



CONSERVATION OBJECTIVES FOR THE ECOLOGICALLY AND BIOLOGICALLY SIGNIFICANT AREAS (EBSA) OF THE ESTUARY AND GULF OF ST. LAWRENCE

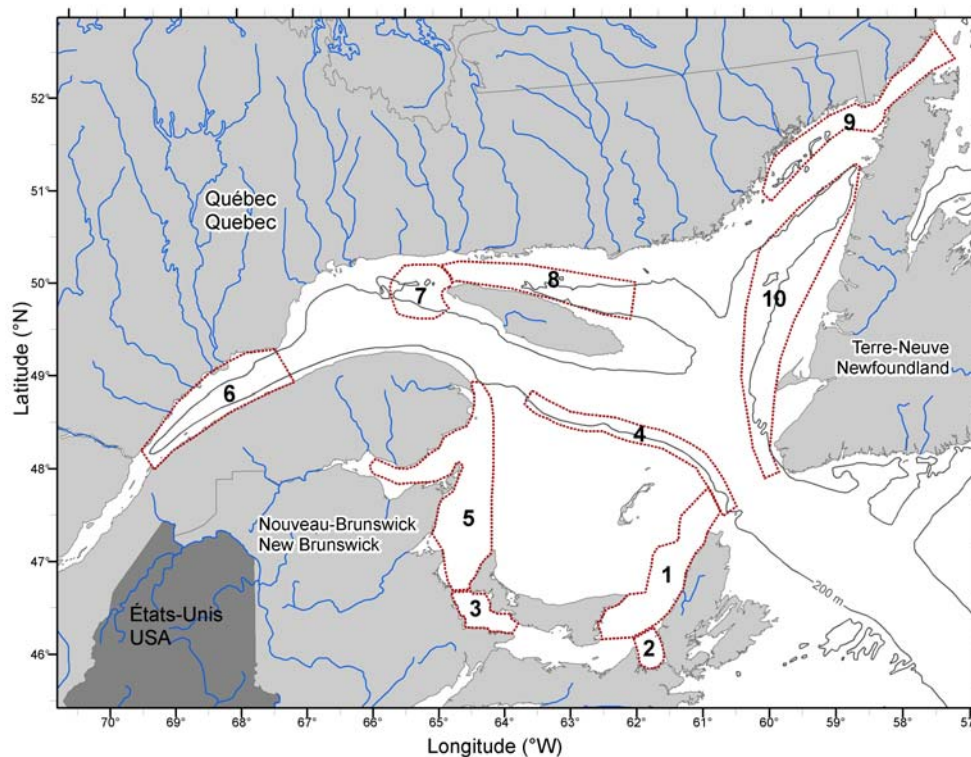


Figure 1: Map of the Large Oceans Management Area (LOMA) for the Estuary and Gulf of St. Lawrence showing the previously identified Ecologically and Biologically Significant Areas (EBSA). EBSAs in order: 1) western Cape Breton, 2) St. George's Bay, 3) Northumberland Strait, 4) the southern fringe of the Laurentian Channel, 5) the south-western coast of the Gulf, 6) the lower estuary, 7) western Anticosti Island, 8) northern Anticosti Island, 9) the Strait of Belle Isle, and 10) the west coast of Newfoundland.

Context

One of the important deliverables requested of DFO Science Branch within the framework of the Oceans Action Plan (OAP) is to produce conservation objectives for the purpose of preserving the integrity of the areas and species that have a major role to play in how the targeted marine ecosystems are structured and function. The Estuary and Gulf of St. Lawrence was identified as one of the five Canadian Large Ocean Management Areas (LOMA) for which a series of conservation objectives would be developed. These conservation objectives are intended to guide managers and other ecosystem users throughout the Integrated Management process of human activities that will be carried out there, by establishing the

safe limits within which the social, cultural and economic objectives will be established.

