ECOLOGICALLY AND BIOLOGICALLY SIGNIFICANT AREAS – LESSONS LEARNED

Figure 1: Department of Fisheries and Oceans' (DFO) six administrative regions.

Context :

Canada's Oceans Act (1997) authorises Fisheries and Oceans Canada (DFO) to conserve and protect living aquatic resources and their supporting ecosystems through the creation of Marine Protected Areas (MPA) and MPA networks, and to provide enhanced management to areas of the oceans and coasts via the development of Integrated Oceans Management Plans. The application of criteria for Ecologically and Biologically Significant Areas (EBSA) has proven to be a useful tool for identifying areas that have particular ecological or biological significance, in order to facilitate a greater-than-usual degree of risk aversion in the management of activities in such areas..

DFO has developed national guidance for the identification of EBSAs [http://www.dfo-mpo.gc.ca/csas/Csas/status/2004/ESR2004_006_E.pdf] and Canada has endorsed the very similar scientific criteria of the Convention on Biological Diversity (CBD) for identifying ecologically or biologically significant marine areas in need of protection in open-ocean waters and deep-sea habitats as defined in Annex I of Decision IX/20 of its 9th Conference of Parties [http://www.cbd.int/decision/cop/?id=11663].

Since 2005, DFO has undertaken the identification of EBSAs within Canadian waters, primarily within the Department's five Large Ocean Management Areas (LOMAs). As efforts expand to identify EBSAs outside the boundaries of the LOMAs, for example within the 13 biogeographic units that are the spatial framework for Canada's network of marine protected areas, it is timely to reflect on the lessons learned in previous EBSA exercises within Canadian waters. Although there is general agreement within the scientific community on the use of criteria for the identification of EBSAs, the scientific guidance regarding the use of these criteria was revisited to ensure it is adequate and clear. Experience to date could provide the basis for further guidance on how to evaluate areas using the criteria. In order to

properly and efficiently identify the EBSAs, an approach is required that minimizes the likelihood of possible bias and inconsistent practices during the identification and evaluation process. As such, a meeting was convened to reflect on the lessons learned to date and to provide science advice on the application of EBSA criteria in the future.

This Science Advisory Report results from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, National advisory meeting of May 19-20, 2011 on Ecologically and Biologically Significant Areas – Lessons Learned.

SUMMARY

- Applying the three primary criteria of uniqueness, aggregation, and fitness consequences has worked well in the past and can be expanded to other areas. A functional overlap often exists between the criteria, especially between aggregation and fitness consequences. However, this is not considered a liability that would require adjustments to previous guidance.

- Uniqueness should always be assessed relative to the boundaries at which the criteria are being applied, and evaluated at a spatial scale relevant to policy and management.

- In general, application of the aggregation criterion has been straightforward, especially when related to life history processes such as spawning and migration.

- The fitness consequences criterion has been more challenging to apply, since there is often insufficient information to be sure all areas important to fitness were identified.

- Naturalness and resilience are not intended to be used as the sole basis for the identification of EBSAs, but rather serve as a key consideration in prioritizing EBSAs.

- Guidance is provided on approaches to ensure consistency in use of information layers used for identification of EBSAs, and for collection and use of SEK/TEK/LEK. Each data/knowledge/information layer must be accompanied by information on data sources, uncertainties, and weightings, if any.

- EBSAs need to be re-evaluated over time. To the extent that drivers of temporal changes in the biological features triggering the EBSA criteria are known or suspected, advice on EBSAs should also describe the specific factors that may require re-evaluation, along with potential timelines for future evaluations. EBSA identification processes must also be revisited when something relevant is known to have changed and when new relevant types of information become available.

- Extended guidance is given on appropriate uses of information in data-poor situations,

- The EBSA criteria are generally applicable to freshwater and coastal habitats, just as they are in the offshore applications. However, some ecological functions and processes in these systems differ from comparable ones in marine systems, and guidance is provided on how these differences should be accommodated in the EBSA evaluation process.

- Simply reporting fixed boundaries for EBSAs loses information that may be valuable for management, so advice should indicate the number and type of ecosystem properties/components contributing to each spatial geographic unit at which the

evaluation was done. Such maps should be produced and presented separately for each of the core EBSA criteria.

