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**Proceedings of the Workshop to  
Review Science Considerations in the  
Development of Conservation  
Objectives for the Placentia Bay-  
Grand Banks Large Ocean  
Management Area**

**May 1 - 2, 2007  
St. John's, NL**

**Meeting Chairperson  
Dr. M. B. Davis**

**Editors  
B. Hickey, N. D. Templeman**

**Compte rendu de l'atelier d'examen  
des considérations scientifiques  
relatives à l'élaboration d'objectifs de  
conservation pour la zone étendue de  
gestion océanique de la baie de  
Plaisance et des Grands Bancs**

**1 et 2 mai 2007  
St. John's, TNL**

**Président  
M. B. Davis, Ph.D.**

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**November 2007**

**novembre 2007**

## **Foreword**

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings include research recommendations, uncertainties, and the rationale for decisions made by the meeting. Proceedings also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

## **Avant-propos**

Le présent compte rendu a pour but de documenter les principales activités et discussions qui ont eu lieu au cours de la réunion. Il contient des recommandations sur les recherches à effectuer, traite des incertitudes et expose les motifs ayant mené à la prise de décisions pendant la réunion. En outre, il fait état de données, d'analyses ou d'interprétations passées en revue et rejetées pour des raisons scientifiques, en donnant la raison du rejet. Bien que les interprétations et les opinions contenus dans le présent rapport puissent être inexacts ou propres à induire en erreur, ils sont quand même reproduits aussi fidèlement que possible afin de refléter les échanges tenus au cours de la réunion. Ainsi, aucune partie de ce rapport ne doit être considéré en tant que reflet des conclusions de la réunion, à moins d'indication précise en ce sens. De plus, un examen ultérieur de la question pourrait entraîner des changements aux conclusions, notamment si l'information supplémentaire pertinente, non disponible au moment de la réunion, est fournie par la suite. Finalement, dans les rares cas où des opinions divergentes sont exprimées officiellement, celles-ci sont également consignées dans les annexes du compte rendu.

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## **SUMMARY**

A Fisheries and Oceans Canada (DFO) Science Regional Workshop was held in St. John's, Newfoundland and Labrador, on May 1<sup>st</sup> and 2<sup>nd</sup>, 2007, in order to review science considerations in the development of conservation priorities and objectives to aid in the Integrated Management (IM) of the Placentia Bay-Grand Banks (PBGB) Large Ocean Management Area (LOMA). The purpose of the workshop was to seek consensus on the science-based Conservation Objectives for the PBGB LOMA. The methodology for the selection and prioritization of conservation priorities and the evolution of these into Conservation Objectives was defined by a National Workshop carried out in January 2007.

Scientists and oceans management stakeholders, from within DFO and externally, participated in this two-day Regional Workshop. The development of the LOMA Conservation Objectives started with the preparation of an Ecosystem Overview and Assessment Report (EOAR) by the DFO Science Branch in the Newfoundland and Labrador Region. From this report lists of Ecologically and Biologically Significant Areas (EBSAs); Ecologically Significant Species and Community Properties (ESSCPs); Depleted and Rare Species; and Degraded Areas were developed which were discussed during the Workshop.

The proposed Conservation Objectives were modified during Workshop discussions and there was general consensus on the resultant Objectives.

## **SOMMAIRE**

Le secteur des Sciences de Pêches et Océans Canada (MPO) a tenu un atelier régional à St. John's, Terre-Neuve et Labrador, le 1<sup>er</sup> et le 2 mai 2007, afin d'examiner les considérations scientifiques relatives à l'élaboration des priorités et des objectifs en matière de conservation pour la gestion intégrée (GI) de la zone étendue de gestion océanique (ZEGO) de la baie de Plaisance et des Grands Bancs (BPGB). Le but de l'atelier était de tenter d'atteindre un consensus quant aux objectifs de conservation à fondement scientifique pour la ZEGO BPGB. La méthodologie utilisée pour le choix des priorités en matière de conservation, leur classification et leur évolution vers des objectifs de conservation avait été définie lors d'un atelier national tenu en janvier 2007.

Des scientifiques et des intervenants en gestion des océans, du MPO et de l'extérieur ont participé à cet atelier régional de deux jours. L'élaboration des objectifs de conservation de la ZEGO a débuté par un rapport d'examen et d'évaluation de l'écosystème (REEE) préparé par la direction générale des sciences du MPO de la Région de Terre-Neuve et du Labrador. Des listes des zones d'importance écologique et biologique (ZIEB), des espèces et des attributs des communautés d'importance écologique (EIE-ACIE), des espèces en déclin et rares et des zones dégradées tirées de ce rapport ont fait l'objet de discussions.

Les objectifs de conservation proposés ont été modifiés pendant l'atelier et un consensus général a été atteint sur leur version finale.





## **DAY 1 – MAY 1, 2007**

### **SECTION 1 – WELCOME AND INTRODUCTION**

The workshop Chair, Dr. Ben Davis, welcomed the participants and informed them that an audio recording of the discussions was being made in order to facilitate the preparation of the proceedings report. He then introduced Julian Goodyear, the Director of Science for DFO's Newfoundland and Labrador Region.

Mr. Goodyear noted that there had been some anxiety about name of the event, which was initially identified as a Regional Advisory Process (RAP) but which is being undertaken as a workshop. He urged the participants to be open and transparent and to focus on the Conservation Objectives for the Placentia Bay – Grand Banks (PBGB) Large Ocean Management Area (LOMA).

### **SECTION 2 – OVERVIEW OF THE OCEANS ACTION PLAN (OAP) AND INTEGRATED MANAGEMENT (IM) – Dr. Ben Davis**

#### *Presentation Highlights*

The Chair noted that this Workshop is the start of a continuum of the Integrated Management (IM) process and as such management issues will not be discussed at this Workshop. He noted that DFO's Science Sector does not make recommendations on management measures, but rather provides some of the information on which decisions on management measures are based.

Under the *Oceans Act*, passed in 1997, the Minister of Fisheries and Oceans has the responsibility to lead and facilitate a number of activities related to the IM of oceans activities, including the coordination of IM. Canada's Ocean Management Strategy, which was released in 2002, and the Oceans Action Plan (OAP) of 2005 described how the *Oceans Act* was to be implemented. There are four pillars to the Oceans Action Plan: International Leadership, Sovereignty and Security; Integrated Oceans Management for Sustainable Development; Health of the Oceans; and Science and Technology. Ecosystem-based management (EBM) is a fundamental concept under the *Oceans Act* and requires a broader approach than trying to understand individual issues.

This workshop will attempt to reach agreement on COs for the PBGB LOMA. Ultimately there will be an IM plan for the LOMA which will also consider social, cultural and economic elements in addition to this scientific information and advice. The management measures associated with an IM plan will be based on existing legislative authorities: integrated fisheries management plans, variation orders, *Species at Risk Act* (SARA) recovery strategies, marine protected areas, and the *Canadian Environmental Assessment Act* (CEAA) and regulations.

#### *Discussion*

Although an opportunity for questions was offered by the Chair, there was no discussion of this presentation.

## **SECTION 3 – DFO SCIENCE ACTIVITIES UNDER OCEANS ACTION PLAN (OAP I) – Dr. Ben Davis**

### *Presentation Highlights*

Under Pillar 2 of the Oceans Action Plan DFO developed five Large Ocean Management Areas (LOMAs): Placentia Bay-Grand Banks (PBGB); Gulf of St. Lawrence (GOSLIM); Eastern Scotian Shelf (ESSIM); Pacific North Coast (PNCIMA); and the Beaufort Sea.

The preparation of an Ecosystem Overview and Assessment Report (EOAR) was the first Science Branch deliverable for the PBGB LOMA. The state of the environment document included information on the geology, physical, biological and chemical oceanography, and the flora and fauna of the area. The document also described system interrelationships and the assessment considered the impacting activities and stressors.

Ecologically and Biologically Significant Areas (EBSAs) are areas that have particularly high ecological or biological significance -- and which should receive a greater-than-usual degree of risk aversion in management of activities in order to protect their overall ecosystem structure and function within the LOMA. EBSAs for the PBGB LOMA were identified using criteria developed during a 2004 National Workshop (DFO 2004). Ten EBSAs, covering about 25% of the total area of the LOMA, were identified:

- The Southeast Shoal and Tail of the Banks
- The Southwest Shelf Edge and Slope
- Placentia Bay Extension
- Laurentian Channel and Slope
- St. Pierre Bank
- Smith Sound
- Burgeo Bank
- Virgin Rocks
- Northeast Shelf and Slope
- Lilly Canyon - Carson Canyon

Data constraints limited the precision of the boundaries of the EBSAs, but enabled focus on particular areas which was sufficient for the purpose of identifying COs. However, there is an obvious bias in favor of a higher likelihood for consideration of data-rich areas. Therefore, additional information from research-in-progress, grey literature, and Traditional Ecological Knowledge (TEK) could have a significant effect on the identification of EBSAs and boundaries in the future.

Ecologically Significant Species and Community Properties (ESSCPs) are species or community properties that have particular ecological or biological significance to the LOMA, such that if severely perturbed the ecological consequences would be greater than equal perturbation of most other species or properties. Species and community properties can be significant due to functions they serve in the ecosystem or features they provide for other parts of the ecosystem to use. As is the case with the EBSAs, a DFO National Workshop produced a guidance document for identifying ESSCPs (DFO 2006). Elements for identification of ESSCPs include key trophic species, community properties, structural species and species for control.