The conservations objectives were developed by Science during a scientific peer review process of experts' consultations. Participants from the three DFO administrative regions bordering the LOMA (Gulf, Newfoundland and Labrador, and Quebec) as well as from other federal and provincial departments met in a workshop in Montreal, Feb. 27 to March 1, 2007. This advisory report was drafted after the workshop based on the discussions and conclusions of the workshop participants and finalized by an editorial and review group from DFO Science personnel from the three administrative regions.

SUMMARY

- A general conservation objective common to each of the ten Ecologically and Biologically Significant Areas (EBSA) was developed:

Ensure that the features of the EBSA related to its uniqueness, which make the area appropriate for aggregation and / or that ensure the reproduction and survival of the dependant species in that area (fitness consequences), are not altered by human activities.

- Consensus was reached on assigning a priority to the ten EBSAs with seven categorized as first priority and three EBSAs classified as second priority.

BACKGROUND

Three essential steps completed previously led to the development of the conservation objectives for the Ecologically and Biologically Significant Areas (EBSA) of the Estuary and Gulf of St. Lawrence (EGSL) Large Oceans Management Area (LOMA):

- the development of an approach to define EBSAs (DFO 2004, 2006),
- the definition of the EBSAs in the EGSL (DFO 2007a; Savenkoff et al. 2007), and
- the development of an approach to identify conservation priorities and phrasing of conservation objectives for the EBSAs (DFO 2007b, 2007c, 2008).

The EBSAs were identified during a workshop held in December 2006 (DFO 2007a; Savenkoff et al. 2007). Research documents were produced for most of the biological information layers that helped determine the EBSAs which are the subject of the conservation objectives exercise in the present document. A subsequent workshop in February-March 2007 reviewed and classified the previously identified EBSAs into two priority levels (DFO 2007c). A conservation objective for the EBSAs was subsequently prescribed following the general guidelines developed by DFO (DFO 2007b, 2008).

The Ecologically Significant Species (ESS), Ecologically Significant Community Properties (ESCP), the list of rare or depleted species, as well as the degraded areas were not considered at this time as elements that could help in developing conservation objectives since they had not yet been reviewed in detail.

ANALYSIS

Conservation objectives for the EBSAs

During the scientific review of December 2006, ten (10) EBSAs covering 77,184 km², equivalent to 30% of the surface area of the EGSL were identified, mapped and described (Figure 1; DFO 2007a). These EBSAs (in no order of priority) are:

- Western Cape Breton,
- St. Georges Bay,
- Western Northumberland Strait,
- Southern fringe of the Laurentian Channel,
- South-western coast of the Gulf (including Chaleur Bay),
- Lower Estuary,
- Western Anticosti Island,
- Northern Anticosti Island,
- Strait of Belle Isle (including Mecatina trough), and
- West coast of Newfoundland.

The conservation objective for the EBSAs in the EGSL reads as follows:

Ensure that the features of the EBSA related to its uniqueness, which make the area appropriate for aggregation and / or that ensure the reproduction and survival of the dependant species in that area (fitness consequences), are not altered by human activities.

Prioritization of the EBSAs

The relative importance of the EBSAs (priority level) was assigned during a workshop in 2007 (DFO 2007c). The exercise consisted of placing each of the EBSAs into one of two levels of priority, based on three criteria of consideration: first, the EBSA itself, second the species and stocks of concern, and third, the structural and functional properties of the ecosystem. This analysis was conducted independently by four sub-groups during the workshop with brief points to support the prioritization attributed by each sub-group. Differences in the initial priority level assigned by the sub-groups most often were the result of differences in expertise among the sub-groups. Following discussions in plenary, a consensus priority ranking was attained with seven of the ten EBSAs in the EGSL assigned a priority level 1 and the three remaining EBSAs a priority level 2.

A complete description of the characteristics of the biological components for each EBSA are available in DFO (2007a) and Savenkoff et al. (2007). The characteristics considered during the identification and prioritization process consisted of the following biological component groups : primary production, secondary production, meroplankton, benthic invertebrates, pelagic fishes, demersal fishes, and marine mammals (Savenkoff et al. 2007). The key characteristics of the EBSA that relate to its uniqueness, which make the area appropriate for aggregation and / or that ensure reproduction and survival of the dependant species in that area are summarized in the following section specifically for each EBSA.

