

PACIFIC AQUACULTURE REGULATIONS

Approach to Managing Feed-Related Organic Deposition in Aquaculture

Foreword

In response to the February 9, 2009 British Columbia Supreme Court decision in *Morton vs. British Columbia* (Ministry of Agriculture and Lands), the Government of Canada through the Department of Fisheries and Oceans (DFO), has enacted the Pacific Aquaculture Regulations (PAR) under the authority of the *Fisheries Act* (R.S.C., 1985, c. F-14). The regulations took effect on December 18, 2010, and provide the regulatory framework for the management of aquaculture activities in BC and in particular waters off its coasts.

The purpose of this document is to support the implementation of the new regulatory regime for British Columbia under the PAR. Marine finfish, shellfish and freshwater aquaculture operations now require a federal aquaculture license in order to operate legally in the province of British Columbia. Pursuant to the PAR, DFO may determine conditions of license for the range of issues. This approach document supports the development of licence conditions pertaining to the management of feed-related organic deposition in aquaculture.

There are no general conditions of licence for habitat compensation; however, specific conditions of licence may be developed for individual farms. Once compensatory habitat is deemed to be functioning as intended by DFO, monitoring is no longer required and those requirements should be removed from the licence.

Site specific licence conditions will typically be applied to individual aquaculture facilities if they were required by DFO prior to December 18, 2010. These conditions will be reviewed in the future to ensure they are still applicable or if additional measures to minimize the impact of organic and inorganic matter from the aquaculture facility on fish and fish habitat are required.

Purpose

This document provides guidance on management measures, conditions of licence and the use of management plans and protocols for aquaculture activities related to managing benthic impacts associated with feed related organic deposition. Aquaculture activities will be managed in a manner that limits impact to benthic habitat, particularly sensitive or important fish habitat, and mitigates the nature of that impact.

This approach is mainly intended to guide management activities specific to feed associated organic deposition at both marine and fresh water farming locations including hatchery and grow out operations.

Context

Benthic ecosystems are essential components of Canada's oceans environments¹. They provide habitat, support food webs and are an important source of biodiversity. Benthic ecosystems also support many aquatic species that play an important social, cultural and economic role in the lives of many Canadians.

Recognizing the ecological and biological value of benthic ecosystems and their role in supporting aquatic species on which Canadians depend, it is imperative that these ecosystems are considered when managing aquatic activities. This includes the consideration of target species, non-target species, the ecosystems of which they are part, and the impact of culture activities on these ecosystems when making management decisions. This is consistent with DFO's Sustainable Development Strategy.

Discharges from facilities with point-source discharges have the potential for impacting fish and fish habitat if excessive amounts of effluent constituents such as suspended solids and (limiting) nutrients are released. This can lead to smothering, and eutrophication. Point source discharges are usually associated with land-based facilities involving tank-type culture and include commercial finfish hatcheries, large commercial finfish grow-out facilities and small pond-based U-Fish operations. There are also a small number of facilities that rear less common species such as crayfish, and a small number of shellfish hatcheries.

Protection of Fish and Fish habitat

In order to ensure the protection of fish and fish habitat, a suite of management measures will be used to manage aquaculture activities and will be reflected in the finfish conditions of licence or other management tools employed. They include, but are not limited to:

- Use of predictive tools for siting, and habitat compensation purposes;
- Incorporation of indicators of impact and thresholds in decision making;
- Use of standardized monitoring programs to assess impacts.
- Requirement for data collection, record-keeping, and reporting in standardized formats
- Use of measures including mitigation measures to reduce risk of exposure to hazards and/or reduce extent of environmental effects;

¹ See DFO "Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas" which provides guidance for benthic habitat protection

No Net Loss

The DFO Policy for the Management of Fish Habitat guiding principle of “no net loss of productive capacity” will continue to help determine siting, mitigation, monitoring, and compensation requirements for the purpose of fish habitat protection

Approach

Use of Predictive Tools

Predictive tools assist in the assessment of potential impacts from an aquaculture facility as it relates to the direction, extent and concentration of specific parameters. One such tool is DEPOMOD, which predicts the extent and general location of organic deposition associated with localized farm activities (feeding). Based on input parameters such as: proposed maximum biomass, feeding rates, containment structure location and configuration, and currents, model outputs can be used to assess if there are likely to be critical or sensitive habitats within the zone of impact. If such a risk is identified, management measures including additional monitoring, adjustment of farm location, etc may be required. DFO (AMD) intends to continue using DEPOMOD or other acceptable models according to the use previously established by DFO Habitat. DFO will encourage the development of and evaluate new or revised modelling tools to better inform management decisions.

