



Ocean Research Advisory Panel Stakeholder Workshop On USA Priorities for the Ocean Biogeographic Information System

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EXECUTIVE SUMMARY

The Ocean Biogeographic Information System (OBIS¹) is the information component of the Census of Marine Life (CoML), serving as a web-based provider of global geo-referenced information concerning marine life and their habitats. OBIS databases presently contain 2.8 million records and OBIS software provides a variety of mapping and modeling tools for visualizing relationships among species and their environment. OBIS was formally launched in May 2000 with the funding of 8 awards by the National Oceanographic Partnership Program (NOPP). Since then, OBIS has evolved rapidly and is now at the stage where links to operational ocean observing systems can be considered.

The U.S. Integrated Ocean Observing System (IOOS) is envisioned as a network of global, national, and regional observing systems that rapidly and systematically acquire and disseminate data and data products to serve the needs of multiple users, including environmental protection, public health, industry, education, research, and recreation. One aspect of the IOOS which is moving ahead quickly is the development of Regional Associations (RAs) and regional observing systems, such as the Gulf of Maine Ocean Observing System (GoMOOS). The emergence of regional observing systems, combined with recent calls by the U.S. Commission on Ocean Policy² and the Pew Oceans Commission³ to implement "ecosystem-based management," has made it urgent to consider priorities for the development of OBIS within U.S. waters. In this light, the Ocean Research Advisory Panel – as the advisory body to the National Ocean Research Leadership Council, the decision-making body of NOPP – convened a workshop⁴ to address a number of goals related to the implementation of OBIS. The goals of the workshop were:

- 1) To encourage stakeholders in the oceans to articulate the OBIS services which should first be developed for U.S. waters, i.e. the U.S. EEZ;
- 2) To foster integration between those building regional observing systems and those developing biological data services at the regional and ecosystem level;
- 3) To define financial and governance models for the sustained operation of OBIS at regional and national levels;
- 4) To consider possible legal and regulatory issues and requirements, such as use of OBIS data in environmental impact statements; and
- 5) To develop a regionally-based strategy for U.S. OBIS development that would also operate smoothly at a national level.



PRELIMINARY WORKSHOP RECOMMENDATIONS

Participants devised a strategy for U.S. OBIS development that is compatible at both regional and national levels, which is reflected in the following recommendations.

- The U.S. National Committee (USNC) for CoML should establish a short-term, transitional OBIS subcommittee until a more self-reliant OBIS structure emerges;
- OBIS, through the USNC, should prepare a business plan that includes a strategy that clearly shows all federal agencies and their role in the OBIS governance structure;
- OBIS should determine which recommendations in the U. S. Commission on Ocean Policy preliminary report are pertinent to OBIS development and bring these recommendations to the attention of its sponsors;
- OBIS should take steps to become a nationally accredited database;
- OBIS should increase its outreach and publicity efforts both to raise public awareness of OBIS and to determine potential users' needs;
- NOPP should fund an OBIS pilot project to incorporate environmental datasets into OBIS for use in regulatory issues and other applications on an operational basis;
- Federal funding agencies should require that data collected under federally funded research be compatible with OBIS. Ocean.US should require OBIS-compatible data to be provided by RAs;
- OBIS must capitalize on cheaper and more efficient technology to provide the means to integrate widely variable datasets;
- OBIS and Ocean.US should strengthen links between RAs and OBIS through the designation of liaisons and joint workshops;
- Ocean.US should invite OBIS representatives to participate in upcoming workshops related to data management starting with the OOS Tech 2004 Workshop on 10-11 May 2004; and
- A position at Ocean.US to coordinate the integration of OBIS and IOOS should be established.



