (RFMO)	http://www.iotc.org/English/index.php	Indian Ocean
Industry Consultative Bodies (e.g. European RACs)		
Institute for Advanced Sustainability Studies (IASS)	http://www.iass-potsdam.de/	Germany
Institute for Ocean Conservation Science (IOCS)	http://www.oceanconservationscience.org/	USA
Institute for Sustainable Development and International Relations (IDDRI)	http://www.iddri.org/	France
Instituto de Ciencias del Mar y Limnología (ICML)	http://www.icmyl.unam.mx	Mexico
Inter-American Tropical Tuna Commission (IATTC)	http://www.iattc.org/	Pacific - Eastern
Intergovernmental Oceanographic Commission (IOC) - UNESCO	http://ioc-unesco.org/	International
Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)	http://www.ipbes.net/	International
International Commission for the Conservation of Atlantic Tunas (ICCAT) - RFMO	http://www.iccat.int/en/	Atlantic
International Council for Science (ICSU) (Also see Future Earth)	http://www.icsu.org/	International
International Council for the Exploration of the Sea (ICES) - WG Deep-Water Ecol	http://www.ices.dk	International
International Geosphere-Biosphere Programme	http://www.igbp.net	International

International Marine Minerals Society (IMMS)	http://www.immsoc.org/	International
International Maritime Organisation (IMO)	http://www.imo.org	International
International Panel on Climate Change (IPCC)	http://www.ipcc.ch/	International
International Programme on the State of the Ocean	http://www.stateoftheocean.org/	International
International Research Institute of Stavanger	http://www.iris.no/research/environment	Norway
International Seabed Authority (ISA)	http://www.isa.org.im/	International
International Tribunal for the Law of the Sea (ITLOS)	http://www.itlos.org/	International
International Union for the Conservation of Nature (IUCN) & commissions	http://www.iucn.org/	International
InterRidge - Biology Working Group	www.interridge.org	International (China Office)
IOBIS	http://www.iobis.org/	International
IPIECA - Oil and gas industry association for environmental and social issues (Biodiversity WG)	http://www.iecea.org/	International
Japan Science Technology Agency (JST)	http://www.jst.go.jp/EN/	Japan
Joint Nature Conservation Committee (JNCC)	http://jncc.defra.gov.uk/	UK
Kaplan Fund	http://www.jmkfund.org/	USA
Locally-Managed Marine Area Network (LMMA)	http://www.lmmanetwork.org/	Asia & Pacific
Madang Guidelines (Principles for the Development of National Offshore Mineral Policies)		SOPAC
Marine Alliance for Science and Technology for Scotland (MASTS) - Deep-Sea Forum	http://www.masts.ac.uk/masts-research/research-forums/deep-sea-forum.aspx	UK
Marine Conservation Institute (MCI)	http://www.marine-conservation.org/	USA
Marine Conservation Society (MCS), UK	http://www.mcsuk.org/	UK
Marine Litter in European Seas - Social Awareness & Co-Responsibility (MARLISCO)	http://www.marlisco.eu/	European
Marine Stewardship Council	http://www.msc.org/	International
MarineBio Conservation Society	http://marinebio.org/	USA
Median	http://median-web.eu/	Spain
MEDPLAN	www.medplan.org	European
Ministry of Fisheries and Marine Resources	http://www.mfmr.gov.na/	Namibia
Mision Blue	http://mission-blue.org/	International
Moore Foundation	http://www.moore.org/	USA
National Geographic	http://www.nationalgeographic.com/	International/USA
National Ocean Council	http://www.whitehouse.gov/administration/eop/oceans	USA
Natural Resources Defence Council	http://www.nrdc.org/oceans/	USA
Nature Conservancy	http://www.nature.org/	USA
NatureServe	http://www.natureserve.org/	USA
Nautilus Minerals Inc	http://www.nautilusminerals.com/	Canada
Neptune Canada	http://www.neptunecanada.com/	Canada
Neptune Minerals	http://www.neptuneminerals.com/	USA