First Priority

Western Cape Breton

- The Western Cape Breton EBSA (number 1 in Figure 1) covers 8,198 km², or 3.2% of the EGSL.
- It is part of a larger region (Chaleur Bay and the South-western Gulf coastal area) which has the largest array of meroplanktonic species (witch flounder exclusively north of the area, Atlantic cod, winter flounder, American plaice, yellowtail flounder, decapod crustaceans, etc) as well as the highest meroplankton abundance (eggs and larvae) among all the identified areas in the Gulf.
- Throughout the Gulf, there is no greater area for small (<1 mm) mesozooplankton production.
- The Cape Breton trough is the main annual migration route (spring and fall) for Southern Gulf cod and the Southern Gulf white hake coastal component. It also represents the key summer feeding grounds for many demersal fish, such as adult witch flounder in southern Gulf and white hake.
- The Cape Breton trough has very high concentrations of benthic species or a collection of widely distributed (brittle stars) or very widely distributed (starfish, basket star, hermit crab) benthic invertebrates.
- It is also a significant area for marine mammals relative to the diversity of species. This area is utilized in winter by grey seal, hooded seal and harp seal and the ice transports easterly the pups born further west. In summer, numerous species represented elsewhere in the Gulf are found here as well as species typical of the Scotian Shelf (striped dolphin, white whale, and pilot whale).

St. Georges Bay

- The St. George's Bay EBSA (number 2 in Figure 1) covers 1,216 km², or 0.5% of the EGSL. The area is shallow (<40 m).
- The area is distinguishable mostly for its major role for meroplankton as well as for groundfish and pelagic fish.
- As in the adjacent area (Western Cape Breton), this area is part of the southern section of the Gulf where the largest array and abundance of meroplanktonic species in the Gulf are observed.
- It is also one of the areas in the southern Gulf where several pelagic fish species (alewife, spiny dogfish, Atlantic herring, mackerel) can be found in high densities, presumably to feed.
- White hake, a species in decline and presently at low abundance in the Gulf, is particularly vulnerable in this area as it is the principal spawning, rearing and summer feeding area for the coastal component of the stock in the Gulf.
- St. Georges Bay and the eastern Northumberland Strait to Charlottetown is an important zone for haul-out of grey seals on the ice and on the shores from the end of December into January.

Western Northumberland Strait

- The western Northumberland Strait EBSA (number 3 in Figure 1) covers 2,194 km², or 0.9% of the EGSL. It is shallow (<20 m).
- This area of the Gulf has the highest annual water temperature and annual temperature cycle amplitude.
- An isolated population of calico crab (*Ovalipes ocellatus*, endemic species or sub-species) occurs in this area where it spends its entire life cycle.

- Almost half the winter skate population of the Gulf, which has been declining for over thirty years, is concentrated in this area and in the southernmost part of the adjoining area (South-western coast of the Gulf) in summer and fall.
- Several other groundfish species with limited distribution (particularly white hake and windowpane) are found in high density in the area.

South-western coast of the Gulf (including Chaleur Bay)

