

Terms of Reference

National Peer Review Meeting

Aquaculture - Environment Interactions: Scientific Advice for Finfish Cage Aquaculture in the Marine Environment

*Week of February 21, 2005 (precise dates to be confirmed)
Precise location to be confirmed*

Chairperson: Jake Rice

Preamble

The trigger for this peer review is DFO Habitat Management's need for science advice related to the habitat effects of finfish cage aquaculture in the marine environment. Clear science advice is required to recommend appropriate tools (models and thresholds) for assessing habitat effects, to determine the sensitivity of selected fish habitats and to ensure national coherence between regionally specific tools or approaches.

While the original intent of this science advice project was to address site-specific habitat effects under the *Fisheries Act*, we need to recognize the increasing importance of ecosystem-based management under the *Oceans Act*. This ecosystem approach also requires science to inform its decision-making.

As part of this peer review, science advice was expected regarding the effects of finfish cage aquaculture on sensitive marine habitats. This peer review will address habitat sensitivity at two levels of specificity. First, science advice will be generated related to the effects of finfish aquaculture activities on eelgrass and kelp. Second, a method to evaluate the sensitivity of other functional habitat (i.e., spawning grounds, lobster habitat, habitat for species at risk, shellfish habitat, etc.) will be determined.

The peer review should, as much as possible, try to establish how the proposed scientific advice would respond to foreseen future aquaculture industry expansion, such as high energy or offshore production. It should be taken into consideration that a greater level of uncertainty would be associated with the recommendation of tools for assessing habitat effects and determining sensitivity of selected fish habitats in the context of future industry activities.

Science Advice

Peer-reviewed science advice will be generated on the following four themes:

1. science advice on the strengths and weaknesses of existing measures/models of benthic and water column habitat effects;
2. science advice on the application of thresholds of environmental change to the measures/models recommended above;

3. science advice on the strengths and weaknesses of operational models of carrying capacity (far-field effects);
4. science advice on habitat sensitivity of specific habitats and a method to evaluate the sensitivity of functional habitat.

The following working papers will inform the science advice:

- Predictive models for habitat management of finfish mariculture in Canada based on benthic sampling;
- DEPOMOD modeling of particle deposition rates and benthic impacts;
- Oxygen balance models;
- Eutrophication impacts of salmon aquaculture;
- Habitat sensitivity: case study of eelgrass;
- Habitat sensitivity: case study of kelp.

National Peer Review

A DFO-hosted national peer review will be held in February 2005 to review the working papers and to provide science advice. Invited participants will receive copies of the working papers approximately two weeks prior to the peer review.

The peer review will assess whether the conclusions presented in the working papers are credible, supported by scientific data and complete relative to global knowledge. In addition, the peer review will provide science advice on the following:

1. How effective are the following measures/models in assessing and predicting benthic and water column habitat effects of finfish cage aquaculture:
 - Benthic community structure;
 - Sediment geochemistry;
 - DEPOMOD;
 - Oxygen balance.Which measures/models are the most appropriate in which bottom substrate (soft, hard and mixed), under which environmental conditions and in which regions?
What are the major sources of uncertainty?
2. What thresholds for recommended measures/models represent significant biological changes in environmental conditions? What do these changes represent? How do these thresholds vary under different environmental conditions and differ among different regions?
3. How can the carrying capacity of marine environments to sustain finfish aquaculture be determined under operational conditions? What variables can be monitored?
4. What is the sensitivity of eelgrass and kelp to finfish cage aquaculture activities (e.g., sedimentation, eutrophication)? What thresholds or siting criteria could be developed based on this information? How can the evaluation process used in these working papers be applied to assess sensitivity of other fish habitats?

Outputs

A summary of the peer review discussions will be published in a Canadian Science Advisory Secretariat (CSAS) Proceedings. The recommended science advice will be published via one or many CSAS Habitat Status Reports.

Ultimately, the science advice will help DFO's Habitat Management in reviewing finfish cage aquaculture siting applications and in assessing ongoing aquaculture operations in the marine environment. In addition, the science advice will provide a basis for future examinations of aquaculture activities in an ecosystem-based management context.