Depleted and Rare Species are species that are both currently at a very low abundance and were usually much more abundant at some time in the past; and because of their status, warrant particularly risk-adverse management to ensure their survival and recovery. No specific criteria were used for the determination of Depleted and Rare species—species lists were based on existing assessments by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), DFO's Precautionary Approach Framework, and Northwest Atlantic Fisheries Organization's (NAFO)  $B_{LIM}$ . Species include those that have been given 'Threatened' or 'Endangered' status under COSEWIC, as well as those that are under NAFO moratoria. Species that are typically rare and widespread seem to be at their "usual" state and are not especially exposed to harm and therefore are not included on the list of depleted species.

Degraded Areas are areas where environmental quality has been impacted by human activities to a state where the natural structure and function of the ecosystem in the area is severely diminished. No specific criteria were used for the determination of Degraded Areas, with lists being based on existing assessments by municipal, provincial, and federal departments or agencies. Degraded areas are not just areas that have been altered from their pristine state; they reflect areas that are severely impacted by human activities, and on scales large enough to have widespread consequences within the LOMA. Both Placentia Bay and St. John's Harbour have been deemed degraded at the Federal/Provincial/Municipal level but only Placentia Bay may be deemed significant at the LOMA scale. However, given the lengthy history of contamination in the area, it cannot be said with certainty if the degradation has led to a significant decrease in "natural" structure and function in the area.

The four lists that have been compiled and presented are a good starting point for developing COs. The main negatives associated with the lists are: data gaps and dated data; information management and participation; human resources and time constraints. The main positives associated with the lists are: experience (identifying future do's and don'ts); identify areas for future research and collaboration; identification of areas for future funding and organization. It is clear there is a need to revisit and re-evaluate these lists at regular intervals in order to monitor changes in the ecosystem, and to provide the best and most up-to-date advice in support of IM.

### *Discussion*

The Terms of Reference referred to a Science Advisory Report (SAR) as well as a Proceedings Report as products to be prepared pertaining to the workshop. Concern was expressed about the lack of time on the agenda for discussion of the format and/or content of the SAR. It was agreed to make room at the end of the meeting for that discussion.

In response to a question about the process for reviewing and finalizing the draft documents circulated in advance of the workshop, the Chair stated that if other information is provided it will be considered, noting that this is a dynamic process with opportunities for consultation throughout.

The boundaries of the 500,000 km<sup>2</sup> PBGB LOMA entailed considerable discussion due to the fact that many species, including cod, are migratory. As well, the LOMA includes areas outside Canada's Exclusive Economic Zone.

## **SECTION 4 - INTRODUCTION TO THE NATIONAL FRAMEWORK AND GUIDELINES FOR SETTING CONSERVATION OBJECTIVES (COs) – Dr. Ben Davis**

### *Presentation Highlights*

The basis for IM plans will include COs against which ecosystem status and management success can be measured. These COs are science-based objectives related to the status of the non-human components of the ecosystem. They are traceable to sound science processes and set the bounds within which social, cultural and economic objectives are established.

In January 2007, a National Workshop was held to develop a nationally-consistent approach to the establishment of COs. The objective was to consider how to combine the four ranked lists into a single set of conservation priorities; consider and agree on how to express the conservation priorities as COs, striving for nationally consistent language and degree of specificity; and develop a common overall set of guidelines. It was decided that the lists would be merged and ranked in order to identify (at least) a top tier of conservation priorities (DFO 2007). These would be the ecological properties considered most essential for the natural structure and function of the ecosystem, and properties where management should be least willing to accept risks.

A three-step process was identified for determining the tiers. The first step was to specify the rationale for each entry on each list. The second step was to categorize all EBSAs by considering multiple criteria with the highest tier conservation priorities meeting the greatest number of criteria. The outputs are highest spatial conservation priorities. The final step was to consider those features thought to be most important in regulating functional dynamics of ecosystem(s). If some key species or properties were not adequately covered, then the necessary ESSCPs could be added to the highest tier.

### *Discussion*

None.

## **SECTION 5 – GUIDANCE ON IDENTIFYING AND PHRASING COs FOR LARGE OCEAN MANAGEMENT AREAS – Dr. Ben Davis**

### *Presentation Highlights*

Once conservation priorities are identified it is necessary to express them as COs. A January 2007 National Workshop developed expressions for COs that have consistent language and degree of specificity (DFO 2007). It was determined that, where possible, the CO should use language that directly corresponds to language in existing policies, regulations and legislation. As well the COs should be tied closely to criteria which were met (as qualifying as an EBSA, ESSCP, Degraded Area, Depleted or Rare species).

The following phrasing was developed at the National level:

### Properties of Uniqueness

For areas that are truly unique, any form of human-induced perturbation of the unique property should be prevented, therefore: “Ensure that (*features which make an area unique*) are not altered by human activities”.

### Properties of Aggregation

Less prescriptive than uniqueness; *some* degree of alteration of the area or population would be permissible as long as it continues to serve its ecological function, therefore: “Ensure that (*the features that make the area suitable for aggregation*) are not disrupted by human activities”.

### Properties of Fitness

Less prescriptive than uniqueness; *some* degree of alteration of the area or population would be permissible as long as it continues to serve its ecological function, therefore: “Ensure that reproduction and survival of (*the dependent species in that area*) are not disrupted by human activities”.

### Key Trophic Species

“Ensure that (*the species*) is not perturbed by human activities to the point where it is unable to fulfill its (ecological role) within the ecosystem”.

### Structure-Providing Species

“Ensure no net loss, due to human activities, of structural habitat provided by (*the species*)”

### Species for Control

“Prevent non-authorized introduction of invasive species” and “Control the spread and abundance of (*the species*)”.

### Properties above Species Level

Premature to develop CO templates at this time due to complexity and lack of available specific information on community properties.

### Depleted Species

“Ensure the survival and recovery of (*the species*)”.

### Rare Species

“Ensure survival of (*the species*)”.

### Degraded Areas

In cases where the area cannot serve its ecological function: “Restore the area to a state where it can serve that function, if feasible”.

Where restoration of the specific area is not feasible: “Restore that function on the scale of the EBSA or ESS within the LOMA”.

In cases where regulatory authority has declared the area degraded the CO is to achieve whatever state of restoration the regulatory authority has tasked management to achieve.

## *Discussion*

Concern was raised that the CO language may be too categorical and prescriptive, especially as to the use of the verbs “ensure” and “alter”. Similar concern was expressed about the meaning of “disturbing severely” and “serious and irreversible harm”. It was noted that such language may eventually be incorporated in a new *Fisheries Act* and that objectives can become the center points in legal cases.

It was suggested that some of the current language was problematic and was not acceptable and, therefore, should be reviewed by participants to find a solution acceptable to all. An example of a similar situation was noted where there had been an issue of wording during the ESSIM process. In that case, the solution was to describe the end result due to the inability to agree on the use of a specific verb. For example, for the protection of unique areas the statement was that unique areas are to be protected. It was observed that matters must also be considered at the population level. For example, there is a harvest level for a fishery that will not lead to an alteration of the population by human activity.

## **SECTION 6 – OVERVIEW OF DRAFT CONSERVATION PRIORITIES FOR THE PBGB LOMA – Dr. Ben Davis**

### *Presentation Highlights*

Conservation Priorities were derived from EBSAs, ESSCPs, Depleted and Rare Species and Degraded Areas lists, and were the basis for the expression of COs. Unable to be individually ranked, they were assigned to high, medium and low levels (tiers) of priority.

Based on the guidelines from the January National Workshop (DFO 2007), conservation priorities were derived by creating a Conservation Priority Matrix based on the EBSAs and their overlap with the other conservation issues (lists). ESSCPs, Depleted and Rare Species, and Degraded Areas that were thought to be most important to the functional dynamics of the LOMA ecosystem(s) were automatically added to the highest tier of priorities.

From an EBSA perspective, the following are in the top tier: Southeast Shoal and Tail of the Banks; Southwest Shelf Edge and Slope; and Placentia Bay Extension.

The following are either Key Trophic Species ranks 1-5 and all structure-providing species and species for control: Cod > 35cm; Greenland Halibut < 40cm; Capelin; Harp Seals; Hooded Seals; Greenland Halibut > 40cm; and Piscivorous small pelagics.

The following Depleted and Rare Species that are Endangered or Threatened or are under NAFO moratoria AND are not rare *and* widespread were added as well: Piping plover; Atlantic Cod (Newfoundland); Porbeagle Shark; Leatherback Seaturtle; American Plaice; Capelin; Witch Flounder; Redfish; Spotted Wolffish; Northern Wolffish; Atlantic Cod (Laurentian); Cusk; and Shortfin Mako.

The addition of Placentia Bay as a Degraded Area that may not serve its function at the EBSA or ESS scale completes the top tier.

## *Discussion*

It was observed that the process appeared to give additional weight to the EBSAs rather than providing an equal weighting to the four lists, resulting in a situation where there was virtually no way for the overlap to overrun the ranking of the EBSAs. This was due to the fact that overlap resulted in slight ranking changes in some of the secondary, but none of the primary, EBSAs. It was suggested that if there had been the intent to use all four criteria, a different process could have been used so that the other three criteria actually had some influence. The opinion was expressed that the other lists become important only for setting the conservation priorities, and not in identifying the areas where those priorities apply.

## **SECTION 7 – OVERVIEW OF DRAFT COs FOR THE PBGB LOMA – Dr. Ben Davis**

### *Presentation Highlights*

Acknowledging the concerns raised earlier in the workshop about the nature of the language, the COs distributed prior to the workshop were introduced to workshop participants.

