PACIFIC REGION

FRESHWATER/ LAND-BASED

INTEGRATED MANAGEMENT OF AQUACULTURE PLAN

July 2016– Version 1.1

Fisheries and Oceans Canada | Pêches et Océans Canada

Canada

This Management Plan is intended for general purposes only.
Where there is a discrepancy between the Management Plan and the regulations, the regulations are the final authority.

FOREWORD

The purpose of the freshwater/land-based Integrated Management of Aquaculture Plan (FW/LB-IMAP) is to identify the main objectives and requirements for the management of freshwater/land-based aquaculture in British Columbia, as well as the management measures that will be used to meet these objectives. This document provides federal and provincial agencies, local government, industry, First Nations, stakeholders, and the public with an overview of freshwater/land-based aquaculture operations in British Columbia, and how the industry is managed by Fisheries and Oceans Canada.

The FW/LB-IMAP will be reviewed periodically in order to incorporate changes in the management approach and to ensure that it includes the most current information available in relation to science, policy and management practices.

The FW/LB-IMAP is not a legally binding instrument which can form the basis of a legal challenge. It can be modified at any time and does not fetter the discretionary powers of the Minister of Fisheries and Oceans as set out in the *Fisheries Act, Species at Risk Act,* and the *Oceans Act;* as well as the *Fishery (General) Regulations,* the *Aquaculture Activity Regulations,* or the *Pacific Aquaculture Regulations.* The Minister can, for reasons of conservation or for any other valid reason, at any time modify any provision of the FW/LB-IMAP in accordance with the powers granted pursuant to the *Fisheries Act,* the *Oceans Act, or the Species at Risk Act* and supporting regulations.

Where Fisheries and Oceans Canada is responsible for implementing obligations under land claim agreements, the FW/LB-IMAP will be implemented in a manner consistent with these obligations. In the event that an FW/LB-IMAP is inconsistent with obligations under land claims agreements, the provisions of the land claims agreements will prevail to the extent of the inconsistency.

Please note that attempts are made to keep the internet-based links provided in this paper up to date, however providers do change their web addresses regularly and inevitably the reader will find some links which no longer work. Please report broken links to IMAPs@dfo-mpo.gc.ca.

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1. BACKGROUND AND OVERVIEW OF THE SECTOR

1.1 Background

In December 2010 the Government of Canada assumed primary responsibility for the regulation and management of aquaculture in British Columbia. As the lead federal agency, the Department of Fisheries and Oceans Canada (DFO, the Department) is responsible for regulating, monitoring and licensing all aquaculture operations in the province, including those which are freshwater/ land-based. In order to carry out these responsibilities, the *Pacific Aquaculture Regulations* (http://laws-lois.justice.gc.ca/eng/regulations/SOR-2010-270/) were developed under the *Fisheries Act* to govern the management and regulation of the aquaculture industry in British Columbia. The *Aquaculture Activity Regulations* (http://laws-lois.justice.gc.ca/PDF/SOR-2015-177.pdf) provide further direction relating to the management of the aquaculture industry throughout Canada. The Department established the British Columbia Aquaculture Regulatory Program (BCARP) to support implementation of the regulations and day-to-day management of the sector.

While DFO is the lead federal authority governing the regulation of the aquaculture industry, other federal departments and provincial agencies also have roles in managing and regulating various aspects of aquaculture management in British Columbia. For example, Transport Canada is responsible for reviewing applications with respect to the protection of navigable waters, and the Canadian Food Inspection Agency has jurisdiction related to aspects of fish health and processing.

The Province of British Columbia remains responsible for authorizing the occupation of provincial Crown land, aquatic Crown land, and lakes associated with aquaculture operations. The Province manages some environmental aspects of aquaculture operations in fresh water bodies, and some fish processing responsibilities. In some cases, zoning requirements, administered by local governments, apply to aquaculture facilities.

Under the *Pacific Aquaculture Regulations*, aquaculture is defined as "the cultivation of fish." The freshwater/land-based Integrated Management of Aquaculture Plan (FW/LB-IMAP) is concerned with the cultivation of fish (inclusive of shellfish) in a freshwater environment (ponds, rivers, lakes) or in a land-based facility using either fresh or salt water. Cultivation implies individual or corporate ownership, control, and responsibility for the stock being cultivated. An aquaculture licence is required where a facility is raising fish or shellfish which are destined for sale for human consumption or transfer to another aquaculture facility.

The *Aquaculture Activity Regulations* clarify conditions under which aquaculture operators may treat their fish for disease and parasites, as well as deposit organic matter, under Sections 35 and 36 of the *Fisheries Act*. They allow aquaculture operators to do so within specific restrictions to avoid, minimize, and mitigate any potential serious harm to fish and fish habitat. All freshwater/land-based aquaculture sites which release effluent to fish bearing waters must provide written reports of considered alternatives to pesticide and drug use. Sites are required to have mitigation measures in place to minimize serious harm to fish and fish habitat when they use any pesticide or drug. They must also report these activities on a yearly basis to the Department, which makes this data publicly available.

The FW/LB-IMAP outlines the management framework for freshwater/land-based aquaculture in British Columbia. In some cases, where more than one cultivation method is used, the process of cultivating fish throughout a life cycle may fall under more than one IMAP (e.g. marine finfish or shellfish and freshwater/land-based). This includes the situation where juvenile fish/ shellfish are

bred or reared on land and then transferred to a marine-based aquaculture facility at some stage of their life cycle.

Consistent with its overall management approaches, DFO has established advisory processes to support the development of IMAPs and to provide a mechanism for feedback to DFO related to the management of aquaculture in British Columbia. There are Aquaculture Management Advisory Committee (AMAC) processes in place for marine finfish and shellfish aquaculture, which link to most species covered in this plan. The AMAC Terms of Reference provides seats on the committees for First Nations, aquaculture licence holders, industry associations, environmental interests and local government. DFO and the Government of British Columbia are ex-officio participants. More information on AMACs and a schedule of meetings are available on the DFO Pacific Region consultations webpage (http://www.pac.dfo-mpo.gc.ca/consultation/index-eng.html).

