

## **Terms of Reference**

**A review of the community aquatic monitoring program of the littoral nekton community:  
Can it be used to infer the ecological health of bays and estuaries in the southern Gulf of St. Lawrence?**

Regional Advisory Meeting (Gulf)

Gulf Fisheries Centre  
343 University Avenue  
Moncton, NB

March 17-18, 2010  
Chairperson: Rod Morin

### **Context**

Gulf Region's Oceans sector has engaged an ecosystem-based risk analysis decision making process to enable integrated coastal zone management in the southern Gulf of St. Lawrence (sGSL). This process includes an ecological risk assessment of drainage basins in which pathways of adverse environmental effects to aquatic ecosystems are linked to known stressors (pressures) and their potential sources (drivers). These relationships were used to develop vulnerability profiles and have been compiled in a draft Regional Vulnerability Atlas which identifies drainage basins potentially at risk from particular human activities. There are five potentially manageable adverse environmental effects that are considered as the main contributors to environmental issues of bays and estuaries and which could significantly impact aquatic communities: nutrient regime alteration, sediment regime alteration, habitat alteration, biota alteration and hydrological alteration. The objective is to develop a monitoring tool that reflects the environmental health of the coastal environment of the sGSL and that could be linked to adverse environmental effects that are contributing to that state.

Fish community assemblages have been used as a monitoring tool for evaluating the biological effects of point source pollution such as effluents discharged by pulp and paper mills and sewage treatment plants (Neuman and Karás 1988; Grigg 1994; Adams et al. 1996; Otway et al. 1996a and b; deBruyn et al. 2002) and fish plant effluents (Therriault et al. 2006). In 2003, the Stewardship and Environmental Science Sections of the Department of Fisheries and Oceans (DFO) Gulf Region developed a Community Aquatic Monitoring Program (CAMP) The program was designed for, and conducted by, community based environmental groups. One of the potential uses of the CAMP initiative is the development of a monitoring tool, based on the littoral fish and crustacean community, that can serve as an indicator of the occurrence of adverse environmental effects in the estuaries and bays of the sGSL.

### **Objective:**

The objectives of the workshop are to review the data which has been collected in the CAMP program, to review data on land use activities in watersheds that could correlate

with the CAMP data and to review if the measured variation of the aquatic community is associated with the extent of land use impacts. Specifically:

- 1) To review the data from 2004 to 2008 collected by CAMP from the best data available for eleven “core” sites and to identify the factors within the design which are contributing to variance of the nekton community abundance and diversity.
- 2) To review the land use indicators within the eleven CAMP “core” site estuaries and to assess the extent of human activities that could be linked to the five main groups (nutrient regime alteration, sediment regime alteration, habitat alteration, biota alteration and hydrological alteration) of adverse environmental effects within these estuaries.
- 3) To review a preliminary analyses of variation in the nekton community and the variation in the stressor groups among the core sites of CAMP.
- 4) To identify gaps in the CAMP program and the land use assessment if any and to make recommendations for further analyses and research to lead to the development of monitoring tools to assess the environmental health of estuaries and bays. This could include consideration of what can be learned from sites with incomplete data sets (i.e., sites other than the 11 “core” sites), the necessity for sampling monthly May-September, and sampling at six stations. Information from aquatic community monitoring programs from other regions and of other monitoring datasets and activities may be provided to assist in the review and development of recommendations.

## **Outputs**

The expected output of the meeting is a proceedings document which will summarize the presentations, discussions and conclusions of the review. Several research documents may also be completed.

## **Participation**

Participants may include DFO Oceans and Science (Gulf, Maritimes and Quebec), from universities, NGOs and provincial governments.

The meeting will be chaired by Rod Morin, DFO Oceans and Science, Gulf Region.

## **References**

- Adams, S. M., K. D. Ham, M. S. Greeley, R. F. LeHew, D. E. Hinton, and C. F. Saylor. 1996. Downstream gradients in bioindicator responses: point source contaminant effects on fish health. *Canadian Journal of Fisheries and Aquatic Sciences* 53: 2177-2187.
- deBruyn, A. M. H., D. J. Marcogliese, and J. B. Rasmussen. 2002. Altered body size distributions in a large river fish community enriched by sewage. *Canadian Journal of Fisheries and Aquatic Sciences* 59:819-828.
- Grigg, R.W. 1994. Effects of sewage discharge, fishing pressure and habitat complexity on coral ecosystems and reef fishes in Hawaii. *Marine Ecology Progress Series* 103: 25-34.
- Neuman, E. and P. Karås. 1988. Effect of pulp mill effluent on a Baltic coastal fish community. *Water Science and Technology*. 20:95-106

- Otway, N. M., C. A. Gray, J. R. Craig, T. A. McVea, and J. E. Ling. 1996a. Assessing the impacts of deepwater sewage outfalls on spatially- and temporally-variable marine communities. *Marine Environmental Research* 41: 45-71.
- Otway, N. M., D. J. Sullings, & N. W. Lenehan. 1996b. Trophically-based assessment of the impacts of deepwater sewage disposal on a demersal fish community. *Environmental Biology of Fishes* 46: 167-183.
- Therriault, M-H., S.C. Courtenay, C. Godin and W.B. Ritchie. 2006. Evaluation of the Community Aquatic Monitoring Program (CAMP) to assess the health of four coastal areas within the southern Gulf of St. Lawrence with special reference to the impacts of effluent from seafood processing plants. *Can. Tech. Rep. Fish. Aquat. Sci.* 2649: vii + 60p.