Starting with the highest level, Southeast Shoal and Tail of the Grand Banks, the COs are to: “Ensure that **X** on the Southeast Shoal and Tail of the Banks is not altered by human activities” with **X** denoting: benthic biomass; Capelin spawning; yellowtail nursery; and shallow, sandy habitat respectively.

Similarly “Ensure that **X** on the Southeast Shoal and Tail of the Banks is not disrupted by human activities” with **X** denoting: Capelin spawning; cetacean feeding; seabird feeding; reproduction and survival of Capelin; reproduction and survival of striped wolfish; reproduction and survival of American Plaice; reproduction and survival of yellowtail Flounder; and reproduction and survival of Atlantic Cod respectively.

Rather than continuing with the Power Point slides, workshop participants gathered into five “breakout” groups to discuss the following items regarding the full list of COs:

- What appears on the list of objectives?
- Is the list of objectives adequate?
- Has something been missed?
- What are the implications of the items being on the list?
- Is the language adequate?

## *Discussion*

It was observed that the dictionary definitions of alter and disrupt differ from the definitions presented in the workshop documents and the opinion was expressed that there are likely many definitions for the words being used in this process. The opinion was expressed that the use of the verbs is unacceptable; however, what would be acceptable would be a statement of the outcome, or state of being, of the elements. It was also stated that any activity will alter or perturb a system to some extent, but that what should be sought is maintaining the integrity of the functionality of the system.

In view of the continued unease about the use of strong verbs and prescriptive language it was agreed that a small working group consisting of workshop participants Bruce Chapman [Groundfish Enterprise Allocation Council (GEAC) and Canadian Association of Prawn Producers (CAPP)], Marty King (WWF Canada) and Mariano Koen-Alonso (DFO Science) examine the language and report back to the workshop.

## **SECTION 8 – REPORTS OF “BREAKOUT” GROUPS – VARIOUS RAPPORTEURS**

### Group “3” (Rapporteur Robin Anderson)

- There is an absence of the ecology of the inshore and its role in the LOMA. This was identified as one of the most important items not on the list, since the models for the LOMA were based on the offshore food web.
- Highly migratory species such as top-predator pelagics and anadromous species are missing from the conservation priorities. Missing as well are lightly-monitored species, especially species at the bottom of the food web, e.g., zooplankton and lower levels of secondary production.
- The existing conservation priorities are based on either single species or small species groups. More broadly-based ecological conservation priorities should be established in order to take a more holistic approach to conservation priorities.
- There is concern that portions of some of the EBSAs are outside the 200 mile limit, beyond Canadian jurisdiction, and COs for those areas may be meaningless for management purposes.
- Risks from increased human activity levels are not included, especially in the context of the Placentia Bay ecosystem where there are plans to increase human activities in numerous areas. In a brief discussion about the concept of “degraded” as it applies to Placentia Bay it was felt that the sites used to give the whole bay this classification are very small relative to the size of the whole bay.
- How should the term “degraded” be applied to the Grand Banks, or to the LOMA as a whole, and with regard to the fishing activities that have gone on in that area? E.g., gravel beds that have been dredged, and the habitat modified, as a result of the scallop fishery.
- There is a need for protection of the ubiquitous species that aren’t necessarily particular to an EBSA, but which may be key to the ecosystem as a whole.
- The target ecosystem which is to be conserved through these priorities was also a topic of discussion. It is unclear whether the target is the ecosystem which was existent in the 1980’s, the pre-human activity ecosystem or some other?
- EBSAs appear to represent primarily areas where humans have a number of activities, rather than areas that are biologically or ecologically important without that human activity. The discussion led to consideration of the multi-stakeholder use of Placentia Bay which in turn led to a discussion of the regulatory nature of these COs.



Is the intent to have a way of promoting regulation to preserve the integrity of these EBSAs? Is this more similar to the regulations pertaining to a Marine Protected Area (MPA)?

- The workshop may want to view a DVD on IM from a community perspective which has been produced for Placentia Bay.

#### *Discussion*

None.

#### Group “4” (Rapporteur Garry Stenson)

- Shellfish is notably absent from the lists.
- With respect to not alter / not disrupt, how do these fit with the matrix used to determine what was included in those categories? Using Southeast Shoal as an example, it was agreed that it is that area’s physical characteristics that make it important. Those are things that human activity will not change very much. However, there are other characteristics, such as capelin spawning beds and yellowtail nurseries that are a consequence of the physical characteristics. Maintaining that shallow, sandy habitat is important and one would not want to alter the spawning and nursery areas. In the not-disrupt category, feeding areas would be included.
- It was felt that “reproduction and survival” of various species is too broad as a conservation goal, both from the perspective of measurement as well as scale. If important, it should be addressed under the significant species rather than a particular area.
- On the Southwest Shelf and Slope, among the important elements are the corals and groundfish species biodiversity. While it is understandable why the haddock spawning areas are in the not-disrupt category it is unclear why highest groundfish biomass and northern-most haddock are in the not-alter category. Missing from the list for the Southwest Shelf and Slope area is cetacean feeding.
- Regarding Placentia Bay Extension as an EBSA, it was felt that it is too big and diverse. However, it is agreed that, within Placentia Bay, there are particular areas that should be addressed. For example, it was felt that the nesting seabirds are an important structure, as are the stock spawning areas, not the stocks themselves. Spawning and nursery habitat for a number of species are listed in the not-disrupt category and that was seen as important. High concentrations are a result of maintaining the spawning areas. For seabirds, there is reference to seabird nesting, seabird feeding, seabird refugia, as well as reproduction and survival. What is it that is to be protected?
- Regarding Placentia Bay as a Degraded Area it was the group’s opinion that the Argentia restoration should include “and surrounding waters”. It was felt that the statement “restore Placentia Bay, where feasible, to a state where it can serve its normal ecological functions at the EBSA and ESS scales” was confusing in that it raises the question of whether it is now serving it’s normal ecological role. If not, why

are there seabirds and cod stocks present? It seems too broad an area. Is there concern for Degraded Areas other than around Argentina?

- There was some difficulty determining whether “perturbed” is the correct word to be used in referring to ecologically significant species. The concept of identifying the trophically-important species is good for illustrative purposes. There was some feeling that the existing model, which is founded on data from 2J3KLNO, may not be the most appropriate one for the Grand Banks. For example, hooded seals are an important species in 2J3KLNO, whereas they are not on the Grand Banks.
- Regarding invasive species, it was felt that non-authorized introduction should be added to “spread and abundance”. What is an invasive species? Should it also include natural range changes, caused by population expansions due to abundance changes or climate change? It is relatively easy when the discussion is about ballast water, but more difficult when the discussion is about killer whales in Hudson Bay due to a decrease in ice cover.

### *Discussion*

Should “reproduction and survival” be removed from the phrasing due to the natural influences affecting this element, noting that the establishment of COs largely pertains to human activities? The best that can likely be done is to protect the spawning areas in this case. It should be noted that, in addition to spawning areas, nursery areas are also important for survival such as the Southeast Shoal as a nursery area for 3NO Cod. Further, areas significant for the life history of an individual should be protected, whether spawning, nursery or feeding areas, so “reproduction and survival” in many instances will be appropriate in phrasing the objectives.

While crab and shrimp are important in the area’s ecosystem, it was noted that they are homogeneously dispersed over the Grand Banks so it is not accurate to say they are more important in one area than another for EBSAs. With respect to ESSCPs, although the model was based on data from a much earlier time, it was noted that while some changes are to be expected, the rankings of shrimp in the Eastern Scotian Shelf models from the 1980’s to the 1990’s did not change significantly.

Shrimp is important both as a fishery, as well as a forage species. However, it will be difficult to assess the change in biomass because while it is known that shrimp has increased, there are no recent diet studies to indicate whether prey species are consuming shrimp to a greater extent. In the mid 1980’s the crab and shrimp fisheries were quite limited, but these species have since become ubiquitous. It is unclear how the increase in these species has affected ecological function.

There is undoubtedly a need for information pertaining to the Newfoundland and Labrador area models to be updated. Some work on the Newfoundland and Labrador mass balance models is ongoing but is still dealing with mathematical implementation and data issues. It is important to understand the dynamics of the system, and since the individual models provide snapshots in time and it is important to link them together. It is unknown when the latest results will be available.

### Group “1” (Rapporteur Laura Park)

- Sandlance is important on the Southeast Shoal.
- Southeast Shoal may be the area where American Plaice is recovering, and therefore it is important that nursery habitat be protected.
- There is an experimental Hagfish fishery on the Southwest Edge, Shelf and Slope and that it may be a fairly unique area for this fish.
- Gorgonian and Bamboo coral, halibut, cod, skate and grey sole should be included on the list for the Tail of the Grand Banks.
- Why are the Halibut and Haddock Channels not included in EBSA boundaries?
- For Placentia Bay Extension and its reference to not altering the “largest spawning stock of Atlantic Cod”, it was felt that a phrase such as “maintain the stock in its current biomass” would be more appropriate.
- Halibut and Gorgonian corals should be added to the Depleted and Rare Species high priority list. There appears to be inconsistent application of “rare and widespread” and “edge of range” terms such that the Piping Plover is considered at the edge of its range, but was never widespread. It was agreed that the terms should be applied, but that the application should be consistent
- There should be a more proactive approach pertaining to Degraded Areas by identifying areas at risk of degradation.
- Seabirds are not one species and the Canadian Wildlife Service (CWS) has data available for individual species.