- There is currently very little guidance on how to use EBSAs in policy and management outside of the development of MPA networks. However, EBSAs are increasingly being used in contexts outside of MPA networks. Guidance is needed for the application of EBSAS in a consistent and efficient manner for the diversity of management situations in different sectors.

BACKGROUND

In the past DFO has provided national guidance for the identification and prioritization of Ecologically and Biologically Significant Areas (EBSAs) (http://www.dfo-mpo.gc.ca/csas/Csas/status/2004/ESR2004_006_e.pdf). The guidance was provided at a time when there was relatively little experience in their identification and application. At the time the original guidance was provided, significant dedicated financial resources and preparation time were available in support of each initiative to identify EBSAs in Canadian waters. Science in support of Oceans Management has developed to the point where EBSAs have been identified, considered, and applied within a number of management contexts in several areas, including the original context of integrated management for the five Large Ocean Management Areas (LOMAs). Over this time, significant experience was acquired in applying the criteria for the identification of EBSAs. This experience has led to further interest in use of the EBSA criteria, in particular how well these criteria can be applied to comparatively data-poor areas, as well as coastal and estuarine areas.

A number of conceptual, strategic, and operational issues associated with how DFO will fully implement the Ecosystem Approach and Integrated Management are still under discussion. Although EBSAs were initially introduced to support Integrated Management of LOMAs, it is becoming clear that the identification of EBSAs may have further implications with respect to their use in policy and management within and outside of DFO Oceans programs. Consequently, the potential for such developments needs to be considered in guidance on applying the EBSA criteria and prioritizing the outcomes.

As these developments progress and efforts expand to identify EBSAs outside the boundaries of the LOMAs, for example within the 13 biogeographic units that are the spatial framework for Canada's network of marine protected areas (MPAs), it is timely to reflect on the lessons learned in any previous application of the criteria for EBSA identification and subsequent associated management experiences with EBSAs.

CONCLUSIONS AND ADVICE

Criteria for the Identification of EBSAs

Based on the use of existing criteria for EBSA identification, there is general agreement within the scientific community that applying the three primary criteria of uniqueness, aggregation, and fitness consequences has worked well to date, and that their application could be expanded to other areas outside the five original LOMAs. It was noted that there often exists a functional overlap between the criteria, particularly with respect to aggregation and fitness consequences. However, this is not considered a liability that would require adjustments to the current guidance,. Rather, the overlap is taken as being consistent with the common observation that animals often congregate in areas where they undertake activities of particularly high fitness

consequences. Still, circumstances have been readily identified where available information might be adequate to apply one criterion but not the other, so deleting either criterion on the basis of partial redundancy would not be good practice.

General considerations in applying the primary criteria

1. A temporal (longer than seasonal) dynamic component to the information triggering each of the three criteria was highlighted, indicating that EBSAs *do* need to be re-evaluated over time. To the extent that drivers of temporal changes in the biological features triggering the EBSA criteria are known or suspected, advice on EBSAs should also describe the specific factors that may require re-evaluation. Potential timelines for future evaluations should also be included in advice in cases when known natural processes or perturbations may be driving the changes.

2. Participation by the full breadth of interests - other departments, other levels of government, groups with status in governance, and affected user and interest groups - is essential for the identification of EBSAS to be considered credible and legitimate. Consequently the process for the identification of EBSAs needs to be inclusive from the start. To date inclusiveness of practice has been inconstant. Although broad engagement of all such groups is desirable throughout the process, the actual science review and advisory components must be conducted in a manner certain to maintain scientific integrity, as well as openness and transparency. This includes ensuring all participants in the review and advisory meetings are holders of relevant knowledge and participate as knowledgeable individuals and not as representatives of agencies, organizations, or interest groups

3. Areas meeting the EBSA criteria have usually been considered on an individual basis. However, particularly for fitness consequences, the connectivity among EBSAs used at different life history stages or for different ecological functions needs to be considered. This will require developing scientific guidance for assessing connectivity, and collecting or assembling ecological information in new ways.