DFO undertakes bilateral consultation with individual First Nations, and works with the First Nations Fisheries Council in order to engage British Columbia First Nations in discussions related to aquaculture management and decision-making. The Department also meets with other organizations through bilateral processes to engage these constituent groups in discussions related to the management of aquaculture in British Columbia.

1.2 Sector Overview

DFO currently licences approximately 110 freshwater/land-based aquaculture facilities. A list of all current freshwater/land-based aquaculture licences is available on the DFO website: http://www.pac.dfo-mpo.gc.ca/aquaculture/licence-permis/docs/fresh-douce-eng.html.

As of January 2016, the types of culture authorized under these licences (a licence may include more than one type of culture) include:

- Finfish hatchery: 51;
- Shellfish hatchery: 13;
- Recirculating Aquaculture System (RAS):18;
- Land-based contained, not RAS (tanks, raceways): 18;
- Lake net pen: 2;
- U-catch: 12;
- Isolated fish rearing ponds (not U-catch): 27.

1.2.1 Cultivated Species

The most commonly cultivated species under the freshwater class of licences include:

Common Name	**Scientific Name**
Atlantic salmon	*Salmo salar*
Chinook salmon	*Oncorhynchus tshawytscha*
Coho salmon	*Oncorhynchus kisutch*
Pacific oyster	*Crassostrea gigas*
Signal crayfish	*Pacifastacus leniusculus*

Rainbow trout/ steelhead trout	*Oncorhynchus mykiss*
Sablefish	*Anoplopoma fimbria*
Tilapia (Nile)	*Oreochromis niloticus*
White sturgeon	*Acipenser transmontanus*

1.2.2 Cultivation Operations and Characteristics

Freshwater/ land-based fish and shellfish are cultivated within facilities, including:

- **Hatcheries:** Hatcheries breed and raise juvenile fish/shellfish from eggs or larvae. Once the fish/shellfish reach a certain size they are moved to one or a series of grow-out facilities, where they are allowed to grow until they reach the desired size for harvesting. Some species are held in land-based facilities for their entire life cycle, while others are transferred to grow-out facilities in the marine environment.
- **Freshwater and land-based grow-out facilities:** Freshwater/land-based aquaculture grow-out operations may take place either on land in a contained facility or in a body of water.

Some facilities include both hatchery and grow-out components.

1.2.2.1 Finfish Hatcheries and Rearing

Today most finfish aquaculture companies harvest eggs from their own fish which have been reared in British Columbia over several generations and bred for traits that allow them to thrive in a local environment. In some cases DFO provides limited access to wild or enhanced fish stocks for broodstock development. Access of this kind is provided through the *National Policy for Access to Wild Aquatic Resources as it Applies to Aquaculture* (http://www.dfo-mpo.gc.ca/aquaculture/ref/AWAR-ARAS-eng.htm).

Licensees may apply for an introductions and transfers licence to import eggs from outside of Canada. Imported eggs must meet stringent requirements as set out by the Canadian Food Inspection Agency, the federal regulatory authority on disease risk management of fish imports. With respect to Atlantic salmon, there have been no eggs imported for commercial aquaculture purposes since 2009. There have been imports of sablefish eggs and fry within recent years, as this new industry works to establish an effective, self-sustaining broodstock program.

Information relating to the process of applying for an introductions and transfers licence is available here: http://www.dfo-mpo.gc.ca/aquaculture/management-gestion/licen-permi-eng.htm.

The life cycle of a cultivated salmon begins in a freshwater hatchery. As fry emerge from their eggs, they are transferred into troughs or tanks, where they are provided with a continuous flow of water and a diet appropriate to their size. As the fish grow, they are moved into different tanks to maintain the desired stock densities. Other species such as sablefish may also be cultivated using land-based hatcheries and tanks to breed and rear young fish.

Hatcheries generally access groundwater through an underground intake system (i.e. a well), and discharge to a groundwater outfall. In some cases there may be a surface water intake from a stream or river, but groundwater is preferred to minimize the risk of pathogen or disease exposure for young fish. Many hatcheries today utilize recirculating technology and both require and discharge relatively small amounts of water in comparison to older-style hatcheries.

Juvenile fish are generally kept in a controlled setting to provide optimal growing conditions and protection from disease and predation. Vaccination occurs in the juvenile stage, most commonly by injection, prior to transfer from the controlled setting of the hatchery to other facilities.

The approach to the hatchery and early rearing phase varies depending upon finfish species. In some cases the aquaculture industry in British Columbia is still in the process of determining the most effective way to breed fish in captivity. The *National Policy for Access to Wild Aquatic Resources as it Applies to Aquaculture* (applicable to marine species only) allows limited access to wild broodstock in specific cases, but the overall objective is for aquaculturists to have the ability to generate their own broodstock and juveniles to sustain operations. DFO policy states that the aquaculture industry should not rely on wild stock for brood purposes, and should aim to be self-sustaining.

Propagation of freshwater fish takes place along much the same lines as that of marine finfish. In most cases broodstock will be collected from the population being cultured for breeding purposes. Fish will be bred, generally with the assistance of human intervention, and are reared during their juvenile phases according to their biological needs. At some point during the grow-out period they are separated according to size.

1.2.2.2 Shellfish hatcheries and rearing

Shellfish culture begins with the production of seed/spat. Spawning can be facilitated through human intervention in natural biological processes. While some spat is collected in the wild, the aquaculture industry in British Columbia generally relies on the production of seed/spat by hatcheries. Most clam, mussel, and scallop spat utilized by the shellfish aquaculture industry in British Columbia are produced in hatcheries. Seed are generally acquired by grow-out facilities in the spring or early summer to maximize growth. Most of the oyster and clam seed used by British Columbia growers today is imported from hatcheries in the United States. Importation of aquatic animals is regulated by the Canadian Food Inspection Agency.

1.2.2.3 Freshwater and land-based grow out facilities

As outlined above, many of the marine finfish and shellfish propagated in a freshwater/ land-based hatchery will eventually be transferred to a marine-based grow-out facility. Some fish and shellfish will remain in freshwater/land-based aquaculture facilities. These include:

- Recirculating Aquaculture Systems (RAS);
- Land based contained, not RAS (i.e. tanks, raceways);
- Lake net pens;
- U-catch;
- Isolated fish rearing ponds (not U-catch).