Nippon Foundation	http://www.nippon-foundation.or.jp/en/	Japan
NOOA (Office of Ocean Exploraiton, National Marine Fisheries Service)	http://www.noaa.gov/	USA
North Atlantic Marine Mammal Commission	http://www.nammco.no/	Atlantic - North
North Atlantic Salmon Conservation Organisation (NASCO) - RFMO	http://www.nasco.int/	Atlantic - North
North Pacific Marine Science Organization (PICES)	http://www.pices.int/	Pacific - North
North-East Atlantic Fisheries Commission (NEAFC)- RFMO	http://www.neafc.org/	Atlantic - North East
Northwest Atlantic Fisheries Organization (NAFO)- RFMO	http://www.nafo.int/	Atlantic North West
Norwegian Government	http://www.norway.org	Norway
Norwegian Research Council	http://www.forskningsradet.no/	Norway
Noumea Convention	http://www.sprep.org/attachments/2012SM23/english/noumea-convention/11NC.WP.8.4 - Noumea Convention Amended Protocols.pdf	Pacific - South
Oak Foundaiton	http://www.oakfnd.org/	International/Switzerland
Ocean Alliance	http://www.oceanalliance.org/	USA
Ocean Conservancy	http://www.oceanconservancy.org/	USA
Ocean Health Index (UNEP)	http://www.oceanhealthindex.org	International
Ocean Research and Conservation Association (ORCA)	http://www.teamorca.org/cfiles/home.cfm	USA
Oceana	http://oceana.org/en/eu/home	International
Oceans 5 Foundation	http://www.oceans5.org/	International
Oceans Inc.	http://www.oceansinc.org/	International
Organización del Sector Pesquero y Acuícola del Istmo Centroamericano (OSPESCA)	http://www.sica.int/ospesca	America - Central
OSPAR (Regional Seas Org.)	http://www.ospar.org/	International
Pacific Marine Analyais and Research Association (PacMARA)	http://pacmara.org/	USA
PharmaSea	http://www.pharma-sea.eu/pharmasea.html	European
Presencing Institute	http://vimeo.com/presencinginstitute	International
Regional Seas Programme	http://www.unep.org/regionalseas/	International
Royal Society Global Environmental Research Commission	http://royalsociety.org/about-us/governance/committees/gerc/	UK
Royal Society Science Policy Centre	http://royalsociety.org/policy/	UK
Rutgers Center for Deep-Sea Ecology and Biotechnology	http://deepseacenter.rutgers.edu/index.html	USA

Sargasso Sea Alliance	http://www.sargassoalliance.org/	Bermuda
Schmidt Foundation	http://theschmidt.org/	International/USA
Scientific Committee on Oceanographic Research (SCOR - ICSU)	http://www.scor-int.org/	International
Sea for Society	http://seaforsociety.eu/	European
SeaBiotech	http://spider.science.strath.ac.uk/sea-biotech/index.php	European
SeaNet	http://seanet.org.nz	New Zealand
SeasAtRisk	http://www.seas-at-risk.org/	European
Secretariat of the Pacific Community (SCP)	http://www.spc.int/	Pacific Islands Region
Secretariat of the Pacific Regional Environment Programme (SPREP)	http://www.sprep.org/	Pacific Islands Region (Samoa)
SERPENT	http://www.serpentproject.com/	International/UK
Society of Marine Research and Conservation	http://www.smrindia.org/	India
South African National Biodiversity Institute (SANBI)	http://www.sanbi.org/	Africa - South Africa
South East Atlantic Fisheries Organisation (SEAFO) - RFMO	http://www.seafo.org/	Atlantic - South East
South Indian Ocean Fisheries Agreement (SIOFA) - RFMO	http://www.fao.org/newsroom/en/news/2006/1000360/index.html	Indian Ocean - South
South Pacific Community Division of Fisheries, Aquaculture and Marine Ecosystems (FAME)	http://www.spc.int/fame/	Pacific - South
South Pacific Regional Fisheries Management Organisation (SPRFMO) - RFMO	http://www.southpacificrfmo.org/	Pacific - South
Southern Ocean Observing System (SOOS)	http://www.soos.aq	International (Southern Ocean)
SPC-EU Deep-Sea Minerals Project (2011-2014)	http://www.sopac.org/dsm/about-us.html	Fiji
Spiral (EU Funded Project)	http://www.spiral-project.eu/	European
Surveillance and Enforcement of Remote Maritime Areas (SERMA) project	http://www.cimes.hawaii.edu/sites/www.cimes.hawaii.edu/files/SERMA.pdf	USA
Swakopmund Matters	https://www.facebook.com/swakopmund.matters?ref=ts&fref=ts	Namibia
TEEB Ocean & Coasts (The Economics of Ecosystems and Biodiversity) - UNEP Programme	http://www.teebweb.org/wp-content/uploads/2013/04/2013-Oceans-and-Coasts-Flyer.pdf	International
Thankyouocean	www.thankyouocean.org	USA
The Fisheries Secretariat	http://www.fishsec.org/	European
The Nature Conservancy-Mexico (TNC)	http://www.nature.org/ourinitiatives/regions/northamerica/mexico/index.htm	Mexico
The Ocean Foundation (TOF)	http://www.oceanfdn.org/	USA
The Ocean Project	http://www.theoceanproject.org/	USA