Uniqueness/Rarity

The application of the uniqueness criterion has occasionally posed problems in the past, especially when considering multiple geographic scales. Features unique or rare in an area may be more common when that area is part of a much larger area being evaluated according to the EBSA criteria. At times, features that stand out as unique on a comparatively finer scale may “disappear” due to averaging out when moving to larger spatial scales. Therefore, uniqueness should always be assessed relative to the boundaries at which the criteria are being applied, and evaluated at a spatial scale of disaggregation relevant to policy and management. It is also noted that there may be a temporal dimension to uniqueness. It is possible that due to such circumstances as climate change or industrial development rare habitats might become more common over time, (e.g.more three-dimensional structure associated with infrastructure),or that common areas might become rarer over time, (e.g., reduction in semi-permanent polar pack ice, and ice shelves.

Aggregation

In general, application of the aggregation criterion has been found to be straightforward, especially for life history processes such as spawning and migration. However, there can be a temporal dimension to activities causing aggregation, such that the areas used may not remain

the same over time. Consequently, re-evaluation of significant areas of aggregation will be required periodically.

Fitness Consequences

In general, the fitness consequences criterion has been found to be easily applied, although groups often found themselves with insufficient information to conclude that all areas important to fitness were identified. As well, it was apparent that the information to which this criterion was applied was usually biased towards a small fraction of the species within the evaluation area. Temporal considerations here are similar to those with the other criteria; except that many more factors could cause changes in which areas are important for specific functional activities, and the changes could occur at different rates for different species. An additional temporal aspect that needs to be considered for the fitness consequences criterion is the relative timing of different, but related, ecological events (technically referred to as phenology). The fitness implications of conducting a particular activity in a specific place may depend critically on some other event already having occurred in that area, such as the need for fish spawning to be timed so that the fish larvae hatch when and where their plankton prey are available. Consequently, re-evaluation of areas that meet the fitness consequences criterion will be required periodically.

Naturalness and Resilience

In general, naturalness refers to how much a system has already been changed, directly or indirectly by human activities, whereas resilience refers to how likely a system is to change if exposed to a pressure, and its ability to recover following disturbance. Past guidance has indicated that these secondary criteria are not intended to be used as the sole basis for the identification of EBSAs, but rather serve as key considerations in prioritizing EBSAs. However, it has been noted that these criteria have also not played a significant role in the identification or management of EBSAs to date. Although these criteria do not directly affect the identification of EBSAs, their use should be considered in the context of potential future developments in application of the Ecosystem Approach.

When considering naturalness, it was also noted that naturalness is associated with past/historical states of ecosystems before human activities were dominant determinants of ecosystem structure and function. If the Department's evolving interpretation of the Ecosystem Approach gives weight to "pristine conditions" as legitimate reference benchmarks, the importance of this prioritization criterion would increase.

Data for the identification of EBSAs

Data and information used to identify EBSAs within each Canadian region have traditionally been compiled from a number of available sources (e.g., designed monitoring studies and remote sensing, modeling and spatial extrapolation of data from parts of the area or other similar areas, opportunistic or targeted local scientific studies, Traditional Ecological Knowledge (TEK) and Local Ecological Knowledge (LEK) on many scales, and expert opinion). The use and integration of these sources requires attention to several considerations throughout the EBSA identification process. Interim guidance is provided for sound science practices in data/knowledge-poor situations.

General considerations for the use of data to identify EBSAs

1. To ensure consistency of layers used in the identification of EBSAs, a standardized checklist of data, knowledge and information layers should be considered. As per previous guidelines

for evaluating Ecosystem Overview and Assessment Reports, this would include geomorphology; oceanography; plankton; invertebrates; marine plants, fish, mammals, birds and reptiles (commercial and non-commercial and anadromous and estuarine as applicable); Scientific Ecological Knowledge (SEK); and Traditional and Local Ecological Knowledge (TEK/LEK).

2. The rationale for EBSA identification must be well documented to ensure that users can access each layer of information that was compiled for the identification process (e.g., for evaluating management measures or for use in re-evaluation). At the time each data/information/knowledge layer is created the following information must be documented within the metadata :
   - The type of data/information/knowledge used, its origin and scale, spatial and temporal range, and quality;
   - The level of uncertainty associated with each layer
   - Any weighting or other prioritization methods associated with each data layer

3. Minimum standards for the application of temporal data should be used in the definition of EBSAs. If data for any layer are old, they should still be used unless there is a demonstrable reason to exclude them (e.g., ecosystem, communities, species, oceanographic features are known to have changed since data were collected, or the data were found to be incorrect). Historical data may also be useful as reference benchmarks and should therefore always be archived as carefully as recent data.