### *Discussion*

Regarding EBSAs, exclusion of some areas within the boundaries of some of the EBSAs is likely due to the richness of the data on which the decisions were made.

Regarding Degraded Areas, it was noted that the emphasis on Degraded Areas has been on chemical toxicity and that recent discussions questioned whether the elements that would make an area degraded should be broadened. Where an earlier ecological set-point is known, but has changed over time due to human influence, is something that could be considered for future exercises.

In response to a question whether any of the seabird populations would qualify as a Depleted Species a representative of the CWS stated that most seabird populations in the area are doing relatively well. However there are two seabirds that may be found in the LOMA that are defined as “Species At Risk”. The Piping Plover is a shore bird and would be found only in the coastal areas. The Ivory Gull would be found in the pelagic area; however it is an Arctic species and it is unusual to find it in the PBGB LOMA.

### Group “2” (Rapporteur Tammy Keats)

The group did not have significant expertise in specific species, but had questions and comments about process.

- There is a requirement for baseline data, and also for the establishment of specific outcomes and related thresholds.
- There is a need for clarification of “altered” and “disrupted”. While noting that a working group is looking at that issue, this group felt that “altered” seems to apply to physical habitat while “disrupted” applies to behaviours. However, further discussion indicated that it is not always the case, e.g., disrupted structural habitat for corals.
- There is the possibility that individual elements may be within established thresholds but that the cumulative effects may cause problems.
- Salmon, lobster, scallop, snow crab, shrimp, halibut, haddock, herring, and cunners should also be considered for priorities.
- What is the process to deal with data gaps?
- Where does water quality or the Marine Environmental Quality (MEQ) information fit into this process?
- Were geological data used in mapping the significant areas? Placentia Bay is a very large area which perhaps should be broken into smaller areas in terms of degraded or significant areas and geology.
- How does “no net loss of structural habitat” fit with the “altered” and “disrupted” categories?

### *Discussion*

Comments surrounding Placentia Bay as an EBSA and Degraded Area suggest that the issue will require some more consideration. It is one of the busiest areas of multi-stakeholder use and the development of an IM plan will require a lot more information about the ecological effects of those activities than is currently available.

### Group “5” (Rapporteur Derek Osborne)

- Why is the phrasing “Capelin spawning” as opposed to “reproduction and survival of Capelin” for the Southeast Shoal and Tail of the Banks?
- Species biodiversity is listed as “ensure X is not altered” on the Southwest Shelf, Edge and Slope. Why is “species biodiversity” not similarly listed for other EBSAs? While this area has particularly high biodiversity shouldn’t there be the objective not to alter species biodiversity in all areas?
- “Highest groundfish biomass on the Grand Banks” should be simply “groundfish biomass” because the fact that it may be the highest on the Grand Banks is irrelevant. Similarly,

“northernmost Haddock population” should be simply “Haddock population” because, if Haddock range expands, this may no longer be the northernmost population.

- The use of the COSEWIC populations of Atlantic Cod may prove problematic for Depleted and Rare Species because of difficulties between Laurentian North and Newfoundland and Labrador populations.
- Piping Plover should be removed from the Depleted and Rare Species list. There are five known breeding sites on the South Coast and the EBSA is at the extreme edge of the range.
- Blue whale is SARA-listed as endangered and, while uncommon in the area, is probably not rare; historical populations were probably much higher than they are now, and therefore, should be added to the Depleted and Rare Species list.
- 3NO Haddock should be considered for Depleted and Rare Species. There was historically a concentration of Haddock in the area.
- There is a need to be more specific about sites which have issues within Placentia Bay. It is acknowledged that it is difficult to determine what “normal ecological function” is.
- From a SARA perspective Cusk is considered at the edge of the range, and not a significant factor in Newfoundland and Labrador waters. While there has been some discussion of the possibility that there may be a separate Cusk population north of the Laurentian Channel, there is no supporting scientific data. Cusk should not be a medium priority species but rather a low priority one, at best.
- Tobin’s Point, where there is a high coral concentration, i.e., biomass and structural habitat, should be considered as a significant feature for the Northeast Shelf and Slope EBSA.
- Lilly and Carson Canyon EBSA should consider coral diversity and concentration as a significant feature.

### *Discussion*

Blue whales will be added to the Depleted and Rare Species list since they are indeed a depleted population that spends time in the area in the winter and spring. It was noted that there had been a delay in providing the marine mammal information for the matrix but that it had been recently provided. Also of note, with respect to marine mammals information, the Southwest Shelf and Southeast Shoal are major cetacean feeding areas. In addition, there are Right Whales and Northern Bottlenose Whales but it is difficult to determine how critical they are in the LOMA.

### Working Group on Language (Rapporteur Mariano Koen-Alonso)

With respect to phrasing for the COs, the working group reached agreement on the goal, but were in disagreement on how to express that goal. It was felt that what is missing is a clear statement of the overarching goals which would form the framework under which the more process-oriented objectives are described. Among those goals would be: promoting

sustainable use of resources; the conservation of biodiversity and ecological functionality of the system; and, to avoid human activities that produce serious or irreversible harm to biodiversity or ecological functionality.

Significant discussion surrounded what was meant by the objectives being discussed at the workshop and what someone else may interpret them to be. One of the members of the group was concerned that they are too prescriptive and not clear enough to convey the message we want to achieve. Many of these objectives all have the same structure.

The group developed a general phrasing to simplify the presentation, by using a general statement with a following list to which the statement applies. The proposed statement is:

*“For the following area the objective is to ensure that these features, listed below, are not permanently altered or disrupted by human activities to the point that they can no longer be identified as unique and/or serve the ecological function that identifies them as significant “.*

It was noted that further discussion is required to determine the acceptability of the use of the word “ensure”. It was felt that this approach would make it clear that the alteration or disruption is qualified by the capacity of the human activity to prevent those areas or species from fulfilling their ecological roles. It was also felt that alteration is a harder term than disruption in that alteration means that something is so unique that it is necessary to be even more risk-averse. It was recognized that all areas and species are important and have a role to play, but this process is to identify those elements that are so important that extra care is required.

*Discussion*

None.

## **SECTION 9 – OVERVIEW OF DRAFT COs FOR THE PBGB LOMA – Dr. Ben Davis**

The first day’s sessions were deemed quite productive, and it was felt that the breakout groups had been very useful. Among the accomplishments: a comprehensive description of the process that has been followed through OAP I and from which was distilled a long list of draft COs; there were some proposed additions, deletions and adjustments to the draft list of COs, and Day 2 will see discussion of the process for their evaluation. Accepting that the objectives were written in prescriptive, legalistic language, they will have to be considered in terms of what they mean and how they are to be applied, by the end of the workshop, and pending circulation of the proceedings report and the list, it is expected that there should be a penultimate draft of the COs for the PBGB LOMA.

## **DAY 2 – MAY 1, 2007**

### **SECTION 10 – WELCOME AND REVIEW OF PREVIOUS DAY’S DISCUSSIONS – Dr. Ben Davis**

Following the day’s welcome, an outline of the plan for the day was provided, noting that there would first be a summary of the previous day’s highlights before the review and discussion of the outputs from the breakout groups with an opportunity for proposals for further additions or deletions.

#### **Day 1 Summary**

DFO Science put significant time and resources into the preparation of the documents for this workshop. However, it is clear that there are concerns about the prescriptive nature of the language, and those discussions will be very useful as the IM process proceeds. Participants were encouraged to consider the language issue, among others, as they review the documents from the workshop and to provide comment. This will be important as the IM planning process is long and complex and very much “learn by doing”.

Breakout sessions and discussions from the previous day highlighted that the current models are based on offshore data but are missing inshore data. The relationships between the ecology of the inshore and offshore areas will also require further examination throughout the IM process. In addition, while up to 90% of human activities will be affected by the PBGB IM plan, these activities are hard to reflect in the models and are hard to predict. Ultimately, specific science research requirements will largely be driven by the needs of the IM process.

Previous day’s discussions also highlighted the concern surrounding the boundaries of the LOMA, since they do not fully reflect the impact of highly migratory species in the area, e.g., marine mammals, finfish, and others. Cod occurring outside of the boundary was considered to be a significant example of a migratory species during the discussions and it was felt that it is necessary to consider all aspects of the life cycle of a species with respect to the LOMA boundaries.

Finally, a key point of the previous day’s discussions pointed to the fact that lightly-monitored species for which there are little data are biased in favor of commercial species for which extensive data are available. Since data-poor species play an important role in the ecosystem as well, there was concern on how to consider these species in the process. Participants also felt it important to consider the top pelagic predators and the species at the bottom of the food web, the primary and secondary producers.

#### ***Discussion***

#### **LOMA Boundaries**

The fact that a portion of the LOMA is outside the 200 mile Economic Zone raises issues of management in that area, where fisheries management is undertaken by NAFO. IM will involve issues on the shelf edge as well as in deeper waters, and ecosystem based science will assume greater importance as IM will require a more holistic approach. Currently, plans are being developed for a follow-up to an ecosystem workshop held several years ago at Dunsmuir Lodge, where the focus was on ecosystems and community properties.

## Human Activities

On the issue of human activity levels not being accounted for and their associated level of risk, one of the participants from the Oceans and Habitat Management sector confirmed that there will be, at a future time, an assessment of human impacts. However, no decision has yet been made as to when and how that will occur. It was decided to separate human activities from the science advice so that when a new activity occurs it can be examined in the same way as any other activity.