- The south-western coast of the Gulf including Chaleur Bay (number 5 in Figure 1) covers 13,506 km², or 5.3% of the EGSL.
- Zooplankton production and accumulation is seasonally considerable in the area and these concentrations can represent an important biomass for the entire Gulf.
- The production of small zooplankton (copepods < 1 mm) and the accumulation of larger zooplankton (*Calanus* type copepods > 1 mm, euphausiids) is considerable in this area and these concentrations of prey organisms explain why most important pelagic fish such as Atlantic herring, capelin, Atlantic mackerel and American smelt feed in the area.
- This area represents an important part of the Atlantic mackerel spawning area and, historically, also for southern Gulf Atlantic cod.
- It is part of a larger region (southern Gulf) which has the greatest abundance in terms of species as well as having the most abundant eggs and larvae from different marine organisms throughout the entire Gulf.
- The area contains several benthic invertebrate species with abundance varying from high (starfish, basket stars, *Eualus macilentus*, *Pandalus borealis*, *Pandalus montagui*, and snow crab) to average (ascidians, sponges, anemones, urchins, whelks, sea scallops, Icelandic scallops, squid, Northern Atlantic octopus, *E. macilentus*, *E. fabricii*, *Spirontocaris spinus*, *Lebbeus polaris*, *Lebbeus groenlandicus*, *Argis dentata* and Arctic lyre crab).
- Chaleur Bay is an overwintering area for southern Gulf juvenile herring and this area as well as the Shediac valley are the main feeding areas for southern Gulf herring. Shediac Valley is also a significant zone for many biological functions (feeding, shelter, spawning) for other pelagic fish species (alewife, spiny dogfish, capelin, mackerel, rainbow smelt).
- The areas of the Gaspé peninsula and the channel to the east of the peninsula are significant feeding areas for several marine mammal species with species composition varying seasonally. The area is used by blue whale (endangered species according to the Species at Risk Act). Anecdotal information indicate that the area is also used by North Atlantic right whale, which is also an endangered species.

Lower Estuary

- The lower Estuary EBSA (number 6 in Figure 1) covers 9,046 km², or 3.5% of the EGSL. It is characterized by an estuarine water circulation and by the Laurentian Channel that crosses the area's entire length. The channel reaches depths of around 300 meters.
- The exceptional hydrographical conditions at the head of the channel provide considerable nutriment input.
- Deep waters across the estuary have less than 30% oxygen saturation and some areas only have 20%, a low saturation level which is lethal for certain species, such as Atlantic cod.
- A strong production of phytoplankton (generated by upwellings containing high levels of nutrient elements) can usually be observed starting in June and this productivity then moves downstream from the Estuary until August. These rich waters also support a strong primary production in the north-western and southern Gulf.
- There is also a strong production of zooplankton in summer and fall, and strong biomass accumulations in fall and winter. It is a significant accumulation area in winter in deep

waters for mesozooplankton (>1 mm) and potentially for macrozooplankton throughout the Gulf.

- It is a high area of concentration for juveniles of turbot, witch flounder and thorny skate.
- There is a high level of marine mammal biomass throughout the year and this area is especially significant for the St. Lawrence beluga, which spends its entire life cycle there.

Strait of Belle Isle (including the Mecatina trough)

- The strait of Belle Isle EBSA (number 9 in Figure 1) covers 7,403 km², or 2.9% of the EGSL. This north-eastern part of the Gulf has a particularly complex topography.
- The Strait of Belle Isle is very important for *Lebbeus groenlandicus* shrimp and represents the only area in the Gulf where *Eualus gaimardii gaimardii* shrimp have been observed. It is also a very significant area for a few shrimp species that are somewhat limited in their distribution elsewhere (*Lebbeus groenlandicus*, *E. gaimardii belcheri*) and for a few invertebrate species (ascidians, starfish, basket stars, *Sclérocragon boreal*, *E. fabricii*, *E. macilentus*, *S. spinus*, *L. polaris*, *Pandalus montagui*, *Sabinea septemcarinata*, *Argis dentata*, sepiola and *L. microceros*) that are limited or somewhat limited in their distribution elsewhere.
- The Strait of Belle Isle is the main area for spawning of the fall herring component of the northern Gulf. It is also an area with high concentrations of capelin (and marine mammals) and other pelagic species (spiny dogfish and sand lance).
- It is also an extremely significant and diverse area for large cetaceans and several other piscivorous (fish eating) marine mammal species.