4. Minimum standards for the application of spatial data should be used in the definition of EBSAs. For example, if species are widespread, but data do not cover the complete study area, the data can be extrapolated to larger areas providing the area of data origin is determined to be representative of the complete area. This extrapolation must be clearly documented with the associated level of uncertainty indicated both in the metadata and on the resulting map products. If species distributions are clustered and data come from a partial area, it is not acceptable to extrapolate from one small sampling area to the larger LOMA or equivalent area, unless appropriate statistical models of distribution patterns are first validated and then applied.

5. Procedures to collect and use SEK/TEK/LEK must follow established protocols including: information associated to its collection (e.g., representative sample size, who is consulted, who are the experts, types of surveys used). Additional guidance/advice is available from the DFO National Centre of Expertise – Traditional Ecological Knowledge (CETEK) on the gathering and integration of TEK in Departmental activities. This report should be evaluated to determine whether it is comprehensive enough to cover all EBSA cases. In all cases, appropriate experts in the social sciences should be involved in verifying processes used to include SEK/TEK/LEK in the identification of EBSAs.

6. When displaying the data layers as map products, resulting maps must clearly indicate: where there were no data, where data were collected, and areas where data were extrapolated (e.g., leave grid marks on map in data layers); number of layers used to define each EBSA; and the level of uncertainty associated with each data/information/knowledge layer. Any weighting or other prioritization methods associated with each data layer should be clearly documented.

7. Future uses of the data used in EBSA identification can only be served if data are archived and maintained into the future, and uses are most efficient if the data are accessible through a single point of access. It is recommended that:

- Databases must be "living" – ongoing time series existing in the database must be kept up to date and the database reviewed every 5 years. This should not limit a more rapid inclusion of new data when they become available(see 8 below);;
- Data collection must continue, or consequences of not collecting new data must be evaluated, and incorporated into more risk averse actions;
- Specific databases used for all EBSA identification processes, past and present, must be recoverable, for example, to facilitate comparisons over time;
- New types of data must be incorporated into the database after appropriate evaluation relative to the EBSA criteria;
- Databases must follow DFO and government policies for data management, i.e., governance, standards, archives and access. (DFO Management Policy for Scientific Data http://www.dfo-mpo.gc.ca/science/data-donnees/policy-politique-eng.htm, and Treasury Board Secretariat Policy on Information Management http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?section=text&id=12742).

8. EBSA identification processes must be revisited when something is known to have changed (e.g., a change is detected through regular monitoring or new targeted studies), and when new relevant types of information become available.

9. Data, information or knowledge used to identify EBSAs that are not already published must undergo peer review either as part of the EBSA CSAS review process or in a separate CSAS process, with the publication of resultant research documents.

Guidance for data/knowledge-poor situations

10. Uncertainty will increase the patchier (in space, time, and type) and incomplete the information sources are, and consequently the more justification there is for the application of precaution in decision-making. The scientific advice in such situations should reflect the uncertainties, but not be biased in directions thought to be either permissive or precautionary. The advice should clearly inform decision-makers about the need for precaution and what options would be precautionary.

11. Where data from soundly designed and conducted monitoring studies are available, other types of information will usually be used to augment and enrich conclusions based on the data, not override such conclusions. However, there may be conditions where, even with consistent monitoring studies, other types of information provide more information for some species or areas.

12. Where scientific data and information are only available from sites neither selected to be representative nor part of sampling designs intended to produce representative results, the reason for site selection needs to be considered. The more the selection of the study site(s) was based on what were thought to be special properties of the site, the less appropriate it is to apply the information from that site to other parts of the area.

13. Even if the scientific data provide incomplete coverage in space or time, they should only be rejected if there are reasons to believe they were not collected using sound methods, or their use will be misleading, even for local applications. The reasons for excluding such scientific data should be recorded in the meeting proceedings.