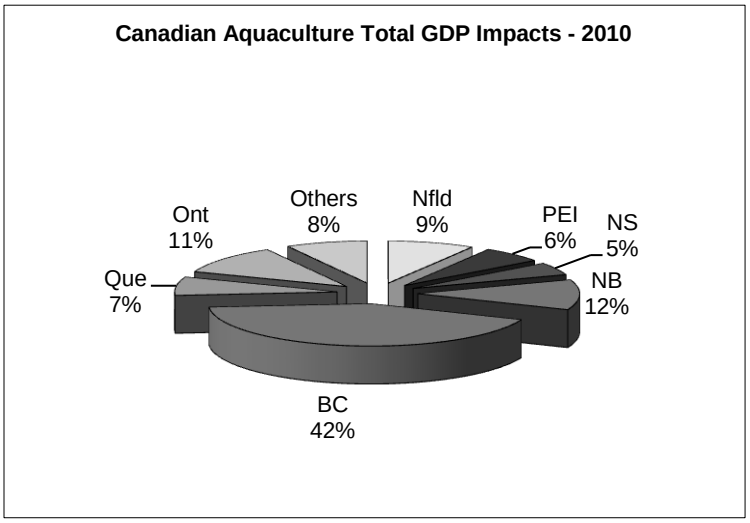
1.2.2.4 Transfers

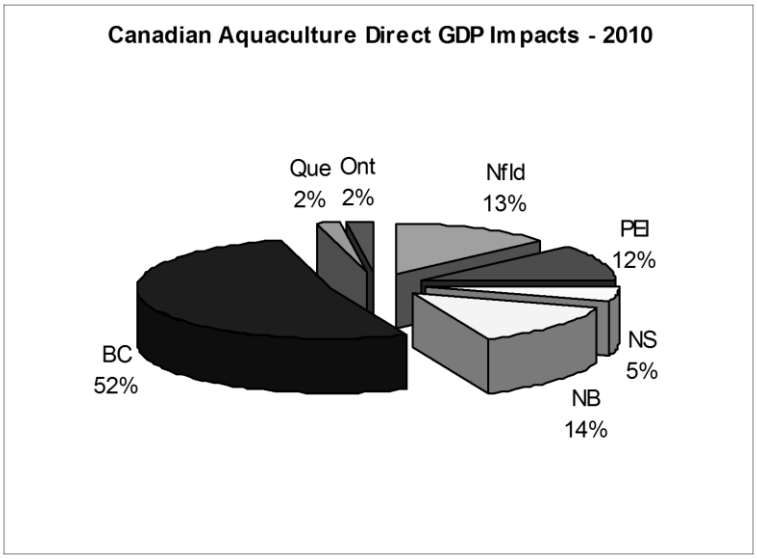
The *Fisheries Act* governs the transport of fish and shellfish within Canada. The freshwater/ land-based Conditions of Licence grant licence-holders the authority to move certain species under specific low-risk and routine circumstances to and from their facility. All other transfers of fish require a separate Introductions and Transfers Licence.

1.3 Economic Profile of the Aquaculture Industry

Aquaculture production takes place across Canada, with the bulk of production occurring in the Atlantic provinces and British Columbia. Canada is the 26th largest producer of aquaculture products in the world and the fourth largest producer of salmon after Norway, Chile and the United Kingdom. In 2013, Canadian aquaculture production had a final product value of approximately $1 billion.[1] Finfish accounted for about 90% of the value. Shellfish accounted for 10% of the overall aquaculture product value.

The British Columbia marine finfish aquaculture industry is the largest in Canada, with British Columbia producers accounting for 55% of Canadian finfish value ($.9 billion). The shellfish industry is the second-largest producer of shellfish in Canada after Prince Edward Island, accounting for about 1/3 of the farmgate value for shellfish nationally. British Colunbia is the largest producer of cultured clams, oysters, and scallops.





Gross Domestic Product (GDP) measures the value added to the economy by an activity and includes wages, owner profits, returns to invested capital, changes in inventories and depreciation. The aquaculture sector as a whole can affect the economy through direct, indirect and induced impacts.[2] In 2010 (the last year of available data), the direct contribution to Canadian GDP from aquaculture was about $354 million, of which $185 million was in British Columbia (0.09% of the British Columbia total GDP). The indirect effect was an additional $464 million in Canada and $173 million in British Columbia. The induced effects added $246 million to Canadian GDP, $95 million of which was in British Columbia. The overall impact on the GDP of Canada was $1.1 billion (0.07% of total Canadian GDP), of which $452 million was in British Columbia (0.21% of total British Columbia GDP). British Columbia accounts for a larger share of direct impacts than total impacts as

[1] Fisheries and Oceans Canada (DFO). 2013. Socio-Economic Impact of Aquaculture in Canada, 2013 Edition. Accessed: August 2013.

[2] Direct impacts are the result of expenditures by aquaculture companies (e.g. feed, maintenance on net pens), indirect impacts are due to expenditures by suppliers to the aquaculture sector, and induced impacts are the result of employees of aquaculture companies and their suppliers spending their earnings.

there are substantial indirect and induced impacts in Ontario and Quebec, both of which have limited aquaculture production.

It is difficult to quantify the economic impact of the freshwater/ land-based aquaculture sector to the Canadian or British Columbia economy. Marine finfish (as outlined above) are reared for the early stages of their life cycle in a freshwater/ land-based facility and then transferred to a marine finfish aquaculture facility. Many cultivated shellfish will start their lives in a land-based shellfish hatchery and eventually be transferred to a beach or deep-water shellfish facility. In addition, there are numerous freshwater and land-based facilities which grow-out fish to marketable size entirely on land.

1.4 Employment

Statistics Canada estimated that the aquaculture sector in British Columbia employed an average of 1,700 people in both 2010 and 2011. Income declined by 5% from $58.5 million in 2010 to $55.7 million in 2011.