West coast of Newfoundland

- The west coast of Newfoundland (number 10 in Figure 1) covers 18,238 km², or 7.1% of the EGSL.
- It is a significant spawning area for the Northern Gulf cod stock.
- Fish larvae, particularly capelin and herring, are found in significant quantities in the coastal region north of the Port-au-Port Peninsula.
- The Esquiman Channel is the only known overwintering area for Northern Gulf herring and capelin (head of the Channel). The mouth of the Channel and Cabot Strait are also known for the strong aggregations of these pelagic fish species that feed there.
- High aggregations of juveniles of northern Gulf cod, redfish, American plaice and Atlantic wolfish are found in this EBSA.
- It represents the main migration corridor (spring-fall) for northern Gulf cod, redfish and other demersal fish species.
- Serving as a feeding area for marine mammals, it is also moderately unique in the terms of the diversity and biomass of marine mammals observed.

Second Priority

Southern fringe of the Laurentian Channel

- The southern fringe of the Laurentian Channel (number 4 in Figure 1) covers 5,941 km² or 2.3% of the EGSL. It covers almost the entire length of the Gulf west to east. The southern slope of the channel has a steep vertical drop from almost 100 m to over 300 m.
- Several significant biological functions (i.e. feeding, migration, shelter) for many fish species (e.g. Atlantic herring, capelin, white barracudina, spiny dogfish, pollock and silver hake for example) occur there.
- This area only partly covers the significant areas for groundfish. The Cape Breton Channel serves as a migration corridor (spring and fall) to the Atlantic for Atlantic cod (southern Gulf

stock), for white hake (coastal component of the stock) as well as for other groundfish species. It serves as an overwintering area for the southern Gulf Atlantic cod population but the highest concentrations of overwintering southern Gulf cod extend eastward and outside the boundary of this EBSA.

Western Anticosti Island

- The western Anticosti Island EBSA (number 7 in Figure 1) covers 3,822 km², or 1.5% of the EGSL.
- It is a significant vertical mixing area (north-western Gulf) and a significant accumulation area for phytoplankton and zooplankton caused by the Gyre and the Gaspé current. It also seems to be very significant for mesozooplankton (>1 mm) reproduction, recruitment and retention in the north-western Gulf and Lower Estuary.
- It is part of the Anticosti Island region which is remarkable for its high densities of fish eggs and larvae (particularly cod and winter flounder eggs, sand lance and Arctic shanny larvae) and decapod crustaceans.
- It is part of an important area (Jacques-Cartier Strait) for two shrimp species (*Lebbeus groenlandicus* and *L. microceros*) and one shrimp sub-species (*Eualus gaimardii betcheri*) of limited distributions, for significant Icelandic scallop beds and for several species of limited or somewhat limited distribution in the Gulf (several other shrimp species, green sea urchin, sea cucumber, sponges, jellyfish, sepiola, starfish, basket stars, brittle stars and hermit crabs).

Northern Anticosti Island

- The northern Anticosti Island EBSA (number 8 in Figure 1) covers 7,620 km², or 3% of the EGSL.
- It is part of the Anticosti Island region which is remarkable for its high densities of fish eggs and larvae (particularly cod and winter flounder eggs, and sand lance and Arctic shanny larvae) and decapod crustaceans.
- It is also part of an important area (Jacques-Cartier Strait) for two shrimp species (*Lebbeus groenlandicus* and *L. microceros*) and one shrimp sub-species (*Eualus gaimardii betcheri*) of limited distribution, for significant Icelandic scallop beds and for several species of limited or somewhat limited distribution in the Gulf (several other shrimp species, green sea urchin, sea cucumber, sponges, jellyfish, sepiola, starfish, basket stars, brittle stars and hermit crabs).
- It is also a significant aggregation area for fin whales, blue whales, humpback whales and harbour porpoise.

CONCLUSION

The formulation of conservation objectives for the Estuary and Gulf of St. Lawrence LOMA is an important step leading to the development of an integrated management approach for the ecosystem in question. Sources of uncertainty and problems surrounding the identification and prioritization of EBSAs have been discussed in previous documents (DFO 2007a; 2007c; Savenkoff et al. 2007). The EBSA boundaries are not strict and definite and can be refined in order to effectively use this tool in a management approach.