14. Application of the Uniqueness/Rarity criterion should be evidence-based. All sources of peer-reviewed information, including TEK and LEK are considered appropriate sources of "evidence". Where no information is available for an area, the proper scientific advice is that

it is unknown if unique and rare ecological features occur in the area. Any developments in such areas should proceed with caution, including data collection prior to commencing the undertaking, monitoring during development and operation, and use of adaptive management frameworks with clear rules.

15. Application of the Fitness Consequences criterion can be supported by methods that extrapolate information from areas which have been studied in other similar areas. However, the methods of extrapolation need to be peer-reviewed, and the results of their application, as well as the associated uncertainties included in the advice. Modelling and extrapolation methods cannot always be counted on to consistently produce reliable predictions of ecological functions of areas. Habitat suitability modelling methods, using information about similarities in bathymetry, substrate type, and physical oceanographic features to predict likelihood that unstudied areas may be suitable for various ecological and biological functions, are considered promising for such situations. Advice on use of such modelling methods is documented in the 2011 DFO Science Advisory Report addressing Encounter Protocols (DFO 2011).

16. To the extent that the ecological causes of aggregation are understood, on a case by case basis experts can evaluate if suitable sites for aggregation can be predicted from the available information sources (particularly information on habitat features). If so, these predicted sites may be considered tentative EBSAs, and are priorities for validation of the predictions, However, there may be cases where the causes of aggregation are poorly understood; or sites known to be centers of aggregation cannot be differentiated on the basis of habitat (or other relevant) features from many similar sites known to not be centers of aggregation. In those cases predictions based on habitat features may be considered unreliable. In those situations observations on degree of actual use of the area can be used as evidence for whether or not the area meeting the Aggregation criterion. For data-poor areas where there are few observations on the extent to which an area is used the advice would be “unknown”.

17. If modelling or extrapolation methods are used, these methods will predict potentially suitable areas for various functions. However, follow-up studies are necessary and may find that not all sites predicted to be suitable for the originally identified purpose are in fact being used for the function(s). Such situations must be evaluated on a case by case basis, to support advice on whether the prediction is in error, or that the area is suitable for the function, and could become functionally significant in the future if, for example, the status of the species were to improve and require additional habitat for its life history functions, In the latter case the area should be considered at least a candidate as an EBSA, and its potential future function significance considered in management.

18. In cases where modelling and extrapolation methods are being used, oceanographic and other habitat data should be reviewed by appropriate disciplinary experts, and accepted as appropriate for the areas where the models are to be used. The strength of the relationships between the oceanographic and habitat features, and the aggregation or fitness consequences for the populations or communities needs to be fully documented and the associated uncertainties reflected in advice based on model results. Causal explanations for statistical relationships strengthen advice, and should be investigated whenever possible.

The above points of guidance are generalizations, and expert groups may deviate from them if they feel there is good cause. In such cases the methods and justification for the preferred practice should be presented in the advice.

Coastal and freshwater application of EBSA criteria

Although there is limited experience with the use of EBSA criteria in coastal and freshwater systems, the conclusion is that the criteria are generally applicable to these habitats, just as they are in the offshore applications for which they were initially developed. However, the following advice is provided with respect to the application of the EBSA criteria to coastal and freshwater systems:

1. There are ecological functions and processes in freshwater systems that differ from comparable ones in marine systems. In the application of EBSA criteria to freshwater areas, the criteria will still produce scientifically sound and useful results, but areas considered under the criteria, particularly uniqueness and rarity, must be evaluated relative to other freshwater areas; any freshwater area could be “unique” in some important ecological ways if it is compared only to marine areas.

2. There are ecological functions and processes in the coastal and estuarine areas that differ from offshore habitats and communities. There is no consensus that this difference alone categorically qualifies entire coastal and estuarine areas as EBSAs. Therefore, any identification of EBSAs in the coastal and estuarine areas requires the application of EBSA criteria to that area.

3. The use of EBSA criteria in adjacent areas from the offshore to inland freshwater systems can also be used to identify connectivity of significant areas that support multiple life stages of a given species.

4. Most scientific experts specialize on only a subset of aquatic habitats (marine, coastal, riparian, lacustrine) and access to appropriate expertise should be considered during the identification of EBSAs in coastal, estuarine, and freshwater areas.