Table 1: Estimates of employment impacts in 2010 for total aquaculture in British Columbia, estimated using multipliers (BC Stats 2013) with production and processing combined (Prod = primary production, Proc = processing facilities). Jobs are measured in number of employees, and income is measured in thousands of dollars (nominal).

	Total Aquaculture			
	Jobs		**Income**	
	Prod	*Proc*	*Prod*	*Proc*
Direct	1,918	443	85,472	15,860
Indirect	1,870	170	101,498	10,309
Induced	395	52	21,368	2,379
Total	4,183	665	208,338	28,548

2. LEGISLATION, GOVERNANCE & POLICY FRAMEWORK

2.1 Legislation and Mandate

The Department of Fisheries and Oceans Canada's (DFO's) aquaculture management approach in British Columbia is guided by the broader mandate and strategic priorities of the Department. DFO is the lead federal agency responsible for developing and implementing legislation, regulations, policies and programs in support of Canada's scientific, ecological, social and economic fisheries interests in oceans and fresh waters. For the purposes of aquaculture in British Columbia, the most relevant pieces of legislation are:

> The *Fisheries Act* which provides, among other things, broad powers to the Minister for the proper management and control of commercial, aboriginal, and recreational fisheries, and the activity of aquaculture. As part of various long-standing arrangements, the provinces have assumed administrative responsibility for the management of most inland fisheries.
>
> The *Oceans Act*, among other things, provides authority to the Minister to lead the development and implementation of plans for the integrated management of activities affecting estuaries, coastal and marine waters, and the coordination of oceans issues. The *Act*

also establishes the Minister's responsibility for Coast Guard services, as well as responsibility for marine science services such as the Canadian Hydrographic Services' nautical charts and publications.

While the Minister of Environment has primary responsibility for the administration of the *Species at Risk Act*, the Minister of Fisheries and Oceans is the minister responsible for aquatic species.

DFO's Role, Mission and Vision, along with additional information on the organization, are provided on the Department's website: (http://www.dfo-mpo.gc.ca/us-nous/vision-eng.htm).

DFO's Role: The Department:

- supports strong economic growth in the aquaculture and capture fisheries sectors and contributes to a prosperous economy through global commerce by supporting exports and advancing safe maritime trade.
- supports the innovation needed for a knowledge-based economy through research in expanding sectors such as aquaculture and biotechnology.
- contributes to sustainable aquatic ecosystems for Canadians through habitat protection, oceans management, and ecosystems research.

DFO's Mission: Through sound science, forward-looking policy, and operational and service excellence, Fisheries and Oceans Canada employees work collaboratively toward the following strategic outcomes:

- economically prosperous maritime sectors and fisheries;
- sustainable aquatic ecosystems; and
- safe and secure waters.

DFO's Vision: To advance sustainable aquatic ecosystems and support safe and secure Canadian waters while fostering economic prosperity across maritime sectors and fisheries.

Other federal agencies also have important legislation governing aquaculture – for example the Canadian Food Inspection Agency is responsible for the *Health of Animals Act*; Health Canada the *Food and Drug Act* and the *Pest Control Products Act;* Transport Canada the *Canada Shipping Act;* and the Canadian Environmental Assessment Agency is responsible for the *Canadian Environmental Protection Act*.

In British Columbia, provincial legislation relates to business and labour aspects, environmental protection of freshwater and land habitats, processing of fish, as well as the tenuring of Crown land. Local government jurisdiction relates to issues of zoning.

2.2 Regulation

The *Fishery (General) Regulations*, (FGR) the *Pacific Aquaculture Regulations* (PAR) and the *Aquaculture Activities Regulation*s (AAR) are the principle regulations governing marine finfish aquaculture in British Columbia. Under these regulations DFO has established a licensing regime which is consistent with other fisheries managed by the Department, yet tailored to address the unique characteristics of the aquaculture sector.

Licence conditions developed under the PAR incorporate aspects of aquaculture covered under the former provincial regulations and licensing regime, as well as aspects previously managed federally,

such as the introductions and transfers of fish and habitat protection. The PAR also includes the fee structure related to the issuance of aquaculture licences.

The *Aquaculture Activities Regulation*s came into force in 2015 and govern the deposition of substances required to treat pests and disease and the deposition of organic matter. The overall management regime remained very similar through the transition from the PAR to the AAR. Performance thresholds and reporting requirements remain in place under the AAR.

Rules established under the *National Code on Introductions and Transfers of Aquatic Organisms* govern the importation, transfer, and movement of aquatic species within Canada.

2.3 Policies

Legislation and regulations provide a legal framework for the management of aquaculture, while national and region-specific Departmental policies and operational approaches provide more specific context and detail in terms of how that authority is translated into management.

The Fisheries and Oceans Canada Aquaculture Policy Framework provides a high level overview of DFO's approach to aquaculture management. Numerous other policies relate to DFO's approach on specific diverse aspects of aquaculture management, such as introductions and transfers of fish, broodstock collection, compliance and enforcement approaches, and interaction with wild species designated under the *Species at Risk Act*.

2.3.1 Fisheries and Oceans Canada Aquaculture Policy Framework

DFO's vision for aquaculture development is to benefit Canadians through the culture of aquatic organisms while upholding the ecological and socio-economic values associated with Canada's oceans and inland waters.

As the lead federal agency for aquaculture development, DFO is guided by the principles of the Aquaculture Policy Framework, including:

- DFO will support aquaculture development in a manner consistent with its commitments to ecosystem-based and integrated management, as set out in Departmental legislation, regulations and policies.
- DFO will address issues of public concern in a fair and transparent manner, based on science and risk-management approaches endorsed by the Government of Canada.
- DFO will communicate with Canadians and seek their input on issues pertaining to aquaculture development.
- DFO will respect constitutionally protected Aboriginal and treaty rights and will work with interested and affected Aboriginal communities to facilitate their participation in aquaculture development.
- Recognizing that aquaculture is a legitimate user of land, water and aquatic resources, DFO will work with provincial and territorial governments to provide aquaculturists with predictable, equitable and timely access to the aquatic resource base.
- DFO will strive to ensure that its own legislative and regulatory frameworks enable the aquaculture sector to develop on an even footing with other sectors.
- In consultation with other federal departments, the provinces and territories, the academic sector and industry, DFO will support responsible development of the aquaculture sector.