APPENDIX 1: AGENDA

Ocean Research Advisory Panel Stakeholder Workshop
On USA Priorities for the
Ocean Biogeographic Information System
March 24-25, 2004
Washington, DC

24 March 2004

- 0800 Breakfast
- 0815 Welcome: A. Clark, Harris Corporation, and P. Dalton, CORE
Remarks by Sponsors: J. Ausubel, Sloan Foundation
Review Charge/Questions: A. Clark
- 0900 OBIS Overview: K. Stocks, UCSD
- 0950 Ocean.US Regional Association Overview: L. Atkinson, Ocean.US
- 1010 EPA, National Estuary Program Overview, National Coastal Assessment:
D. Brown, EPA
- 1030 Interactions with PISCO, M. Carr, UCSC
- 1045 Break
- 1105 Review Meeting Charge/Questions: A. Clark
- 1115 Breakout Session for Goal 1) Identify the OBIS services that should first
be developed for the U.S. EEZ
- 1215 Lunch Presentation, Grant Gilmore, Dynamac Corporation
- 1315 Breakout Session for Goal 2) Identify integration activities between
regional observing systems and biological data (at the regional and
ecosystem level)
- 1415 Plenary Session for Goal 3) Define financial and governance models for
sustained operation of OBIS (at regional and national levels): B. Branton,
DFO Canada Marine Fish Division)



- 1435 Breakout Session for Goal 3) Define financial and governance models for sustained operation of OBIS (at regional and national levels)
- 1535 Break
- 1550 Plenary Session for Goal 4) Identify legal and regulatory issues and requirements, such as use of OBIS data in environmental impact statements: D. Brown and B. Melzian, EPA)
- 1605 Breakout Session for Goal 4) Identify legal and regulatory issues and requirements, such as use of OBIS data in environmental impact statements
- 1705 Plenary Session to summarize progress
- 1730 Adjourn – Reception

25 March 2004

- 0800 Breakfast
- 0830 Review Meeting Charge/Questions/Progress (A. Clark)
- Reports from Breakout Groups
- 0900 Plenary Session for Goal 5) Develop a strategy for U.S. OBIS development that is compatible at both regional and national level
- 1030 Break
- 1045 Discussion of Next Steps, Recommendations to ORAP
- 1145 Adjourn



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APPENDIX 3: PLENARY PRESENTATIONS

Welcome and Remarks

Andy Clark (facilitator) and Jesse Ausubel (sponsor) began by reviewing the workshop charge and providing background on the development of OBIS to date. Funding through NOPP has brought the system to the point of demonstrable feasibility. The challenge ahead is to move OBIS toward sustained operations. As an example of OBIS capacity, Mr. Ausubel presented one of the data providers, “Spatial Ecological Analysis of Megavertebrate Populations” (SEAMAP), which serves geo-referenced data on marine mammals, birds and turtles, and additionally provides abundance estimates and time-synchronization of animal observations with oceanographic observations through the integration of field survey data from the Tagging of Pacific Pelagics (TOPP) field project of CoML. This type of information can be applied to marine animal habitat modeling.

Overview of OBIS Capabilities and Potential

Karen Stocks gave a demonstration of the OBIS Portal, which provides online access to taxonomically-resolved distribution records as well as tools for use and interpretation of the data for research, management, and education. Example searches were conducted in order to demonstrate the navigation of OBIS from the user perspective. The OBIS federation involves the global-scale collaboration of universities, museums, government agencies, and organizations. Unsolicited datasets are reviewed for consideration in OBIS; however, logistical and cost issues require that priorities be set on a limited number of datasets. OBIS envisions future expansion and activities such as major survey projects, assisting in predicting global climate change, and creating international nodes.

Ocean.US⁵ Regional Association Overview

Larry Atkinson presented the history and structure of the Integrated Ocean Observing System (IOOS). The backbone of the national IOOS is a network of regional observing systems, covering the U.S. EEZ and the Great Lakes. Support for IOOS comes both from U.S. agencies and at the regional level. IOOS will couple physical, environmental, and natural resource measurements with land-based inputs. The IOOS will be an operational system, which separates it from the research-oriented Ocean Research Interactive Observatory Networks (ORION) and Ocean Observatories Initiative (OOI); however, the data collected through both systems will be interoperable in accordance with the IOOS’s Data Management and Communications (DMAC) subsystem.