Consideration of Boundaries and Scale

Previous guidance noted the value of geo-referenced information for the application of the EBSA criteria. However, it is recognized that making use of the best information available will not always allow this standard to be met due to constraints in time and resources. Consequently, EBSA boundaries may face some challenges when included in advice supporting management decisions. Even when all information is fully geo-referenced in fact, the features determining the boundaries do not always change abruptly from meeting the criterion to not meeting the criterion particularly for areas important for fitness consequences of a variety of species, and challenges may be made to any single boundary that is proposed. Therefore, the rationale for all decisions on EBSA boundaries should be documented fully as part of the science advice.

In past applications of the EBSA criteria, scaling up and scaling down of information (aggregating fine scale information to look for larger-scale patterns or trying to subdivide areas to scales finer than the ones on which the original information was reviewed and evaluated) has also presented some concern, particularly with the application of criteria at the coastal/nearshore and offshore/bioregion scale within and outside of the LOMAs. Also, questions have been raised concerning the scales at which EBSAs can be differentiated as coastal, transitional, and/or offshore.

Based on experience to date, the following guidance is offered in relation to EBSA boundaries and scale:

1. Simply reporting fixed boundaries for EBSAs loses information that may be valuable for management. Therefore, rather than reporting fixed boundaries (usually presented as solid lines on maps, e.g., Fig. 2) which integrate but conceal the underlying EBSA properties, there are benefits to both Science and users in policy and management when geographic presentations of EBSAs indicate the number of ecosystem properties/components contributing to each 'pixel' (basic geographic unit at which the evaluation is conducted) (e.g., by using 'heat maps', Fig. 3). The determination of 'boundaries' can then be transparent, revealing how many, and which components are included in the EBSA. Such presentations also permit scaling to larger or smaller spatial scales within the scale of information supported by the underlying data.

2. Heat maps should be produced and presented separately for each of the primary EBSA criterion (uniqueness/rarity, aggregation, fitness consequences). This would ensure that all information is explicitly presented in the maps, reducing the risk that a unique area for one feature/taxon may not be apparent when rolled up with other features/taxa.

3. Once the boundaries of the study area have been defined, areas meeting the uniqueness criterion remain at the same pixels, locations, and size regardless of the scale at which the map is portrayed (geographic extents). In contrast, fitness consequences are often scale-dependent particularly if they are inferred in part from information on environmental conditions and co-variants which may be portrayed with greater or lesser extents and resolution at different scales. Locations important to fitness consequences may disappear if they are smaller than the resolution (pixel size) of the presentation.

4. A web-based approach would have many benefits for mapping and presenting all of the information used in the EBSA process, as outlined in the data section. This includes information on the EBSA layers (uniqueness/rarity, aggregation, fitness consequences) and should include information on the quality and quantity of the available data. A user could then view the data that contribute to higher concentrations of properties, and view locations of unique properties, etc., thereby making the EBSA identification process more transparent and increasing the value of the products to users.

5. Geo-referenced maps and EBSA locations need to be periodically reviewed and updated as per the guidance in the section on temporal considerations associated with the individual criteria (see section on "Criteria for the Identification of EBSAs").