- DFO will make every effort to understand the needs of the aquaculture industry and to respond in a manner that is solutions-oriented and supportive of aquaculture development.
- DFO will work with other federal departments, and with provincial and territorial governments, to coordinate policy development, integrate regulatory frameworks, and improve service delivery.

Through this policy framework, DFO is committed to being both an enabler and a regulator of aquaculture development, affirming its role as a Department engaged in sustainable resource development. In this context "enabling" means improving the business climate for aquaculture development to benefit Canadians. DFO achieves this by:

- ensuring that DFO's laws and regulations relating to aquaculture are clear, efficient, effective, consistently applied and relevant to the sector;
- investing in aquaculture science and research and development;
- working in partnership with provinces and territories to develop a proactive siting process; and
- considering support for industry development programs consistent with DFO's mandate and objectives.

Further information regarding DFO's Aquaculture Policy Framework can be found at the following website: http://www.dfo-mpo.gc.ca/aquaculture/ref/APF-PAM-eng.htm.

2.3.2 Sustainable Aquaculture Program

The Canadian aquaculture industry operates under rigorous environmental standards, the strongest in the world. These standards, based on the best available scientific research, are in place to safeguard the environment and wild fish stocks.

The Government of Canada undertakes numerous initiatives in order to support a successful and sustainable aquaculture industry across Canada. These initiatives streamline the regulatory process, strengthen science to create performance-based environmental standards, spur innovation to enhance the sector's competitiveness and productivity, and support the development of certification schemes to meet rigorous quality standards in international markets.

The mission and guiding principles of the program are as follows:

- Regulatory Reform: Improved regulatory certainty through better coordination among federal, provincial and territorial governments;
- Scientific Research: Improved regulatory science to establish performance-based environmental standards for all aquaculture operations; and
- Regulatory and Sustainability Reporting: Reporting on the environmental and economic performance of the sector.

2.3.3 British Columbia Aquaculture Regulatory Program

The British Columbia Aquaculture Regulatory Program was created to carry out the Department's responsibilities related to aquaculture in British Columbia. In particular, the Program was designed

to implement federal regulations under the *Fisheries Act* and carry out the day-to-day management of the fisheries and environmental aspects related to aquaculture in the province.

These responsibilities include a number of areas previously managed by the Province of British Columbia (until 2010) such as licensing, containment plans and fish health management plans, collection of fees, and audit and compliance, as well as matters which have historically been managed by DFO such as habitat protection, introductions and transfers of fish, and marine mammal interactions.

DFO's aquaculture-related responsibilities are managed by staff both at national headquarters in Ottawa and in the Pacific Region. The Program is primarily administered by DFO staff located in various communities on Vancouver Island and in Vancouver.

Within the Pacific Region, DFO is responsible for a range of aquaculture activities, including:

- developing operational policies and Integrated Management of Aquaculture Plans;
- reviewing licence applications, setting appropriate licence conditions, issuing licences and reviewing licencee/facility management plans;
- collection of fees associated with aquaculture licences;
- liaising with stakeholders, other governments and First Nations;
- reporting publicly on the performance of the aquaculture industry;
- conducting compliance evaluations for fish health and environmental protection;
- reviewing and analyzing environmental and compliance data; and
- evaluating the effectiveness of environmental protection.

Consistent with the legislative, regulatory and policy framework outlined above, DFO has identified the following as the key management objectives of the British Columbia Aquaculture Regulatory Program:

- maintaining healthy and productive aquatic ecosystems;
- supporting an aquaculture industry that is environmentally, economically and socially sustainable;
- supporting economic opportunities through sustainable growth and development of the aquaculture sector in British Columbia;
- ensuring sound environmental performance on the part of the aquaculture industry;
- providing an efficient and effective regulatory system for aquaculture in British Columbia;
- supporting First Nations participation in aquaculture;
- meeting obligations related to First Nations consultation;
- engaging First Nations, industry, other levels of government and stakeholders in management of the aquaculture sector;

- taking an open and transparent approach to the management of aquaculture in British Columbia; and
- maintaining a high level of compliance with DFO regulations and licence conditions.

DFO employs a range of management measures which support Departmental objectives related to aquaculture. These are intended to work in concert with the jurisdictions of other agencies with regulatory authority over aspects of aquaculture management such as the Canadian Food Inspection Agency under the *Health of Animals Act*. Primary tools employed by DFO include the use of aquaculture siting criteria and the process of aquaculture licensing (including implementation of Conditions of Licence), compliance monitoring, and ongoing science and research related to aquaculture management.

2.4 Compliance and Enforcement

Monitoring, audit and enforcement are an integral part of DFO's approach to management of the aquaculture industry. DFO's Conservation and Protection (C&P) staff (Fishery Officers) and other DFO staff play key roles in this approach.

The *Aquaculture Conservation and Protection Unit* was established with the primary role of enforcing compliance with the *Fisheries Act,* the *Pacific Aquaculture Regulations,* and the *Aquaculture Activity Regulations,* within the aquaculture sector. Fishery Officers responsible for aquaculture enforcement are stationed on Vancouver Island in Campbell River and Nanaimo.

DFO Fishery Officers conduct investigations and may initiate enforcement actions based on C&P site inspections, inspections undertaken by DFO staff who monitor and manage industry reporting, or on information received from the public.

In collaboration with the enforcement activities conducted by Fishery Officers, DFO has a team of dedicated veterinarians, biologists, fish health technicians, and resource managers who verify that aquaculture facilities comply with the *Pacific Aquaculture Regulations, Aquaculture Activity Regulations,* as well as all Conditions of Licence. The data gathered by DFO staff through site inspections and technical audits provide valuable information related to the environmental and operational performance of the aquaculture industry in British Columbia.

2.5 Science in Support of Aquaculture

DFO undertakes a science-based approach to managing the aquaculture industry in British Columbia. In addition to supporting regulatory decision-making, scientific research also improves the Department's understanding of the interactions between farmed and wild finfish and shellfish, as well as the environment on which these species depend.