Concern was raised about this approach with the risk of accidentally ignoring things that might be important for different types of risks associated with human activity. For example, Placentia Bay human activity focus seems to be on fishing, oil contamination and shipping issues while the risk of nutrient loading relates to the biology of the system and the desire to conserve current levels of primary production in the system. Not taking into account all types of human activities that may affect conservation priorities may mean that the appropriate conservation goals for that area will not be set. A further comment was that science should focus not only current threats, but must be aware of new and developing threats.

Another participant observed that the expansion of aquaculture licenses in Placentia Bay is raising questions of how these will affect the lobster and scallop fisheries in the area. There is a need to understand the impacts of the various activities, especially when there are potential conflicts. It was noted that sometimes human activity conflicts are based on perceptions rather than real issues and scientific information can be helpful in such situations.

## Degraded Areas

Pertaining to Degraded Areas, it was accepted that while individual sites within Placentia Bay are small scale with many point sources, the total aggregate is also relatively small. Existing degraded sites are identified primarily through contaminant loading and there is need for a discussion of whether Degraded Areas should consider issues additional to contaminant loading. A possible consideration would be to determine whether the ecosystem (at whatever scale) has been perturbed by human activity beyond what an earlier state was.

Returning to the previous day's reference to scallop beds on the Grand Banks and the issue that these are gravel beds of relict glacial deposits where the dredging process permanently alters their sediment characteristics, a scallop biologist was asked of the areal extent of these deposits. It was explained that the fishery takes place mainly on the St. Pierre Bank with some activity in the Lilly and Carson Canyons. With respect to starfish predation on scallops there, this subsided and scallop populations have returned to the levels of the mid 1990's.

One of the participants observed that the previous discussion is a good example of a concern which he has about the informality of the process by which items are added to or deleted from the lists. Using the farming analogy for scallop dredging, as long as the ecosystem function is not disrupted by "farming" scallops, the fact that the area is altered does not automatically make it a candidate for protection. Therefore he questioned the status of the elements now on the list.



The Chair commented that there is a mechanism needed to capture the perspective of what the issue is; for example, the areal extent. In order to provide advice on the seriousness of impacts, that perspective would need to be considered in the IM planning process.

### Ubiquitous species

When participants were asked for examples of the ubiquitous species that they felt are key to the whole ecosystem, one of the participants commented that the concept for this consideration arose from the belief that most of the species and areas had been previously identified because they were depleted or had been degraded in some way. The areas that had been identified had commercial fisheries and it seemed that the list was missing species that had a broader ecological importance. Examples of such species include zooplankton, meroplankton and fish larvae, as well as phytoplankton which was previously mentioned. Another participant noted that the key trophic species list reflects the average between total impact on the ecosystem and its “keystoneness.” There were limitations associated with using a model from a previous ecosystem and trying to balance the effects in terms of the total biomass in the system. However, in the list of total impacts, phytoplankton, zooplankton and such components are indeed at the top of the list. Also being considered are capelin and other forage species. A species was deemed significant in this analysis because of its ecological role, and not because it is a targeted species. The concern in the group was that it is the “fished and fishable species”, the ones that are currently managed, that are showing up in the COs, and that the underlying components of the food-web are not mentioned. It was felt that if they are showing up as important in the food-web models, they should also be shown as important for COs. It was further suggested that there should be a CO to have optimal primary production.

On the above matter, it was finally determined that it is the higher total impact species that should be added to the ESS list as opposed to the ubiquitous ones. If one looks at the ecological role, ignoring the keystone-ness, number one is capelin, number two phytoplankton, number three large zooplankton and number four is small zooplankton.

A participant referred to some recent models on the potential effects of nutrients from produced water on the planktonic systems on the Grand Banks. These models showed a shift in the phytoplankton production from large cells to smaller cells and a shift in the secondary production towards benthic production rather than pelagic production. This demonstrates that manageable human activities can affect the lower trophic levels and should be considered when developing COs. The models were based on 100 km<sup>2</sup> around one platform.

Another participant made reference to two examples of impending consequences of human activity on primary and secondary production; the first being the long-range transport of nutrients, particularly nitrogen loading into coastal zones, which has been shown to have an effect on primary productivity along most of the coastal zones in the Northern Hemisphere. This will have significant consequences for food-web productivity and structure. The second is the decreasing pH of the oceans which is being seen as the bicarbonate balance changes with increased loading of carbon dioxide to the atmosphere. This change in pH will have a significant effect on many of the species at the lower food web that depend on some type of calcium dynamics for production of either their skeletal material or their feeding apparatus. There are significant potential consequences in terms of species shifts as well as completely different algae communities. The consequences to primary and secondary production and the potential changes to the food-web are completely unknown.

COs, whether or not it is possible to associate an action with them, are intended to preserve the integrity of the system as a whole. There should be COs for things like zooplankton and phytoplankton, even if they will only be monitored. Summarizing this portion of the discussion, the Chair commented that the ecosystem science will have to incorporate all components of the ecosystem.

To conclude this topic, it was agreed that phytoplankton and zooplankton be added to the list of ESSCPs.

### Outstanding issues

The issue of how to separate and define “not alter” versus “not disrupt” is the subject of the working group’s continuing discussions and there will be a further report from that group before the conclusion of the workshop. Terminology will also likely be a subject of discussion at what is being referred to as “Dunsmuir II”.

On the subject of the target ecosystem level, it was noted that, while not a subject for this workshop, the issue of from which timeframe the target ecosystem should be established will be the subject of future discussion.

Previous discussions on the definition of Ecologically and Biologically Significant Areas indicated that EBSAs are meant to represent multiple species, not multiple activities, but may often correlate with the latter based on research effort.

Comments on the EBSAs suggested that it may be worthwhile to reexamine the EBSA Matrix to determine what is missing, for example marine mammals and shellfish.

Discussions indicated the phrase “reproduction and survival” is too broad to be a conservation goal and very often we have little control over them regardless of what is done about human activity. Spawning, nursery and feeding areas should not be disrupted and the life history of the species should be considered. When asked if “reproduction and survival” could be removed from the CO phrasing provided that the significance of the area for spawning, nursery and/or feeding is considered, a participant expressed some concern that there are some activities that might disrupt reproductive behaviour but not impact the spawning area’s physical habitat. A positive response was received from the acknowledgement that some activities may impact on reproductive behaviour. Another participant said that the focus should not necessarily be protecting the actual physical habitat, which should be included if it is important to spawning, but rather the focus should be on ensuring that the action of spawning is not disrupted. Another mentioned the concept of “moving EBSAs” which would be associated with processes such as spawning or feeding, rather than a fixed area. However, the implementation of such a concept would be more complicated. Yet another commented that one of the phrases used in the past is “not interfere with key life history processes”.

Discussions surrounding the need for baseline data also highlighted the need for links to limits and project outcomes.

Consideration of cumulative effects is important especially if we begin to define degraded areas to include offshore habitat. It will also be important in the management phase of the IM process during the discussion of social, cultural and economic issues.

In the discussion on the role of Marine Environmental Quality (MEQ) one of the participants pointed out that there are no COs based on water quality, pH levels, or contaminants, although Dunsmuir certainly had water quality Ecosystem Objectives. Since physical habitat is listed, why not consider chemical and oceanographic objectives as well? There is a MEQ objective within the ESSIM process, broken into physical, chemical and habitat with objectives and a management strategy. A participant wondered if this issue is related to DFO having responsibility for physical habitat and Environment Canada having responsibility for toxicants and chemicals in the environment. There is a question of how MEQ should be characterized but many expressed the opinion that it should be included.

Noting that Degraded Areas have already been identified it was questioned whether or not there could be a blanket conservation objective that we want to ensure that there are no additional Degraded Areas? For example, in the Coast of Bays there is increasing aquaculture and associated fish processing, as well as sewage entering the marine environment. The area is not now degraded, but noted that there is now an opportunity to manage it appropriately to ensure that it does not become degraded. The problem with such an approach would be an inability to take specific action, but the matter should be noted.

## **SECTION 11 – STATUS OF GEOLOGICAL SURVEY OF CANADA MAPPING IN PLACENTIA BAY – Dr. John Shaw**

### *Presentation Highlights*

Natural Resources Canada (NRCan) is active in all five LOMAs, with the intention of producing maps of the areas. The more traditional maps are regional compilations based on side scan sonar, sub-bottom profiling, grab sampling, etc. However a new series of maps based on multi-beam bathymetric data are now being produced.

For Placentia Bay (proper) the plan is to produce five 1:50,000 scale maps sheets. Last year multi-beam bathymetric mapping was conducted throughout much of Placentia Bay. However, some of the very shallow areas have not been mapped and will probably not be done under the current project.

Large-scale natural processes occur in the marine environment and Placentia Bay is an example of such. In one area of the bay there is evidence of a large-scale change with the removal of vast amounts of mud from the seafloor while on the other side of the bay there is a seafloor that has apparently not changed in 14,000 years.

Bathymetry is only half of the story in that the backscatter data associated with the survey can be used to identify types of sediment. For example, on the western side of the bay the seafloor has a strange topography, with drumlins and with hundreds of glacial ridges that formed underneath the last icesheet. On the seafloor these are covered with bouldery gravel, there are some bedrock outcrops, and several little patches of soft mud. The whole western side of Placentia Bay also has quite a hard bottom. To the southeast, these drumlin features disappear beneath a blanket of glacial mud, and further to the southeast there is a deposit of soft, recent mud. In this area there are iceberg furrows, some of which are up to 500 metres across, indicating that this entire landscape hasn't changed since the ice left the region. Radiocarbon dating of some of the cores collected last summer established that this is a 14,000 year old landscape, virtually untouched since the disappearance of the ice.

