

PACIFIC AQUACULTURE REGULATIONS

Approach to Managing Non Feed-Related Organic Deposition in Aquaculture

Forward

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 (GoC), 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 non feed-related organic deposition will be managed. 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. This includes consideration of activities associated with the treatment /discharge of domestic sewage, waste water from

harvesting, fish mortalities (cultured fish; incidental catch); and materials (biofouling) dislodged during in situ washing / infrastructure cleaning at farms.

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.

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;

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

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

Approach

The following management measures are to be implemented with respect to marine finfish aquaculture operations:

- Prohibition of some activities:
- Authorization through the licence conditions of other activities:
 - Release of human sewage related to aquaculture operations;
 - In-situ cleaning of nets and other infrastructure resulting in the settlement of macrophytes, mussels and other plant or animal material on the seafloor in the proximity of the containment array.
- Requirement for collection of data, record-keeping and reporting ;

Prohibited Activities

There are a number of activities that historically occurred at aquaculture facilities that are no longer acceptable because of the effects of these activities on fish and fish habitat. Licence conditions prohibit the following activities:

- Release or deposit of mortalities into waters of cultured fish, offal or incidental catch with exception of all SEP facilities;
- Release of bloodwater into waters;
- Composting of nets on the ocean floor.

Though the composting of nets on the ocean bottom is prohibited by Fishery (General) Regulations section 38, unless authorized by a fishery officer, DFO does not approve this activity for aquaculture nets.

Herring spawn may be deposited on nets and other facility infrastructure. Its removal will be managed under the *Access to Wild Fish Stocks for Aquaculture Purposes*. Prior to any washing of nets or cleaning of infrastructure, the licence holder must meet all conditions of licence associated with the removal of herring spawn.

Authorized Activities

Domestic Sewage

The volume of domestic sewage discharging from finfish aquaculture facilities is extremely low but because of its potential to contaminate shellfish resources it must be managed appropriately. Prior to December 18, 2010 these discharges were managed under the provincial *Finfish Aquaculture Waste Control Regulation*. At present, there is a lack of clarity on which agency is responsible for regulating this discharge, as the *Pacific Aquaculture Regulation* does not authorize the discharge of deleterious substances. Unless treated to the extent that it can pass a bioassay toxicity test, domestic sewage is considered a deleterious substance. Both

Environment Canada and the BC Ministry of Environment (*Environmental Management Act*) have the authority to regulate domestic sewage discharges but a decision has not yet been made on who will take the lead or if this will be jointly managed. In the interim, licence conditions require that measures be put in place to ensure that domestic sewage produced from the facility and discharged to the marine environment complies with the following requirements:

- A domestic sewage treatment device capable of treating domestic sewage to a degree that it is not deleterious to fish or fish habitat; and
- The location of the sewage discharge point to the environment is at a depth no less than 15 metres below the surface of the water.

Release of domestic sewage within 125 metres of a shellfish aquaculture facility is a food safety issue that is managed under the Canadian Shellfish Sanitation Program. Discharge of sewage at shellfish operations must meet Environment Canada and the Canadian Food Inspection Agency standards. No conditions of aquaculture licence are required

The discharge of domestic sewage from land-based facilities is managed under the BC *Environmental Management Act* and associated *Municipal Sewage Regulation* or the Ministry of Health *Sewerage System Regulation*. No conditions of aquaculture licence are required.

Equipment washing

Removal of biofouling organisms is an essential part of aquaculture operations and occurs several months of the year, primarily between April and October, to remove biofouling and increase water flow through the containment structure array. Nets are also washed at the end of a production cycle but are removed from the water prior to doing so. Policy for the past several years requires nets to be washed on shore to allow for both organic material and copper to be deposited in one discrete area. Routine in-situ cleaning of nets and other infrastructure results in the removal of organic material (e.g., macrophytes, mussels and other plant or animal material) which settles on the seafloor. This activity is considered a minor contributor to the overall organic input and would be typically limited to the immediate vicinity of the containment structure.

The impact of copper from antifoulant treated nets is not completely understood so a precautionary approach is being taken in this policy to limit potential impacts. The policy allows in-situ cleaning of copper treated nets but not their removal from the water and subsequent washing on site. In addition, licence conditions require the analysis of copper in the sediment samples for compliance purposes. The licence holder is required to maintain records of in-situ removal of biofouling. DFO will subsequently analyze these records and sampling data to assess any correlations for future review of this policy.

In the interim licence conditions specify the following:

- Nets with anti-fouling agents may only be washed in situ, with exception that if completely removed from water, they must be washed at an authorised land-based facility;
- In-situ cleaning of nets and other infrastructure (i.e., in place on cages) is permitted when the net washing is done at a frequency that precludes the discharge of significant volumes of organic material or shell hash.

Licence conditions require that a summary report of all occurrences of net washing and/or cleaning of aquaculture structures must be submitted annually. This information is to be recorded in the *Biofouling Management Plan* in Appendix XV of the *Marine-based Finfish Aquaculture Licence and Conditions*.

Benthic impacts associated with this activity are to be managed under *the Policy on Managing Feed related Potential Organic Deposits under the British Columbia Aquaculture Regulatory Program (BCARP)*.