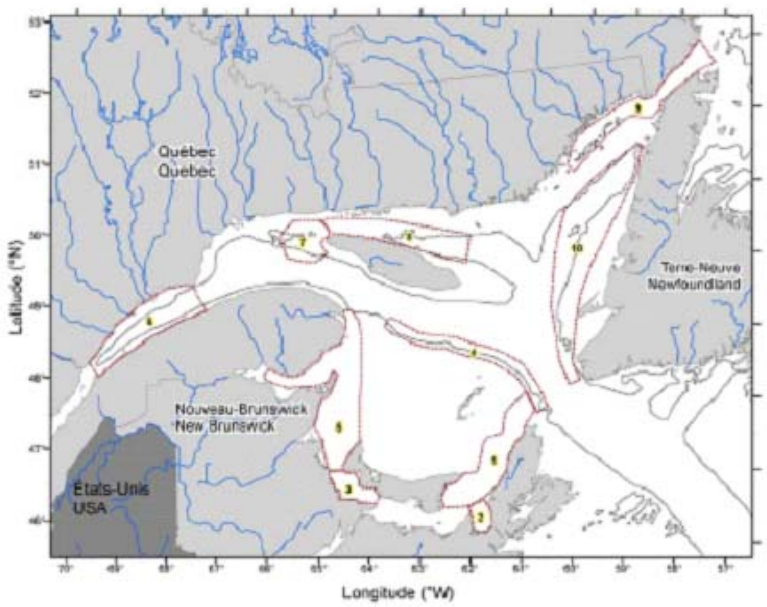

Figure 2. Ecologically and biologically significant areas (EBSAs) identified in the Estuary and the Gulf of St. Lawrence (Savenkoff et al, 2007). Solid lines imply fixed boundaries for each EBSA.

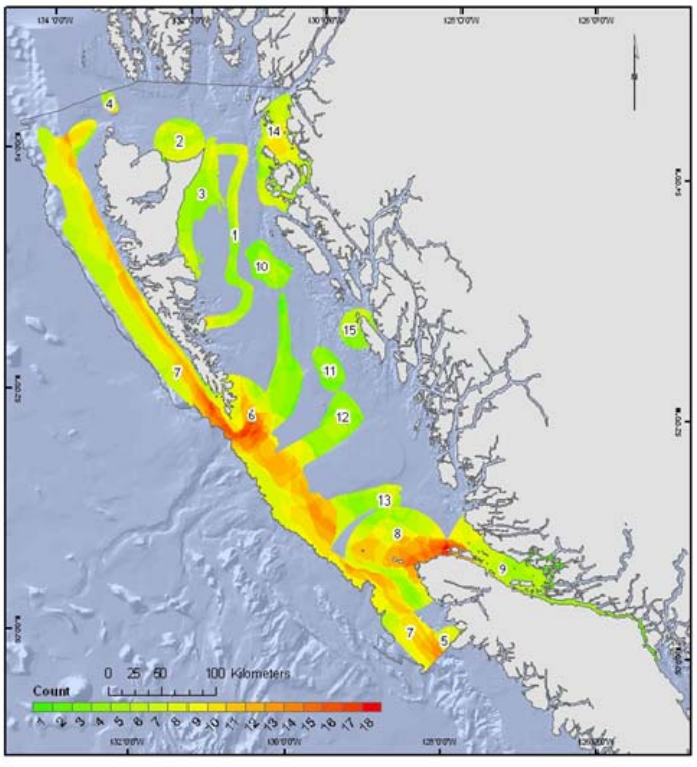

Figure 3. Heat map displaying number of taxa which meet the EBSA criteria at important marine features of the Pacific North Coast Integrated Management Area. (Clarke. and Jamieson 2006).

OTHER CONSIDERATIONS

Further Meetings

Several topics emerged during discussion, on which it was agreed that additional science guidance and advice was needed. In each case relevant scientific information and reports on experiences were known to exist but were not available at this meeting. Since strategic level issues central to implementing an Ecosystem-Based Management / Ecosystem Approach to Management (EBM/EAM) are to be considered by the Department in the near future, discussions of the emergent topics identified here will be much more useful when held in the context of any results of those strategic policy meetings. As such, this meeting calls attention to the need for three additional "guidance framework" meetings arising from issues brought forward, that should all be priorities for the latter part of 2011 and 2012, depending on the decisions made about the Departmental approaches to EBM/EAM.

1. Review and update guidance provided on prioritization of EBSAs, including the use of the Naturalness and Resilience criteria – this review should take advantage of lessons learned from use of past guidance on prioritization and give thorough consideration to departmental needs for EBM/EAM. A corresponding review of the strengths and weaknesses for the various methods (e.g., analytical vs. expert opinion) used to apply the criteria, aggregate data layers, identify and prioritize EBSAs, and identify their management needs will also be required.

2. Review the experiences of the various management sectors of DFO and of other competent management authorities in Canada and internationally with regard to the use of EBSAs (and similar criterion-based selected areas such as VMEs) in management – this review will advise, as the available information allows, on the different types of scientific information that can influence the relevance of EBSAs and their usefulness in management.