There are five areas in Placentia Bay for which map sheets are to be produced. For each, the first map that will be produced will be the multi-beam bathymetric map. The second will be the backscatter map. This backscatter map will be interpreted and contain a key indicating the type of bottom. The third map in the series will be the surficial geology map.

Several years back when work was started on the map series, it had been decided that the fourth map in the series would be a habitat map. Only one map has been produced: Brown's Bank. In the interim, the geological maps could be used as a step towards a habitat map.

It was noted in the presentation that the three cod spawning areas in Placentia Bay are all geologically different and those features are still being studied geologically.

For those interested in the wider area of the LOMA, there is another mapping project, being led by Ned King, who has completed an unpublished map for the area. He also has a vast database of geological information for the region. This summer mapping will occur in the Halibut Channel and side-scan sonar surveys will take place on St. Pierre Bank.

### *Discussion*

One of the workshop participants added that his organization had commissioned Dr. Gordon Fader to prepare a widespread classification and description of all the major seabed features throughout the northwest Atlantic, which would include the PBGB LOMA. They have some draft outputs from that initiative which they want to be a GIS where there are layers of classification of the major features, locations of the major banks and basins, and what characteristics they contain. It was suggested that it would be a good tool to serve as a proxy for different habitat and community types. He observed that Dr. Shaw's seascapes work would complement and supplement that initiative. Dr. Shaw noted that his work is specific to areas where there is detailed multi-beam bathymetric information. He noted, however, that the Geological Survey of Canada (GSC) is doing a classification of all of Canada's marine shelves.

Asked whether there is work being done to develop correlations between marine biota and different bottom types in cod spawning areas, Dr. Shaw responded that DFO's John Anderson has been looking at the substrate with reference to cod. The GSC approach is novel in that it provides complete coverage and during the coming year, the GSC will be looking at the spawning areas, as well as the areas surrounding them.

There has not been enough sampling or bottom photographs to prepare a detailed habitat classification map to date. However, it is possible that DFO may plan to make such a map and the present data would be an interim step. Such habitat maps would prove very valuable as we move to an ecosystem-based approach to management.

Multibeam is essential in order to understand many LOMA-level processes. With his background in fish habitat, a participant commented that when he saw the images of post-glacial tills, he also saw fish habitat. It is the areas of habitat complexity with mixed substrate types and mixed bedforms that are the most important.

Asked whether the imagery of the Southeast Shoal showed iceberg scours or artifacts, Dr. Shaw responded that there were artifacts; however he noted that others have also mapped iceberg scours.

In closing, Dr. Shaw asked if anyone has information about the cluster of shipwrecks in Placentia Bay, which he assumes are scuttled vessels, and if so to please contact him.

The presentation generated a great deal of excitement and appears to be the kind of information that will be very helpful in IM planning.

## **SECTION 12 – REVIEW OF REVISED COs - Dr. Ben Davis**

Acknowledging that there were a number of issues associated with the language of the COs, and that those issues were being considered and worked on, and that they will be part of the final document, the workshop proceeded to go through the revised list of COs based on workshop discussions to date. Setting aside the language, the primary focus would be on the list as it exists, considering what could be added or deleted, as well as the notes in the list.

It was proposed and agreed that the top-tier objectives be discussed at the workshop, but that participants provide written comments on the medium and low-tier objectives after the workshop. Participants would receive a summary of the key points of the discussion to assist with formulating the responses.

Surrounding a brief discussion on who's COs these are, it was determined that a qualifier that could be added in the SAR and/or the proceedings document in that these are "science-based" COs.

### **Working Group on Phrasing**

The rapporteur for the Language Working Group, Mariano Koen-Alonso, offered to go over the conclusions of the Language Working Group at this point in the meeting so that it might serve to allow framing of the objectives during the review.

Dr. Koen-Alonso reported that, firstly, there was agreement on a generic overarching conservation goal that should be in the document that states the conservation objectives:

"The COs stated below are intended to allow fulfilling the overarching conservation goals of promoting sustainable use of natural resources, conservation of biodiversity and conservation of the different ecological components and processes that constitute the ecosystem and define it as an integrated and fully functional system".

The generic phrase that was agreed upon and defined for areas, mainly, but which can be tailored for the other lists is:

"The objective is to [ensure] that the features listed below are not [permanently/long lasting] [altered/disrupted] by human activities to the point they can no longer be identified as a unique feature and/or serve the ecological function that initially triggered their identification as a significant feature.

Feature A  
Feature B  
...  
Feature Z"

Dr. Koen-Alonso explained that with this wording we have the objective of preventing alteration or disruption while at the same time we are qualifying what that alteration / disruption means in terms of human activities. Also the wording defines the goal to prevent those features from not fulfilling their functional role within the ecosystem. However, this also allows room for actual usage of those resources if that use does not cause functional alterations or disappearance of unique features. He said that the statements were a middle ground with which the members of the group were “fairly happy”.

### *Discussion*

One of the participants expressed some concerns about the temporal aspects of the proposed phrasing in terms of changes being “permanent or long-lasting”. Previously there were concerns raised about the legalities of the phrasing of COs. It was questioned whether inserting words such as “permanent” or “long-lasting” opens up a broader legal question. How, for example, would one define “long-lasting”? If there is a temporal aspect who decides where that limit is?

Mr. Koen-Alonso responded that is why the two are in brackets. The group was not able to come to a conclusion about the best way to make the statement. He said that the temporal scope of the alteration change refers to the altering the **functionality** of those features. If the disruption does not prevent those functions from being fulfilled then that would be an acceptable disruption. As long as the disruption prevents those functions from taking place, that would be a long-lasting disruption because it would prevent the ecological function from being carried forward. Bruce Chapman, another member of the working group, reiterated that the group did not have enough time to work through the temporal aspects, but the fact that it is in square brackets suggests that there is a disagreement where there probably isn't one. He added that the group was looking at the idea of deleting any temporal reference but it was linked to finding an alternative way to say “ensure”. Mr. Chapman also noted that “ensure” is a very strong word - it is a guarantee - and that if it were possible to find a strong action word that was not as strong as guarantee the view of the members of the group was that any reference to the temporal could be eliminated. Another participant added that, while many participants are uncomfortable with the word “ensure” there may be circumstances where the use of strong verbs may be appropriate to denote the importance of some COs.

Many of the participants expressed agreement with the addition of the words relating the changes back to the ecological function, noting that this provided greater clarity in terms of the more generic objectives that were discussed yesterday. It was pointed out that the key to temporal considerations would be the serving of the ecological functions and/or continuation of whatever the feature is as being unique. If the nature of the temporal disturbance, of whatever length, is such to interfere with that, it is an issue. If one were looking at some scale of physical alteration of habitat, the temporal nature of that would be related to the length of time involved in the recovery related to the various ecological functions supported. If it were to take a decade to recover, then that would not be very good if it were spawning habitat. It was also noted that a couple of participants had mentioned the desirability of phrasing COs as the definition of a state, as opposed to an action, or series of actions. If that approach were adopted, it might be possible to remove any verb from the first line and say that “the objective is that the features are not ...”.

Marty King, the third member of the working group, supported the participants comments and said that even the phrase “*The objective is*” could be deleted. He stated that what is wanted is “*the features listed below*”, therefore the phrase “*permanently and long-lasting*”, could be

deleted. He said that the “altered” and “disrupted” is qualified by the second half of the sentence. He commented that it could thus be condensed and the words open to interpretation no longer used.

One participant commented that the way it is now worded reads like it is a regulation. How can there be a quantitative measurement that there has been alteration and/or disruption? In addition, the use of terminology such as “unique feature” poses a problem in that there are many possible definitions of the term. It was expressed that this is qualifying the statement too much and suggested using the following: “*the objective is to ensure the features of this ecosystem are maintained*” and do not put any qualifying words in at all. Mr. Koen-Alonso reminded the workshop that “*unique*” and “*ecological function*” was used because they were the criteria for defining the EBSAs and “*unique*” was defined as one of the EBSA criteria.

The above discussion was recognized by the Chair as being very useful in the preparation of the next step-- to review the COs on an item-by-item basis.

### **Updated Conservation Objectives**

Notwithstanding the discussion over language, the list of COs, which was developed over the past year and a half, with additions and deletions from the previous day, was presented.

### **High Priority - EBSAs**

For the Southeast Shoal, the unique focus would be on: the benthic biomass; capelin spawning; yellowtail flounder nursery; and, shallow, sandy habitat.

One participant commented that there should be clarification of what is meant by benthic biomass. It was also pointed out that the area is a nursery for species in addition to yellowtail, including cod. There was also some difficulty with the notion of shallow, sandy habitat, since referring to the area as a highly dynamic oceanographic feature, and, based on work by Don Gordon, it is the understanding that disturbance of this habitat is not as worrisome as disturbance of some of the deeper mud habitat. Therefore it was hard to understand why this habitat is being featured more than other habitat that is even more sensitive.

The workshop was reminded that the shallow, sandy habitat was on the list because of the “unique” trigger in the EBSA guidelines, and that a significant portion of the explanations related to the discussion is information that is contained in the supporting documentation for the list. Other participants observed that the glacial history of the area makes the Southeast Shoal a unique area for capelin spawning, as well as for a number of other things. In addition, noting dredging as an activity which could alter such habitat.