Under current BC/DFO practice, there are minimal requirements around the management of biofouling for shellfish. The only specific licence condition in the interim is associated with the shellfish aquaculture conditions, which state that an operator must ensure that all biofouling is disposed of within the licenced area in a manner that no build-up occurs.

Mortalities

Routine fish mortalities are a normal result of operating a fish farm and operators have operating procedures in place to collect, store, transfer and dispose them. In addition there are times when an abnormal amount of fish may die due to circumstances such as a disease outbreak or environmental factors such as plankton blooms or water column oxygen concentration depression. The condition of licence requires operators to notify DFO when a fish kill event occurs while routine mortalities are only to be reported annually. Fish kill reports are required for two purposes, the first to inform DFO staff of a potential fish health issue and the second to inform the province that a significant amount of mortalities will be disposed of at a provincially regulated land-based disposal site.

The handling and disposal of mortalities is also managed in the conditions of licence associated with the Fish Health Management Plans.

For various reasons including fish health issues and animal attraction, an operator may not dispose of mortalities to fish habitat and must comply with the general requirements associated with mortality handling and disposal as follows:

- Mortalities are to be collected on a timely and routine basis to ensure that the mortalities are whole and in a relatively fresh condition;

- Mortalities should be disposed of in tight lidded, secure containers to avoid any loss of fish or infected material, and to prevent access by birds and other predators;
- Accumulated mortalities must be collected on a regular basis and transferred to composting facilities;
- Cleaning and disinfection of “mort” storage or other handling facilities should follow bio-security protocols or direction provided by fish health specialists;
- In the event of a fish kill, a Fish Kill Contingency Plan is to be invoked.

Specific handling and disposal requirements are to be contained in operator’s aquaculture management plans or SOP’s.

Benthic impacts associated with this activity are to be managed under *the Policy on Managing Feed related Potential Organic Deposits under the British Columbia Aquaculture Regulatory Program (BCARP)*.

Bloodwater

Bloodwater has the potential to spread disease to both wild and farmed fish. A policy has been developed over the past several years to forbid its discharge to the ocean, unless specifically authorized by provincial or federal authorities. On-site fish handling procedures are reviewed by DFO staff, and in cases where fish are bled on site during harvest, the bloodwater must be retained in the harvest vessel to be sterilized and disposed of on land by a processing plant in accordance with the operational activities of that facility. Bloodwater generated during other aspects of the operation, including fish health surveys, must be contained in mort containers prior to disposal at authorised land-based composting facilities. Specific handling and disposal requirements are to be contained in operator’s aquaculture management plans or SOPs.

Record-keeping and Reporting

With respect to human sewage, licence conditions require that, all records related to the construction, operation and maintenance of sewage treatment and disposal works are retained for inspection by DFO.

With respect to release or deposit of mortalities, offal and bloodwater into waters of cultured fish, licence conditions related to the management of fish health requires record-keeping and reporting of all such occurrences. Licence conditions also require the recording of the methods of harvest (i.e. live haul or stun and bleed).

With respect to in-situ cleaning of nets and other infrastructure, licence conditions require such information to be recorded in the *Biofouling Management Plan* in Appendix XV of the *Finfish Aquaculture Licence 2010 under the Pacific Aquaculture Regulation*.

Mitigation Measures

Mitigation measures are those measures taken by an aquaculture facility to avoid or minimize impacts to sensitive habitat and species by the operation and management of the facility. The following mitigation measures are to be used with respect to shellfish aquaculture:

- Moorings are to be made of clean material that will not leach and release toxic materials into the water body;
- Mooring anchors are to be adequately sized to prevent shifting and dragging on the sea floor;
- There must be no use of native beach material as mooring structures while ensuring that native beach material remains in its natural state of distribution on-site;
- Openings in aquaculture structures must be maximized to increase light penetration and prevent shading of fish habitat;
- There must be no storage of aquaculture equipment in the intertidal zone or riparian vegetation;
- Programs for the evaluation of management measures must be instituted to identify areas where adaptive management could be applied;
- Collection of data for record-keeping and reporting is a requirement under licence conditions.

For a number of land-based facilities, including commercial hatcheries and lake-based facilities, there are specific to licence conditions associated with the condition of licence. These conditions include specifying wastewater treatment works, effluent quality standards and sampling and monitoring programs. Licence conditions also require commercial hatcheries to meet the Canadian Council of Ministers of the Environment (CCME) receiving water quality guidelines. In the future DFO will review the need for lake-based facilities to also meet the guidelines. In the future these potential impacts will also be managed under the *Policy on Management of Feed related Organics under the British Columbia Aquaculture Regulatory Program*.

Definitions

For the purposes of this policy:

- **Biofouling** means the organisms that attach and/or live on nets and other structures (excluding herring spawn);
- **Bloodwater** means any liquid that contains more than 50 per cent by volume of fish blood;
- **Domestic sewage** means human excrement, water-borne human excretion or the water-carried wastes from liquid or non-liquid culinary uses, washing, cleansing, laundering, food processing or ice production generated at staff quarters where the treated effluent is discharged to the facility tenure:

- **Mortalities** means facility raised fish that have died, and are not harvested for human consumption;
- **Net-washing** means the act of physically removing the accumulation of organic material (biofouling) from nets by pressure washing, scraping, brushing or any other acceptable means.

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