Data Management and Communications (DMAC) in IOOS

Roz Cohen covered DMAC’s role in modeling, archiving, and data producing. The DMAC data management systems span regional and international, as well as terrestrial



and atmospheric, bounds. DMAC is viewed as a highly distributed system, comprised of three parts. The first part of the DMAC Plan is geared towards semi-technical audiences and deals with management and priorities; the second is intended for highly technical audiences and involves a detailed DMAC implementation plan; the third discusses metadata, biological data, and system engineering. Finally, new funding for the implementation of IOOS is expected for FY06-07, but certain key elements (e.g., finalizing DMAC Plan, appointing a permanent Standing Committee, establishing interim metadata standards) need to be in place by that time.

Overview of the National Estuary Program (NEP⁶) and National Coastal Assessment (NCA⁷)

Darrell Brown outlined the NEP history, mission, and structure. The NEP operates at the watershed- or ecosystem-level and its management is based on sound science. Relying on active participation from the public, NEP is, potentially, both a data producer and a user of OBIS. The EPA has learned a number of lessons through the NEP program, including: community-based resource management achieves results, environmental and programmatic monitoring are critical, and the NEPs are proving capable of addressing emerging issues. One key goal of the NEP is obtaining sustainable levels of funding, as well as leveraging base funding.

The NCA is heavily integrated into the EPA strategic plan as it relates to ecosystem protection and water quality. Its target population is all estuarine drainage areas from the heads of tides to the mouths of estuaries. The NCA asks five big questions: How big is the problem? Is it getting worse? What is the cause? What is the EPA doing about it? and Can a difference be made? The operation examines 12 indicators within three (exposure, response, habitat) categories. The NCA produced National Coastal Condition (NCC) Reports in 2001 and 2004, one application of which is assessing ecological health and trends.

Interactions with Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO⁸)

Mark Carr provided an overview of PISCO, which serves as a baseline monitoring program for Marine Sanctuaries and for state and federal conservation entities on the western coast of North America. PISCO has set large-scale and interdisciplinary objectives based on current impediments to science-based management and conservation of coastal ecosystems (e.g., lack of understanding of habitats, ineffective transfer of scientific knowledge to decision-makers). Certain specifics regarding data collection and documentation were addressed; however, the point was made that PISCO conducts no collection or archiving of samples nor does the system publicly serve raw survey data.



PISCO's target audiences include PISCO consortium members and collaborators, academia, coastal resource managers, conservation organizations, and the general public. A multi-campus ArcGIS database was explained in detail. Future endeavors for PISCO include database syntheses and analyses, external access of data summaries, and identifying key outreach partners and audiences.

Financial and Governance Models for Sustained Operation of OBIS at Regional and National Levels

Bob Branton spoke from the perspective of a self-funded OBIS regional node, recounting many of the challenges Canadian OBIS faced between 1999-2002, including difficult external funding arrangements, emerging technologies, and increasingly stringent government policies regarding use of the Internet. From 2002-2004, however, Canadian OBIS was able to acquire new funding, adopt international standards, augment its data content, and extend its geographic domain. Its 2003 Report of Workshop on Open Standards Access to Biological Data proved valuable in identifying potential users. In 2004 and beyond, Canadian OBIS intends to enhance its capabilities in all of the aforementioned areas. In addition, Canadian OBIS sees its challenges for the future in extending OBIS schema to accommodate time series and fisheries-related concepts.

OBIS as a Tool for Regulatory Issues

Brian Melzian highlighted the need for high quality biological data in the charge to protect the environment, which is why OBIS metadata is of paramount importance. Darrell Brown outlined some ways in which information on ecosystems would benefit the EPA's regulatory mandates. Much attention was given to ocean discharge criteria and its purpose of ensuring that no point source discharge into marine waters causes "unreasonable degradation" of the waters. An overview was given of various legislative Acts, permits, and Environmental Impact Statements (EISs). The EPA reviews EISs prepared by other federal agencies and maintains a national EIS notification system, which also serves to ensure that the EPA's own actions comply with the National Environmental Protection Act.