DFO is involved in a number of aquaculture science and research activities designed to:

- better understand and regulate the potential environmental interactions of aquaculture activities;
- develop new and enhanced tools and technologies to ensure optimal fish health; and
- establish sustainable, ecosystem-based practices.

Results of this research help inform regulatory and policy development and decision-making (within the Department and other government departments and agencies), and support the responsible growth of Canada's aquaculture industry.

DFO's aquaculture research activities fall mainly under two key programs within the Sustainable Aquaculture Program: the *Program for Aquaculture Regulatory Research* (PARR), and the *Aquaculture Collaborative Research and Development Program* (ACRDP).

The PARR supports research activities that build understanding and the knowledge base that is used to inform DFO's aquaculture and fisheries protection regulations and policy decision-making. This includes the Department's ecosystem-based and environmental regulations. More information on PARR can be found at the following website: http://www.dfo-mpo.gc.ca/science/enviro/aquaculture/parr-prra/index-eng.asp.

The ACRDP is a DFO initiative designed to increase the level of collaborative research and development activity between the aquaculture industry and the Department. The ACRDP teams industry with DFO researchers to undertake research that lies within DFO's mandate, but is based on the needs and priorities of the aquaculture industry. Culture of freshwater fish, and enhancement work are not eligible for funding through this program. More information regarding ACRDP can be found at the following website: http://www.dfo-mpo.gc.ca/science/enviro/aquaculture/acrdp-pcrda/index-eng.htm.

Other related programs and activities include Science Peer Review (http://www.dfo-mpo.gc.ca/aquaculture/sci-res/spr-eng.htm), Canadian Integrated Multi-Trophic Aquaculture Network (http://www.dfo-mpo.gc.ca/aquaculture/sci-res/imta-amti/index-eng.htm), and Aquatic Animal Health Science (http://www.dfo-mpo.gc.ca/science/aah-saa/index-eng.htm).

The broad range of aquaculture research initiatives currently being undertaken by the Department, as well as other individuals and institutions (e.g. universities, environmental groups, private consultants, First Nations), and those completed in recent years are summarized in the biennially published *Canadian Aquaculture Research & Development Review.* More information regarding the Review can be found at: http://www.dfo-mpo.gc.ca/science/environmental-environnement/aquaculture/rd2015/index-eng.html .

The Department has undertaken a number of comprehensive science reviews evaluating the state of knowledge and research needs in the area of aquaculture-environment interactions. These include:

- State of Knowledge Initiative (2003-2006): Peer reviewed reports examining the potential environmental effects of finfish (and shellfish) aquaculture activities including interactions between farmed and wild species (e.g.: disease transfer, genetic and ecological effects) and the impact of wastes (e.g. fate and effect of nutrient and organic matter release) (http://www.dfo-mpo.gc.ca/science/enviro/aquaculture/index-eng.htm).
- National Advisory Process: Finfish Aquaculture (2005). Coordinated through the Canadian Science Advisory Secretariat (CSAS), these processes reviewed the potential impact of aquaculture on fish habitat, environmental indicators of impacts at a range of spatial scales, and modeling techniques to predict these impacts: http://www.dfo-mpo.gc.ca/csas/Csas/status/2005/SAR-AS2005_034_E.pdf.
- Aquaculture Pathways of Effects (2009): This CSAS peer review process evaluated the state of knowledge associated with a broad range of potential aquaculture-environment interactions: http://www.dfo-mpo.gc.ca/csas-sccs/publications/sar-as/2009/2009_071-eng.htm.

In some cases this work will be most relevant to fish destined for transfer to the marine environment. In addition to these broad review processes, individual CSAS processes are routinely undertaken to evaluate emerging issues and science developments. The resulting Advisory Reports, as well as Research Documents and Proceedings documents, are posted on the CSAS website: http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm.

The Department recognizes the importance of research on aquaculture-environmental interactions (and broader marine ecosystem and fisheries issues) that is conducted by individuals and institutions (e.g. universities, environmental groups, private consultants, First Nations). The reports and publications resulting from these studies are also included and evaluated through CSAS review processes. This includes participation of external experts at CSAS peer review process workshops and active involvement in the formulation of Science Advisory documents.

2.6 Science and Research Priorities

As advisory processes associated with aquaculture management in the Pacific Region develop, DFO will work collaboratively with First Nations, industry, and stakeholders to identify ongoing science and research priorities. Regional priorities will then be considered within a national context.

Nationally, aquaculture regulatory research priorities for aquaculture have consistently focused on the following themes:

- Fish Pest and Pathogen Treatment and Management Approaches (e.g. effects of sea lice management approaches, fish health zones);
- Cumulative Effects and Ecosystem Management Strategies (e.g. fish health zones, transfer zones, ecosystem assessment to support potential boundary delineation, cultivated/non-cultivated fish interactions, shellfish carrying capacity frameworks, invasive species risks);
- Habitat Impacts (e.g. aquaculture activity effects assessment for different cultivation types, assessment of dynamics of effects from increased deposition, far-field and cumulative issues);
- Interactions with Wild Populations (e.g. non-indigenous species assessment, cultivated stock escapes assessment, incidental catch evaluation, wild-cultivated interactions including sea lice, shellfish transfer zones, shellfish hatchery practices, risk assessments for new species); and
- Canadian Shellfish Sanitation Program (CSSP) (e.g. improvements to coordination and implementation of the CSSP).

The Department seeks input into science and research priorities through advisory committee processes. Science and research will benefit from the collaborative engagement of governments, First Nations, industry, and other stakeholders, working collaboratively to identify priorities and to carry out initiatives.

2.7 Integration of Traditional and Local Knowledge

In developing and implementing its aquaculture management approach, the Department is committed to working with First Nations, other levels of government, industry, and stakeholders in order to gather and integrate traditional and local knowledge. Through collaborative processes with First Nations and local communities, DFO will continue to improve its understanding of how

traditional and local knowledge can be effectively utilized to improve the management of aquaculture.