The Pew Charitable Trusts (and their particular environment groups)	http://www.pewenvironment.org/campaigns/protecting-the-deep-sea/id/8589940401	
The TERRAMAR Project	http://theterramarproject.org/	International
The Third World Network of Scientific Organizations (TWNISO)	http://twiso.org/	International
The Wildlife Trusts - Living Seas	http://www.wildlifetrusts.org/living-seas	UK
UK Seabed Resources Ltd	No website yet	UK
UN Convention on Biological Diversity (CBD)	http://www.cbd.int/	International
UN Earthwatch	http://www.un.org/earthwatch/index.html	International
UN Environment Programme (Deep-Sea Fisheries in High Seas) (UNEP)	http://www.unep.org/	International
UN Environment Programme (Global Marine Litter Initiative) (UNEP)	http://www.unep.org/regionalseas/marinelitter/initiatives/unepglobal/default.asp	International
UN Environment Programme (Mediterranean Action Plan for the Barcelona Convention) (UNEP)	http://www.unepmap.org/	European
UN Environment Programme (Regional Seas Programme) (UNEP)	http://www.unep.org/regionalseas/	International
UN Environment Programme (World Conservation Monitoring Centre) (UNEP)	http://www.unep-wcmc.org/	International / UK
UN General Assembly	http://www.un.org/en/ga/	International
UN World Ocean Assessment (WOA)	http://www.worldoceanassessment.org/	International
UNEP GRID Arendal	http://www.grida.no/	International / Norway
United Nations Educational, Scientific and Cultural Organization (UNESCO) - Biodiversity Initiative	http://www.unesco.org/new/en/natural-sciences/special-themes/biodiversity-initiative/	International
United Nations Educational, Scientific and Cultural Organization (UNESCO) - IOC see above	http://www.unesco.org/new/en/	International
University of the South Pacific (USP)	http://www.usp.ac.fj/	Pacific Islands Region
University of Tokyo	http://www.u-tokyo.ac.jp/en/	Japan
Universidad Nacional Autónoma de México	http://www.unam.mx	Mexico
US National Marine Sanctuaries	http://sanctuaries.noaa.gov/welcome.html	USA
VentBase	http://www.ventbase.org/	International
Western and Central Pacific Fisheries Commission (WCPFC)	http://www.wcpfc.int/	Pacific - Western & Central
Western Indian Ocean Marine Science Association (WIOMSA)	http://www.wiomsa.org/	Indian Ocean

World Bank	http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/0,,menuPK:64140075~pagePK:64133621~piPK:64140076~theSitePK:40941,00.html	International
World Ocean Council	http://www.oceancouncil.org/site/	International
World Register of Deep-Sea Species (WoRDDS) (subset of WoRMS)	http://www.marinespecies.org/deepsea/	International
World Resources Institute	http://www.wri.org/	USA
World Wide Fund for Nature (WWF)	http://www.wwf.org.uk/	International