APPENDIX 4: PLENARY DISCUSSIONS OF WORKSHOP GOALS

Goal 1: Identify priority OBIS services for the U.S. EEZ

Participants discussed the need to attract new users and create new services for OBIS. Potential new user groups include the oil and gas industry, marine resource managers, various government agencies, and non-governmental organizations. The need to have a compelling story of what OBIS is and the benefits of using its products was stressed. One possible mechanism for cataloguing the benefits of OBIS would be to create an interactive page on the OBIS website that allows current users to provide reviews and testimonials on success stories involving the use of OBIS products.

Services and capabilities OBIS should provide to attract new user groups and better serve existing users include interactive maps, a metadata directory, species life history information, and benthic and pelagic habitat information. It was stated that OBIS should offer a “one-stop shopping” capability for biogeographic information. In order to provide this capability, interfaces and screens on the OBIS website should be carefully scrutinized for comprehensiveness, clarity, and ease of use. Lists of OBIS products and services and a statement on data quality should also be added to the OBIS website.

Participants agreed that a key step in identifying priority services will be for OBIS to increase its outreach and publicity efforts both to raise public awareness of OBIS and to determine users’ needs. Outreach efforts could include activities such as focus groups with targeted audiences (e.g. oil and gas industry representatives or marine resource managers) to discuss the development of relevant OBIS products. Partnering with educators was also suggested as a mechanism to attract users. The evolving needs of OBIS users could be addressed through a questionnaire on the OBIS website. The questionnaire would provide feedback on the individual user level and lead to development of new OBIS products and services. While conceding the utility of obtaining user feedback, the participants also agreed that OBIS products should not be constrained to user requested services. OBIS should instead seek to provide services beyond the market needs.

Goal 2: Integration of regional observing systems with biological data

Participants reached consensus that linking OBIS data with the oceanographic data collected by IOOS regional observing systems is a high priority for the development of both programs. Because there is currently insufficient management capability, congressional interest, or funding availability to develop regional OBIS and regional observing systems separately, a formulating principle for the Regional Associations (RAs) should be to build on the OBIS structure and to integrate biological data with physical and oceanographic data recorded by the regional observing systems. OBIS and Ocean.US should strengthen links between RAs and OBIS through the designation of



liaisons and joint workshops. Likewise, Ocean.US should invite OBIS representatives to participate in upcoming workshops starting with the upcoming Regional Association Data Management and Communications workshop. A position at Ocean.US to coordinate the integration of OBIS and IOOS should also be established.

As the OBIS structure is partly organized by region, it was felt that regional OBIS nodes would likely map onto data management systems for the IOOS RAs. Along this line, one proposed mechanism for integration would be to require each RA to contribute data to OBIS. RAs would greatly benefit from potential OBIS data products such as regionally focused biodiversity hotspots and indices, real-time habitat maps, and historical trend analyses of biogeographic data to complement real-time oceanographic data. Potential areas of integration included joint development of applications and data products, cross-calibration of OBIS data with IOOS sensors, establishment of common standards and protocols, and handling of metadata. The participants recommended that OBIS and IOOS perform a gap analysis to determine areas on which OBIS needs to focus its efforts.

Although OBIS has the capability to provide RAs with biological information that cannot currently be collected by observing systems, there are several issues related to OBIS data and products that need to be resolved. There was a suggestion that OBIS expand beyond taxonomic information to include ecosystem information such as community structure and predator-prey distributions. Problems associated with taxonomic confusion (i.e. misnaming a species record) and data duplication must be addressed as well. OBIS should also take steps to increase data discovery capabilities and develop a strategy for long-term data archiving.

Goal 3: Financial and governance models for sustained operation of OBIS

To achieve sustained operation of OBIS, participants recommended that the USNC for CoML should establish an OBIS subcommittee. The OBIS subcommittee should prepare a business plan that includes a strategy that clearly shows all federal agencies and their role in the OBIS governance structure.