Information from model outputs will typically be required for:

Assessment of new applications or amendments to existing licences

- Determining the requirement for compensatory habitat creation.

Habitat Compensation

Compensation refers to the replacement of natural habitat, increase in the productivity of existing habitat, or maintenance of fish production by artificial means in circumstances dictated by social and economic conditions, where mitigation techniques and other measures are not adequate to maintain habitats for Canada's fisheries resources.

The requirement for compensation will be reviewed at the time of application for a new facility, and when changes to an existing facility are proposed where significant change to impact on fish or fish habitat may arise. When a threshold of impact is predicted and mitigation measures can not prevent a harmful alteration, disruption or destruction of fish habitat, the creation of compensatory habitat is required in order to offset the loss of productive fish habitat. Factors considered in determining compensation amounts will include both the value of the habitat that will be disrupted and the value of the habitat that will be created. The objective is to ensure that “no net loss” of productive habitat occurs. Any compensatory habitat created will have required monitoring until such time as DFO determines that the habitat is functioning as intended.

Further specific details related to compensation measures are found in Section 5.0 of the *Operational Directive for Managing Feed-Related Potential Organic Deposits at Marine Aquaculture Facilities*.

Monitoring of Benthic Effects

Monitoring of the condition of the benthos in the vicinity of farms will be required for two main purposes: to generate pre-operational baseline data (application requirement); and to generate operational data to determine if the actual effects are within established thresholds. Monitoring programs will specify:

- the spatial extent of monitoring requirements;
- the methodology for collecting and handling samples;
- the timing and frequency of monitoring

Baseline monitoring surveys form part of the application package for new or significantly amended sites and provide important ecosystem data that is used as a comparison to subsequent operational data for adaptive management. The surveys are to be completed in the area where the zone of impact is predicted (based on DEPOMOD or equivalent accepted model).

Operational monitoring must be carried out to ensure that the applicable management standards are met, i.e., the extent of the organic depositional footprint and associated benthic impacts remain within a designated area and limits as defined by licence conditions. The information collected during operational monitoring will be used to:

- verify that mitigation measures have the intended effect;
- ensure compliance with licence conditions, and
- inform an adaptive management approach as required to meet departmental objectives.
- provide public information on environmental change;

Use of Indicators and Compliance Thresholds

An indicator must be used to define a trait or characteristic of the environment. Indicator species may be used to indirectly represent the status of a particular ecosystem or community. For the purposes of managing depositional impacts associated with feed, DFO may use one or more species whose presence, absence, or relative abundance in a localized area is indicative of the state of organic enrichment of its ecosystem. Where a specific parameter of ecosystem function is difficult to measure accurately and consistently during routine monitoring, a surrogate may be measured instead. The surrogate will be used to indirectly represent the status of the parameter of interest. Indicators and surrogates must be selected based on the type of receiving environment, their function within the associated ecosystem, a robust relationship between the substitute and the characteristic to be assessed, and the current body of scientific knowledge.

Thresholds are used to establish regulatory limits to potential impacts that aquaculture operations may have on fish and fish habitat. Thresholds are established through consideration of the scope of operations, the type of habitat potentially affected, degree of correspondence with ecosystem functions of concern, technical feasibility, and costs relative to quality of information obtained.

Record-keeping and Reporting

Monitoring data and analytical reports are generated during each sampling and monitoring event at an aquaculture facility. As DFO will be assessing environmental changes (indicators species, surrogates, etc) over time, licence holders are required to maintain records for longer than one production cycle and possibly for several years. This will support quality assurance and control of (trend) analyses. Licence conditions specify the length of time that raw data and analytical reports must be retained, the information elements that must be included, and the format and method for submission.

Licence holders are encouraged to retain data for a longer period of time and to use it to support the establishment of their own longer data history for trend analyses and subsequent monitoring program design.

Management tools

Integrated Management of Aquaculture Plans

Under the Integrated Management of Aquaculture Plans (IMAPs), DFO will continue to work with industry to develop collaborative arrangements with respect to generating additional information to test and refine DEPOMOD (or other applicable models) to support management decisions associated with benthic impacts from feed related organic deposition, and siting and operating fish farms.

Organic deposition in the nearfield area of shellfish farms may result from the settlement of solid wastes primarily composed of pseudofeces; however no feed is provided to the cultured shellfish. Historically, no management measures have been established related to benthic impacts from shellfish aquaculture facilities. Management measures for shellfish culture activities may be developed through the IMAP process and or based on pathways of effects science advice.

Related Approaches

Definitions