With respect to the questionable uniqueness of “benthic biomass” by some, one of the participants added that the uniqueness of the benthic biomass could be based on two studies: one by a Russian, K.N. Nesis, in the 1960’s, which was a Grand Banks study of what he termed “biocoenoses”. That study reported that the Southeast Shoal had a benthic biomass of 5 kg/m<sup>2</sup> vs. the Grand Banks average of 157 g/m<sup>2</sup>. The other study was by Maclaren Plansearch, in which shell weight was factored in, and that study reported that the Southeast Shoal has a benthic biomass of 22 kg/m<sup>2</sup> vs. the Grand Banks average of 500 g/m<sup>2</sup>.

The Chair put forward for discussion “*Ensure that the feature, X, on the Southeast Shoal and Tail of the Grand Banks, is not disrupted by human activities: X including capelin spawning, cetacean feeding and seabird feeding*”.

Addressing that there will be duplication when “altered” and “disrupted” are viewed separately, it was agreed that it would be beneficial to condense the list as early as possible in the process, since “altered” and “disrupted” were to be nested in the actual objective statements, where “alter” or “disrupt” or both could be chosen as appropriate. E.g., both may be appropriate for Capelin spawning, so they are not mutually exclusive.

The previous day’s discussions had mentioned the possible importance of Sandlance on the Southeast Shoal. However, Sandlance is one of the important forage species throughout the Grand Banks as a whole and it was agreed by the group that it should be listed as a key trophic species.

The Chair moved the discussion to Southwest Shelf Edge and Slope noting the previous day’s discussion about whether the boundaries needed to be expanded to consider coral concentrations.

While background documents are not subject to examination at the workshop, they are subject to comments that could apply to later refinement of priorities. EBSA boundaries have been a topic of discussion within DFO, both in terms of how fixed they are and why they are where they are. Since this is a dynamic process, as more information becomes available, EBSAs may expand or shrink as appropriate.

The Chair put forward for discussion “*Ensure that X on the Southwest Shelf Edge and Slope is not altered by human activities*”, noting the inclusion of: seabird concentration; seabird biodiversity; coral concentration; coral biodiversity; highest groundfish biomass on the Grand Banks; species biodiversity; and, northernmost Haddock population.

The only question was whether seabird concentrations or groundfish biomass should be listed as unique features or whether it should be part of aggregation and ecological role in the context that the unique feature is not the seabird concentration, but whatever is causing that concentration. However, in terms of the CO, if what is driving species concentration is something that we are concerned about rather than the species, and is something which would fit into an IM process, then that is more appropriately the focus. It was agreed that since there could be another activity, such as bilge-water discharges, that could have an impact on the seabirds directly, but not on the capelin aggregations that were bringing them there, that seabirds should not be removed from the list.

The Chair put forward for discussion “*Ensure that X on the Southwest Shelf Edge and Slope is not disrupted by human activities*”, noting the addition of cetacean feeding; Hagfish, part of an experimental fishery; Gorgonian corals; Bamboo corals; and Grey sole from the previous day.

It was suggested and agreed that Hagfish should not be on the list just for the reason of an experimental Hagfish fishery.

It was discussed and agreed that corals, generally, should be on the list as opposed to Gorgonian corals having a higher priority such that they need special attention.



Returning to the discussion on seabirds it was noted that seabird feeding is being driven by the aggregations of other species. However, one does not want to disrupt the feeding, even if it is being driven by something else, where feeding goes back to the concept of critical life history processes, those things that should be protected. For seabirds, feeding areas are critical areas.

The Chair put forward for discussion “*Ensure that X on the Southwest Shelf Edge and Slope is not disrupted by human activities: reproduction and survival of Haddock; reproduction and survival of Redfish; and, seabird feeding, important to reproduction and overall survival.*”

There were no further conclusions from discussion on these priorities.

The Placentia Bay Extension was the next item opened for discussion by the Chair. It was noted that during the previous day’s discussion it was questioned whether this area is too big and diverse and whether it should be broken into smaller areas. There was also the suggestion that areas within Placentia Bay should be added. It is well known that Placentia Bay is one of the highest stakeholder-use areas and more information is needed about the ecological effects of various uses, and as such, there will be expectations that significantly more information will be needed for planning and decision making. The focus of the workshop was to remain with the currently proposed COs.

Revisiting the previous day’s discussion of the area’s unique components, and the largest spawning stock area for Atlantic Cod it was questioned whether the issue is the maintenance of significant spawning areas for Atlantic Cod or the stock size which would be an aggregation. The discussion lead to consensus that the qualifier of “largest spawning stock” should be removed and the notation should relate to the spawning and survival of Cod in Placentia Bay since it is one of a remnant of large cod spawning areas versus the shelf break and slopes which historically were significant cod spawning areas.

### **High Priority - Rare and Depleted Species**

Given that Rare and Depleted Species lists were derived from pre-existing lists, this was an area where scientifically-based additions were requested.

Noting that the NAFO stocks under moratoria are a component of the list, it was pointed out that there may also be domestic stocks under moratoria that are not on the list.

Considering whether Right and Blue whales should be considered for inclusion, it was stated that Blue whales is a listed species and therefore should occur on the priority list. However, the Right whale status is more difficult to determine since the Right whale occurs occasionally throughout the LOMA, but the frequency is unknown. For the first time in 30 years, there will be a survey in the area this summer.

It was suggested that the list of Rare and Depleted Species appears to have been developed based on information over the last decade, and that if the timeframe were expanded the list would be significantly changed. For example, herring stocks were very abundant, and heavily fished, on the South Coast in the 1950’s and early 1960’s and subsequently collapsed, as did haddock. In turn, it was agreed by participants that South Coast Herring and 3NO haddock be included, as well as any other species under moratoria identified by DFO Aquatic Resources staff.

### **High Priority - Degraded Areas**

To date, the focus for degraded areas has been Placentia Bay, and specifically to the Argentia area where the objective is to “*ensure the restoration of Argentia in Placentia Bay to the level tasked by PWGSC*”.

It was the understanding of several participants that the Argentia restoration had been completed. It was also recognized that there remains pockets of contamination in Placentia Bay, but that their effect at the LOMA-scale is largely unknown. A number of studies using blue mussels to look at heavy metals as well as monitoring programs associated with a number of sites, including Argentia, Long Harbour, Come by Chance, the Trans-shipment Terminal, and the shipbuilding facilities on the Burin Peninsula, indicate that the scale of effect is miniscule or non-existent on a Bay-wide scale, even at Argentia. Unknown, unquantified dumpsites that cannot be found, as well as chronic oiling of birds and shorelines, remain a concern.

The Chair said that while the Degraded Areas component is important, there is not sufficient information to determine whether a CO can be scientifically identified at the Degraded Areas level for Placentia Bay. It would appear that, while there are areas that should be further investigated, there is not sufficient information to demonstrate that it qualifies as a Degraded Area for the LOMA.

### **High Priority - Ecologically Significant Species and Community Properties**

The discussion on ESSCPs opened, recognizing the possibility that the current list may change based on new models and new data. The 2J3KLNO data used for the current model were from 1985 – 1987 and may not be applicable to the Grand Banks because it included areas to the north of the LOMA. Additionally, shrimp and crab are more important to the ecosystem now; whether economic or ecological is to be evaluated further. While there are no new data for shellfish, shrimp did not make any ecological difference in the model for the Scotian Shelf when comparing data from the 1990's versus the 1980's.

One of the participants elaborated by adding that while the latest models, using data from 1995, have not yet been fully analysed, there is some preliminary information available. These limited results show that in only four cases is the percentage of crab and shrimp in the diet of other species higher than ten percent. Those species are: walrus; dogfish; demersal and benthic-pelagic piscivores <= 40cm; and, Greenland cod. Therefore, from an ecological point of view, and in the absence of detailed analysis, it would currently appear that shrimp and crab are not significant prey species.

The current objective is “*to ensure that the highest priority species are not perturbed by human activities to the point where they are unable to fulfill their ecological role within the ecosystem.*”

Given earlier discussions about the lower food web, it was suggested that phytoplankton and zooplankton, which do have an effect on many of the species on the list, should be included as a priority. This was supported by considering total impact and keystone calculations separately, where both were near the top of each list.

It was also suggested that, given all the models are based on data from 2J3KLNO, hooded seals be removed since they are not present in the LOMA area.

Finally, it was questioned whether Greenland Halibut should be on the list since, in the eastern part of the LOMA, it is fed from along the Slopes further north and has a very geographic-specific role. It was agreed that this would be considered in light of the comments.

Some questions arose surrounding inshore species in the analysis of ESSCPs. While the models did not include inshore/nearshore areas due to lack of data, it was considered important by the group to note the question/concern for future consideration. It is clear that there are many inshore coastal issues that are not applicable to the whole of the LOMA, while others have been excluded due to lack of information and/or resources.

It was acknowledged that there has been a very vigorous debate about how lists are generated. At a meeting in Moncton several years ago it was determined that due to data gaps, emerging and disappearing species, and other factors it was not possible to develop the lists exclusively from models. It was agreed to adopt a “Delphic approach” wherein if there is a critical mass of information, the subject-matter experts agree on what should be on the list. The benefit of this process, with is different from the traditional scientific approach, is that it avoids excluding the obvious when there is no empirical evidence on which to base the decision. Frequently it is a combination of the two processes which decides on whether to include something on a list.

The model which generated the initial listings used data from the mid-1980's that covered an area larger than the LOMA. Therefore, when applying the results to the LOMA, hooded seals would be discarded because they are not found on the Grand Banks. While things like zooplankton are showing up, they were not on the list because of the ranking of their occurrence in the output. In addition, cetaceans and sandlance would likely move up the scale as the data becomes restricted to the LOMA boundaries.