2.8 Engagement and Advisory Processes

In order to facilitate open and transparent communication relating to the management of aquaculture, DFO has worked with First Nations, industry, and other stakeholders to establish marine finfish and shellfish Aquaculture Management Advisory Committees (AMAC). The AMACs are multi-stakeholder forums which provide feedback to DFO on the coast-wide management of aquaculture.

DFO will engage with the freshwater/land-based licence holders bilaterally on the IMAP, as well as through the Freshwater/Land-based Aquaculture Industry Advisory Panel, which is comprised of all interested licence holders. This panel meets twice per year, in the fall and spring. Notices are distributed through the Fishery Notice System (FNS), which is available to licence holders: http://notices.dfo-mpo.gc.ca/fns-sap/index-eng.cfm.

DFO has also established bilateral processes with First Nations and the aquaculture industry. These processes complement, inform and support work being done in the multi-stakeholder AMACs, and allow for more targeted discussions to identify and address specific issues.

Through programs like the Aboriginal Aquatic Resource and Oceans Management (AAROM) and the Pacific Integrated Commercial Fisheries Initiative (PICFI), DFO has invested in building First Nations capacity related to aquaculture. These funds have been used to improve communications and information sharing among First Nations on aquaculture issues, and to provide technical capacity to help First Nations more effectively engage in discussions related to aquaculture management.

In addition to consultation and engagement with individual First Nations and other AAROM bodies, the Department continues to work closely with the First Nations Fisheries Council (FNFC) to seek advice and assist with coordination of engagement on a broader, province-wide basis. This includes progress toward the establishment of processes with First Nations which provide a vehicle for bilateral discussions, as well as support for effective First Nations engagement in the AMACs and other processes.

DFO aquaculture staff also participate in bilateral engagement with other groups, including environmental non-governmental organizations, recreational fishing advisory boards, and commercial fishing industry advisory boards.

2.9 First Nations Consultation

Consultation with First Nations is a key part of Fisheries and Oceans Canada's aquaculture licensing and review process. Consistent with legal obligations and the federal duty to consult, DFO consults with First Nations on new licence applications and amendments where there is a potential to impact claimed and/or established rights and title.

Other provincial and federal partners in the harmonized licence application process have their own protocols for consulting with First Nations.

First Nations are provided an opportunity for follow up through meetings and/or discussions. All comments are reviewed and carefully considered by the Department, including key issues and potential impacts identified by First Nations through the consultation process.

In addition to steps undertaken by the Department, DFO encourages aquaculture applicants to contact and engage First Nations prior to applying for a new aquaculture licence or amendment.

3. MANAGEMENT APPROACH

3.1 Federal-Provincial Roles and Responsibilities

The provincial government continues to play a key role in the management of the aquaculture sector. In December 2010, DFO and the Province signed an *Agreement on Aquaculture Management* which clearly defined federal and provincial responsibilities for the management and regulation of the aquaculture sector in British Columbia. A copy of the agreement can be found on the DFO website: http://www.dfo-mpo.gc.ca/media/infocus-alaune/2010/04/agreement-entente-eng.htm.

Under this agreement, the primary responsibilities of the federal government (Fisheries and Oceans Canada) include:

- issuing licences for marine and freshwater aquaculture, including hatcheries;
- assessing modifications to existing aquaculture facilities;
- establishing licence conditions to conserve and protect fish and fish habitat;
- enforcing new aquaculture regulations;
- conducting science and aquaculture research; and
- reporting publicly on environmental and regulatory performance of industry.

The Province of British Columbia remains responsible for:

- issuing tenures for marine or freshwater environments;
- regulating the business aspects of aquaculture; (e.g., workplace health and safety); and
- reporting on seafood exports.

Other responsibilities of the Province of British Columbia (and in some cases local government) include:

- regulating water usage allocations and water effluent quality, including temperature, pH and nutrient loads;
- land use classifications, including oversight of zoning and the governance of Agriculture Land Reserve areas, as well as construction requirements including floodplain mitigation measures;
- transportation of harvested live fish, the treatment and containment of live fish in restaurants and stores, and any transfers to destinations that are not food related for live harvested fish;
- access to broodstock for aquaculture for species managed by the Province, including most freshwater species; and
- recommendations on the number of fish to produce with aquaculture in order to support freshwater recreational fisheries.

Flowing from the Agreement, DFO, Transport Canada and the Province of British Columbia have developed a harmonized approach to aquaculture-related authorizations and decision-making.

To simplify the application and review process, the lead agencies have developed a harmonized application package for the collection of information necessary to apply for federal authorizations under the *Fisheries Act* (*Pacific Aquaculture Regulations*) and the *Navigation Protection Act* and, to apply for provincial authorization under the *Land Act.*

The harmonized application package must be used for all aquaculture applications, including new marine finfish and amendment applications, where one or more of the above-noted authorizations are required.

Depending on the specifics of the application, there may be other authorizations required, (e.g. provincial Water Licence).

In addition to the harmonized application and review process, the lead agencies have also established a number of committees and working groups in order to support implementation of the Canada-British Columbia Agreement.

Front Counter British Columbia coordinates the receipt and distribution of information when an aquaculture application is submitted through the one-window approach. DFO works with the Province of British Columbia and Transport Canada through a harmonized application and review process.

DFO works to coordinate the process of consultation and engagement with First Nations, where aquaculture-related authorizations are considered by the three agencies (DFO aquaculture licence, Provincial land tenure issued by the Province, and/or Navigation Protection Program Permit issued by Transport Canada). In cases where activities associated with a land-based application will take place on private land, the Province may not review the application, as only a federal licence may be required.

3.2 Siting Considerations for Freshwater/ Land-Based Aquaculture

Siting of freshwater/land-based aquaculture facilities may be an area of both federal and provincial jurisdiction. Most land-based facilities are located on private land. In cases where a facility is located on crown land or in a lake, the Province of British Columbia is responsible for issuing tenures under the Provincial *Land Act* which authorize the use of space where an aquaculture facility will operate. DFO issues an aquaculture licence which allows a proponent to carry out the activity of aquaculture.

Both DFO and the Province consider issues related to siting when reviewing aquaculture licence or tenure applications.