3. Review and advise on the methods available for assessing threats, vulnerability, susceptibility, and other aspects of assessing risk against human activities which may have a negative impact on EBSAs – this review will also provide guidance for consistent practice in the use of risk assessment terms and concepts used in the various risk assessment frameworks (e.g. threat, vulnerability, susceptibility, exposure, etc).

Management Uses

There is currently very little guidance on how to use EBSAs in policy and management. To date, most EBSAs applications have been in the development of MPAs and MPA networks. Some managers have used EBSAs as part of a systematic process to establish the ecosystem basis for management ensuring consistency and efficiency in the development of management measures. The use of the established criteria and the resulting EBSA advice in management and regulatory contexts is also considered to reduce Departmental liabilities that could result from inconsistent use and interpretation of scientific advice in policy and regulatory decision-making. In all Regions the use of EBSAs is least developed and implemented in Fisheries Management applications.

Guidance must ensure the application of EBSAS in a consistent and efficient manner, including the science on which they are based, for a diversity of sectoral management situations. In addition to the provision of such guidance, managers across sectors and Regions need to

discuss a coordinated approach to how EBSAs are considered in policy and management across sectors, to ensure consistency and credibility of practice. .

SOURCES OF INFORMATION

This Science Advisory Report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, National advisory meeting held May 19-20, 2011 on Ecologically and Biologically Significant Areas – Lessons Learned. Additional publications from this process will be posted as they become available on the DFO Science Advisory Schedule at http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm.

Clarke, C. L. and G. S. Jamieson. 2006. Identification of Ecologically and Biologically Significant Areas for the Pacific North Coast Integrated Management Area: Phase II. C.L. Clarke and G.S. Jamieson. 2006. Can. Tech. Report Fish. Aquat. Sci. 2686.

Cobb, D.G., 2011. Application of Ecologically and Biologically Significant Areas (EBSA) Criteria in Canadian Waters: Lessons Learned. DFO Can. Sci. Advis. Sec. Res. Doc. 2011/070. v + 39 p.

Convention of Biological Biodiversity. 2008. Annex 1: Scientific Criteria for Identifying Ecologically or Biologically Significant Marine Areas in Need of Protection in Open-Ocean Waters and Deep-Sea Habitats. COP 9 Decision IX/20, Marine and Coastal Biodiversity". www.cbd.int/decision/cop/?id=11663. Accessed July 19, 2011.

DFO, 2004. Identification of Ecologically and Biologically Significant Areas. DFO Can. Sci. Advis. Sec. Ecosystem Status Rep. 2004/006.

DFO, 2009. National Centre of Expertise – Traditional Ecological Knowledge (CETEK). http://www.dfo-mpo.gc.ca/regions/central/cetek/index-eng.htm

DFO, 2011. Science-based encounter protocol framework for corals and sponges. DFO Can. Sci. Advis. Sec. Advis. Rep. 2011/048.

Savenkoff, C., Bourassa, M., Baril, D., and H. Benoît. 2007. Identification of Ecologically and Biologically Significant Areas for the Estuary and Gulf of St. Lawrence. DFO Can. Sci. Advis. Sec. Res. Doc. 2007/015.

FOR MORE INFORMATION

Contact: Dr. Jake Rice
Fisheries and Oceans Canada
200 Kent Street, Stn. 12S014
Ottawa, Ontario
K1A 0E6
Tel: 613-990-0288
Fax: 613-998-3329
E-Mail: jake.rice@dfo-mpo.gc.ca

Contact: Nadine Templeman
Fisheries and Oceans Canada
80 East White Hills Rd.
St. John's, NL
A1K 3E5
Tel: 709-772-3688
Fax: 709-772-6100
E-Mail: nadine.templeman@dfo-mpo.gc.ca

This report is available from the:

Canadian Science Advisory Secretariat
National Capital Region
Fisheries and Oceans Canada
200 Kent Street
Ottawa, Ontario
K1A 0E6

Telephone: (613) 990-0293
Fax: (613) 954-0807
E-Mail: CSAS@dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas-sccs

ISSN 1919-5079 (Print)
ISSN 1919-5087 (Online)

La version française est disponible à l'adresse ci-dessus.

CORRECT CITATION FOR THIS PUBLICATION

DFO. 2011. Ecologically and Biologically Significant Areas – Lessons Learned. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2011/049.