The ESSCP list was initially based on total impact, which was felt to be the best measurement for the development of such a list. However, a “keystoneness” list was developed as well since ESSCP analysis required using a model which was not for the right period of time nor the right area. Adding “keystoneness” and taking the average of the two was hoped to result in a list which was a more biomass-independent measurement of potential impact.

Further, it was explained that when defining the criteria for significant species it was found that some life stages of certain organisms fulfil an important role but other stages may not. When this occurs, it is implied that it is necessary to conserve all stages of the life cycle and this would trigger conservation actions regarding those inshore areas and juveniles.

The Chair put forward for discussion “*Ensure no net loss, due to human activities, of structural habitat provided by corals and sponges, eelgrass, rockweed and kelp*”.

Noting that previous objectives had not set reference points, one participant observed that “no net loss” is a strategy, not an objective and was prepared to discuss the strategy of no net loss for corals as an example. In response to the Chair's comment that it would be speculative to have such a discussion at this time, the participant felt that a better understanding of what is intended is necessary since this wording has very serious implications for a number of physical areas within the LOMA, and offered to take the

afternoon to discuss the wording, expressing the opinion that it was too serious to be dealt with through other communication at a later date.

It was of the opinion of another participant that the wording was derived from policies related to habitat management. The policy of no net loss is a tiered approach where the first tier is replacement of like-for-like habitat in the same spot and, if that is not possible, the next tier is the replacement of like-for-like in a different place. The next tier would be the replacement of unlike habitat for like. However, this policy doesn't apply to fishing and it may not be possible to apply it to the *Oceans Act* since it is related to the *Fisheries Act* and has been established in court that it doesn't apply to fishing.

The Chair expressed reluctance to have a discussion around this in the absence of a clear understanding of what the intent is since a lot of time could be wasted making assumptions.

It was still felt that the discussion is necessary, with the clarification presented first, and then a consideration of the implications. Although it was acknowledged that this is the next step, and noting that this is a dynamic process, concern was still shown over how this could be incorporated in a Science Advisory Report (SAR) from this workshop without discussion and understanding first.

The Chair agreed and proposed that this item be set aside completely until its implications are fully understood and not have it appear in the SAR until there is "informed consent" on what the intent is, and there has been a discussion about the implications.

Another participant commented that no net loss has very specific meanings in many countries, and suggested changing it to the phrase "*no functional loss*" in order to ensure the continued role of these species, both in terms of providing habitat as well as primary production. Therefore, what is trying to be ensured is the continued functionality of the ecosystem, while moving away from the very fixed parameter of net loss.

It was also suggested that it would be necessary to be able to measure all the structural habitats in the entire LOMA in order to say that there is no net loss and that is not feasible. The guidance document states that "the science advice at the IM stage would specify the indicators for how the status of the habitat provided by the species would be measured". The Chair said he is reluctant to get into the next steps of the process, as this is outside of the scope of the meeting.

Another participant commented that, given the nature of the earlier discussion, describing the states of affairs rather than means of getting there, leaving the language in would be the de facto declaration of a management technique and not a state of affairs. This was noted as another reason to set this aside for future consideration.

Moving to discuss the objectives to "*Prevent non-authorized introduction of invasive species*", "*Control the spread and abundance of invasive species*"; and "*Control the spread and abundance of harmful and toxic species*", it was suggested that since this refers to the introduction of aquatic invasive species through human activities, and that there are processes and programs in place within DFO already examining this, that this item be left as is.

## **SECTION 13 – WORKSHOP CLOSING**

The Chair noted the completion of the top tier lists. He reminded participants of the earlier agreement to review the medium and low tiered elements, referencing the documentation to be provided shortly. He said that there were a number of follow-up items and undertook to have a reasonably quick turn-around for the documentation and asked participants to provide feedback promptly.

The Chair acknowledged interest in the IM process but noted disappointment that in the recent Federal Budget the funding for follow-on work was not as rich as had been hoped. Ongoing relationships with various stakeholders, including the NAFO working group; the World Wildlife Fund; GEAC and the Northern Shrimp Research Foundation; and the Fish Food and Allied Workers (FFAW) Union were also acknowledged. He said that the Regional Director-General is anxious to examine how to further this work.

Finally, the Chair thanked the participants and offered specific thanks to Nadine Templeman who had shepherded the process during the past two years. He also thanked Nadine Wells for her work in setting up and delivering this workshop. Finally, he expressed his thanks to Mariano Koen-Alonso and other DFO scientists for their contributions.

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## APPENDIX A – Workshop Participants

### Workshop to Review Science Considerations in the Development of Conservation Objectives for the Placentia Bay-Grand Banks Large Ocean Management Area 1-2 May 2007, Clovelly Golf Club, St. John's, NL

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## **APPENDIX B – Terms of Reference**

### **Workshop to Review Science Considerations in the Development of Conservation Objectives for the Placentia Bay-Grand Banks Large Ocean Management Area**

The Gazebo, Clovelly Golf Club  
Stavanger Drive, St. John's, Newfoundland and Labrador  
May 1-2, 2007

Meeting Chairperson: Dr. Ben Davis, Manager, Environmental Sciences Division, DFO,  
Newfoundland and Labrador Region

## **TERMS OF REFERENCE**

### **Background**

Under Canada's Oceans Action Plan (OAP), Integrated Management Plans will be developed in five Large Ocean Management Areas (LOMAs). These Integrated Management Plans will include a number of Ecosystem Objectives (EOs) against which ecosystem status and management success can be measured. Ecosystem Objectives are defined based on a combination of "Desirable State" Objectives and Conservation Objectives. "Desirable State" Objectives are based on Social, Cultural and Economic Considerations (the human component) of the ecosystem. Conservation Objectives are science-based and are related to the status of the non-human components of the ecosystem. They are intended to protect parts of the ecosystem from serious or irreversible harm. They are traceable to sound science processes and are defensible on objective grounds.

Under OAP, Conservation Objectives are based on the following four sources: Ecologically and Biologically Significant Areas (EBSAs), Ecologically Significant Species and Community Properties (ESSCPs), Depleted and Rare Species and Degraded Areas. These four lists are merged into a single set of conservation priorities for the LOMA based on a number of criteria. Conservation Objectives are to be established for each of these priorities.

### **Objectives**

DFO Science will provide an overview of EBSAs, ESSCPs, Depleted and Rare Species and Degraded Areas for the Placentia Bay-Grand Banks (PBGB) LOMA, as well as the merged list of the above four components, which are expressed as conservation priorities. The objective of this meeting is to consider and agree on scientifically-based Conservation Objectives that have already been drafted for each of the conservation priorities for the LOMA. This objective will be met by following the guidelines laid out in the "Guidance Document on Identifying Conservation Priorities and Phrasing Conservation Objectives for Large Ocean Management Areas", which was developed at a January 2007 National Workshop.

## **Products**

The products coming out of this meeting will include a CSAS Proceedings Report and Science Advisory Report.

## **Participation**

Participation will be solicited regionally from the following:

- DFO Science, Oceans and Habitat, Fisheries Management, Policy & Economics, Newfoundland and Labrador Region
- Other Federal Departments and Agencies
- Provincial Department of Fisheries and Aquaculture
- Fish Food and Allied Workers Union
- Academia
- Non-Governmental Organizations
- Industry Representatives

## APPENDIX C – Workshop Agenda

### Workshop to Review Science Considerations in the Development of Conservation Objectives for the Placentia Bay-Grand Banks Large Ocean Management Area

Clovelly Golf Course, Stavanger Dr., St. John's, NL  
May 1 – 2, 2007

Chair : Dr. Ben Davis

#### AGENDA

*Please note: the following is a tentative agenda and may change as the meeting progresses.*

#### May 1 (Tuesday)

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0900 – 0930	Welcoming remarks  Workshop objectives and proposed process
0930 – 0945	Overview of the Oceans Action Plan (OAP) and Integrated Management (IM)
0945 – 1000	Question period
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1000 – 1020	Health Break
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1030 – 1130	DFO Science activities under OAP 1 <ul style="list-style-type: none"><li>• EOAR</li><li>• EBSAs</li><li>• ESSCPs</li><li>• Depleted and Rare Species</li><li>• Degraded Areas</li></ul>
1130 – 1145	Introduction to the National Framework and Guidelines for Setting Conservation Objectives
1145 – 1200	Question period
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1200 – 1300	Lunch
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## **May 1 (Tuesday) ... cont'd**

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1300 – 1320	Overview of Conservation Priorities for the PBGB LOMA
1320 – 1400	Overview of Conservation Objectives for the PBGB LOMA
1400 – 1430	Subgroup discussions on Conservation Objectives
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1430 – 1445	Health Break
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1445 – 1530	Roundtable – Questions, issues, and discussion from subgroups
1530 – 1630	Roundtable – Suggested revisions for Conservation Priorities and Objectives
1630	Wrap-up and planning for the next day

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## **May 2 (Wednesday)**

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0900 – 0930	Summary of the first day
0930 – 1030	Continuation from Day 1 work on Conservation Priorities and Objectives (if required); and Review of revised Conservation Objectives
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1030 – 1045	Health break
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1045 – 1200	Ecosystem Based Science - Next steps and future considerations (Presentation and discussion)
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1200 – 1315	Lunch
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1315 – 1400	Review of Workshop discussions and key points
1400	Conclusion of the Workshop

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