The national guidance stating that “specificity in phrasing of a final Conservation Objective should be sufficient that it should be possible to select an appropriate indicator(s) and reference point(s) with no additional unpacking” (DFO 2007b), was somewhat difficult to follow. For cases

where indicators and reference points cannot be derived from information specific to the species or groups of species, we recommend that the precautionary approach guiding principles be applied.

Finally, the conservation objective for the EBSAs identified in the current document was developed based on current scientific knowledge of species and areas. Therefore, the conservation objectives for the Estuary and Gulf of St. Lawrence LOMA should be re-evaluated and/or redefined periodically to ensure that new knowledge on ecosystem functions and on significance of areas and/or species can be appropriately considered.

SOURCES OF INFORMATION

Castonguay, M., and S. Valois. 2007. Ecologically and biologically significant areas for demersal fishes in the northern Gulf of St. Lawrence. DFO Can. Sci. Advis. Secr. Res. Doc. 2007/014.

Chabot, D., A. Rondeau, B. Sainte-Marie, L. Savard, T. Surette and P. Archambault. 2007. Distribution of benthic invertebrates in the Estuary and Gulf of St. Lawrence. DFO Can. Sci. Advis. Secr. Res. Doc. 2007/018.

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

DFO. 2006. Proceedings of the Zonal Workshop on the Identification of Ecologically and Biologically Significant Areas (EBSA) within the Gulf of St. Lawrence and Estuary. DFO Can. Sci. Advis. Secr. Proceed. Ser. 2006/11.

DFO. 2007a. Ecologically and Biologically Significant Areas (EBSA) in the Estuary and Gulf of St. Lawrence : identification and characterization. DFO Can. Sci. Advis. Secr., Sci. Advis. Rep. 2007/016.

DFO. 2007b. Guidance Document on Identifying Conservation Priorities and Phrasing Conservation Objectives for Large Ocean Management Areas. DFO Can. Sci. Advis. Secr., Sci. Advis. Rep. 2007/010.

DFO. 2007c. Development of Conservation Objectives for Integrated Management in the Estuary and Gulf of St. Lawrence (GOSLIM); February 27 to March1, 2007. DFO Can. Sci. Advis. Secr. Proceed. Ser. 2007/007.

DFO. 2008. Further Guidance on the Formulation, Prioritization, and Use of Conservation Objectives in an Ecosystem Approach to Integrated Management of Human Activities in Aquatic Ecosystems. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2008/029.

Dufour, R. and P. Ouellet. 2007. Estuary and Gulf of St. Lawrence Marine Ecosystem Overview and Assessment Report. Can. Tech. Rep. Fish. Aquat. Sci. 2744E : vii + 112 p.

Lavoie, D., M. Starr, B. Zakardjian and P. Larouche. 2007. Identification of ecologically and biologically significant areas (EBSA) in the Estuary and Gulf of St. Lawrence : Primary production. DFO Can. Sci. Advis. Secr. Res. Doc. 2007/079.

Lesage, V., J.-F. Gosselin, M. Hammill, M.C.S. Kingsley and J. Lawson. 2007. Ecologically and Biologically Significant Areas (EBSAs) in the Estuary and Gulf of St. Lawrence – A marine mammal perspective. DFO Can. Sci. Advis. Secr. Res. Doc. 2007/046.

Ouellet, P. 2007. Contribution to the identification of ecologically and biologically significant areas (EBSA) for the estuary and the Gulf of St. Lawrence : the fish eggs and larvae and crustacean decapods larvae layer. DFO Can. Sci. Advis. Secr. Res. Doc. 2007/011.

Savenkoff, C., M.-N. Bourassa, D. Baril and H. Benoit. 2007. Identification of ecologically and biologically significant areas for the estuary and Gulf of St. Lawrence. DFO Can. Sci. Advis. Secr. Res. Doc. 2007/015.

Swain, D., and H.P. Benoit. 2007. Ecologically and biologically significant areas for demersal fishes in the southern gulf of St. Lawrence. DFO Can. Sci. Advis. Secr. Res. Doc. 2007/012.

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