Participants discussed both short- and long-term financial requirements for sustaining OBIS. In the short-term, OBIS will continue to rely on NOPP and other federal funds for its operation. In the long-term, OBIS must seek support from state and local funding sources as well, although it is likely that the federal government will remain the largest client for OBIS. With the objective of sustained federal support and management in mind, participants proposed that NOPP should fund an OBIS pilot project to incorporate environmental datasets into OBIS for use in regulatory issues and other applications on an operational basis. OBIS must also capitalize on cheaper and more efficient technology to provide the means to integrate widely variable datasets. Another mechanism for sustained support discussed was producing an annual “State of the Biology of the Oceans” report to engage Congress on OBIS and its capabilities. A fee structure for



OBIS was proposed whereby RAs, federal agencies, the oil and gas industry or other users would pay for specialized data products developed by certified OBIS consultants. The transition from an open system to a closed or semi-closed OBIS system would help defray the costs of sustained operation. The idea was also put forward to merge existing institutional infrastructure or leverage local and federal funding sources (e.g., money from environmental consultants, mitigation money, etc). Above all, it was widely agreed upon that there must be a good “bottom-up” cost estimate. The cost of data archiving was established as a significant challenge. Currently, OBIS neither wants to, nor is able to, be an archive, yet there remains a need for a national archive infrastructure. One option proposed regarding archiving was to employ a commercial contractor to archive OBIS data. The participants felt that the infrastructure should be supported by federal funds, thus ensuring that the data archiving capabilities and system functionality of OBIS continue to thrive. A cross-agency inventory and archiving project was proposed.

As the discussion moved on to governance, other agencies were examined as existing models of governance from which the OBIS model could draw. A national program office for OBIS was suggested as well as an annual stakeholders forum. There was interest in creating a strong relationship between OBIS and the National Federation of Regional Associations (NFRA). The idea that OBIS must maintain a national perspective while building on regional partners was proposed. Creating mechanisms that capitalize on both national and regional governance interests was agreed upon as important. However, in thinking about governance issues, it was suggested to focus not only in terms of regions but also in terms of user group categories such as industry or recreation.

Goal 4: Legal and regulatory issues and requirements

Participants expressed concern over potential liabilities associated with using OBIS data for regulatory purposes. NOAA oversees the development of regulations where OBIS data products would be helpful, and it is important to discover the needs of other agencies (EPA, the Department of Homeland Security, the U.S. Coast Guard, the Minerals Management Service, etc.). An OBIS “estuaries node” pilot project was proposed to delineate potential uses of OBIS by regulatory agencies. Relevant datasets would be identified from a wide array of sources of estuarine information (EMAP, NERRs, NEP, etc.) and prioritized at regional and national levels by resource managers.

It was proposed that OBIS seek legal counsel to assess legal vulnerabilities, and with the advice of counsel issue a disclaimer on OBIS data products that are used in making management decisions. The disclaimer should make clear OBIS’s role as data provider rather than decision maker. In addition, OBIS should clearly delineate its forecast models from their underlying datasets. To defray litigation by OBIS users, collaboration with data providers and users should be encouraged and OBIS users should be entrained as



data providers as much as possible. Federal funding agencies should require that data collected under federally funded research be compatible with OBIS.

It was agreed that high data quality and transparency are essential if OBIS data products are to be used in decision making. The OBIS statement of purpose could be revised to reflect a raising of the bar for data quality by establishing data entry criteria and leaving the responsibility for following those criteria in the hands of data providers. OBIS should also set metadata standards and guidelines and establish standard operating procedures for the removal of faulty datasets. A feedback mechanism could be installed on the OBIS website to report inaccurate data. It was noted that as OBIS becomes more aggregated, it will become further removed from data sources, and it may be more feasible to flag data as questionable or faulty than to remove it. Flags could denote whether the data was certified by OBIS or contributed by a certified OBIS data provider.

The issue of intellectual property was raised in recognition of the fact that certain data (e.g. marine genomics) have economic value and thus ownership must be assigned. It was noted that most OBIS products will be based on multiple integrated datasets provided by several providers rather than a single provider. In cases where a single provider's data are used to create an OBIS product, users should be encouraged to contact the provider. However, concern was expressed over listing contact information for data providers on the OBIS website as it was noted that individuals who conduct research related to marine mammals or other charismatic megafauna may be subject to harassment from radical activist groups.

Goal 5: Develop a regionally-based strategy for U.S. OBIS development

To achieve sustained operation of OBIS, participants recommended that the USNC for CoML should establish an OBIS subcommittee. The OBIS subcommittee should prepare a business plan that includes a strategy that clearly shows all federal agencies and their role in the OBIS governance structure. NOPP should fund an OBIS pilot project to incorporate environmental datasets into OBIS for use in regulatory issues and other applications on an operational basis. OBIS should also determine which recommendations in the U. S. Commission on Ocean Policy preliminary report are pertinent to OBIS development and bring these recommendations to the attention of its sponsors, data providers, and users.

To increase its user base, OBIS should take steps to become a nationally accredited database in accordance with Government Performance and Results Act (GPRA) guidelines. To increase the size and therefore utility of the OBIS database, federal funding agencies should require that data collected under federally funded research be compatible with OBIS. Concurrently, OBIS must capitalize on cheaper and more efficient technology to provide the means to integrate widely variable datasets. Ocean.US should require OBIS-compatible data to be provided by RAs. OBIS should



also increase its outreach and publicity efforts both to raise public awareness of OBIS and to determine potential users' needs.

To integrate regional ocean observing activities with biological databases, OBIS and Ocean.US should strengthen links between RAs and OBIS through the designation of liaisons and joint workshops. Ocean.US should invite OBIS representatives to participate in upcoming workshops related to data management starting with the OOS Tech 2004 Workshop on 10-11 May 2004. A position at Ocean.US to coordinate the integration of OBIS and IOOS should also be established.



APPENDIX 5: OBIS-RELATED USCOP RECOMMENDATIONS

Recommendation 17–7

The National Ocean Council should coordinate the development and implementation of an interagency plan for research and monitoring to understand and prevent aquatic species invasions. Research and monitoring should focus on gathering baseline taxonomic information, identifying invasive pathogens and vectors of introduction, understanding the human dimensions behind species introductions, and developing new options for minimizing invasions.

Recommendation 25–5

The National Ocean Council should coordinate federal resource assessment, mapping, and charting activities with the goal of creating standardized, easily accessible national maps that incorporate living and nonliving marine resource data along with bathymetry, topography, and other natural features.

Recommendation 28–1

Congress should amend the National Oceanographic Partnership Act to establish a federal interagency planning organization for ocean and coastal data and information management to be called Ocean.IT. Ocean.IT should consist of representatives from all federal agencies involved in ocean data and information management, be supported by a small office, and report to the National Ocean Council’s Committee on Ocean Science, Education, Technology, and Operations.

Recommendation 28–2

The National Oceanic and Atmospheric Administration and the U.S. Navy should establish a joint ocean and coastal information management and communications program to generate information products relevant to national, regional, state, and local needs on an operational basis.

Recommendation 28–3

The interagency group for ocean information management, Ocean.IT, should work with developers of the National Virtual Ocean Data System and other innovative data management systems to implement a federally-supported system for accessing ocean and coastal data both within and outside the national data centers.



Recommendation 28-4

The National Ocean Council should establish and enforce common requirements and deadlines for investigators to submit data acquired during federally funded ocean research projects.

NOTES

¹ www.iobis.org

² www.oceancommission.gov

³ www.pewoceans.org

⁴ Under the auspices of ORAP, this workshop was organized by the NOPP Office in cooperation with Ocean.US and the U.S. National Committee for the Census of Marine Life.

⁵ www.ocean.us

⁶ www.epa.gov/owow/estuaries

⁷ www.epa.gov/emap/nca

⁸ www.piscoweb.org