Issues considered include:

- plans for water intake and discharge;
- risk of escape; and
- risk of the transfer of pathogens to or from the facility.

The *Guide to the British Columbia Introductions and Transfers Committee ReviewProcess* provides an overview of the additional requirements which relate to the acquisition and transport of fish to and from a facility (http://www.pac.dfo-mpo.gc.ca/aquaculture/licence-permis/intro-trans/process-processus-eng.html).

3.3 Environmental Management Approach

The conservation of marine ecosystems and wild fish stocks is a priority for DFO. The legislation, policies and a comprehensive suite of related management tools, along with relevant science and research, guide the effective management of aquaculture in British Columbia.

This regulatory framework allows DFO to effectively manage potential risk related to the cultivation of fish in a freshwater/ land-based environment. Similar to the management of other fisheries, aquaculture facility licences provide specific conditions and mandatory requirements that the aquaculture industry must meet in order to operate. Many of these conditions focus on the mitigation of potential impacts.

In addition to the marine finfish aquaculture Conditions of Licence and other regulatory tools, DFO has a robust environmental management approach aimed at identifying potential risks, including possible impacts on fish and fish habitat which support commercial, recreational and/or Aboriginal fisheries. The objective of DFO's regulation of aquaculture in British Columbia is to ensure that the industry is sustainable and operates in a manner that minimizes risk to wild fish and fish habitat.

DFO staff, including veterinarians, biologists and other aquaculture technical experts support the development and implementation of the DFO environmental management approach. These staff work closely with aquaculture resource managers, Fishery Officers and Science staff to identify and manage potential risks to the environment, as well as to ensure a high level of compliance with DFO regulations and Conditions of Licence.

For example, DFO staff are responsible for:

- Identifying licence conditions aimed at strengthening environmental management;
- Conducting environmental audits and compliance evaluations for fish health and environmental performance;
- Reviewing and analyzing environmental and compliance data; and
- Evaluating the effectiveness of the management regime.

DFO staff complete a schedule of site visits each year to support the ongoing development of improved mitigation measures and best practices.

3.4 Freshwater/ Land-based Aquaculture Licensing

Freshwater/land-based Aquaculture Conditions of Licence set out the specific operational and reporting requirements to which licence holders must adhere in order to operate legally and be in compliance with the *Fisheries Act* and associated regulations. The licence conditions define the responsibilities of licence holders and assure processors and consumers that they are buying seafood from a licenced, regulated facility. They contain provisions to ensure that aquaculture sites are operated in an environmentally sustainable manner that minimizes the risk to wild fish stocks and the environment. In addition to the generic Conditions of Licence, site-specific conditions may also apply based on the species being cultivated, culture method and the facility type.

Licences are issued for the operation of a specific aquaculture site and companies and organizations with multiple sites must obtain a separate licence for each site.

DFO issues freshwater/land-based aquaculture licences for a maximum period of nine years. Current licences expire June 18, 2024. There is a flat fee associated with freshwater/land-based licences, due at the time of issuance.

The basic template for a freshwater/land-based aquaculture licence, as well as the general Freshwater/Land-Based Aquaculture Conditions of Licence, can be found here: http://www.pac.dfo-mpo.gc.ca/aquaculture/licence-permis/docs/licence-cond-permis-fresh-douce-eng.pdf .

3.4.1 Conditions of Licence – General Information

Together with the regulations, Conditions of Licence are used to regulate and govern the aquaculture industry in British Columbia. Licence conditions cover a broad range of elements relating to the operation of freshwater/land-based facilities. They set out specific requirements regarding the scope and nature of permitted activities including:

- introduction or transfer of finfish and shellfish;
- fish health and mortalities;
- escape prevention and reporting;
- Annual Aquaculture Statistical Reporting; and
- records and additional requirements for finfish that are destined for marine grow-out, including:
  - fish health;
  - transfers of fish; and
  - fish stocking, fish health, and therapeutant use.

Below are more detailed summaries of key areas covered under the general Conditions of Licence for freshwater/land-based aquaculture in British Columbia.

3.4.2 Licensed Species

This section contains a list of species of finfish and shellfish that are licensed for cultivation at the aquaculture facility.

3.4.3 Introduction or Transfer of Finfish

These conditions specify requirements related to the routine low-risk transfer of finfish to or from the aquaculture facility. The licence holder is authorized to transfer live Atlantic or Pacific salmonids, as outlined on the licence, between facilities within the same Salmonid Transfer Zone. A map of Salmonid Transfer Zones is available here: http://www.pac.dfo-mpo.gc.ca/aquaculture/maps-cartes-eng.html.

Other transfers, such as non-routine movements of Atlantic and Pacific salmonids, require a separate Introductions and Transfers Licence. These are issued following the *National Code on the Introductions and Transfers of Aquatic Organisms* which ensures that all genetic, ecological, and disease risks associated with movements of aquatic organisms have been adequately assessed and managed. Under the Code, the Canadian Food Inspection Agency plays the lead role in the management of disease risks and management of the National Aquatic Animal Health Program: http://www.dfo-mpo.gc.ca/science/aah-saa/National-Aquatic-Animal-Health-Program-eng.html.

3.4.4 Introduction or Transfer of Shellfish

These conditions specify requirements related to the transfer of shellfish (including those in seed, spat, or juvenile stages) to or from the licensed aquaculture facility. The licence provides a list of restrictions associated with the introduction or transfer of various species.

Non-routine movements of shellfish also require a separate Introductions and Transfers Licence.

3.4.5 Fish Health and Mortalities

These conditions relate to the care of fish and the requirement to follow protocols related to fish health and mortality events, including the disposal of carcasses.

Licence holders are required to report any observable symptoms of reportable disease, under the National Aquatic Animal Health Program (NAAHP), which is co-delivered between the Canadian Food Inspection Agency and DFO.

Licence holders are required to report any finfish mortality events including population culls.

3.4.6 Escape Prevention and Reporting

These conditions specify requirements related to the prevention, reporting, and response to finfish escapes. In addition to conditions requiring licence holders to take all reasonable measures to prevent escapes, specific conditions require licence holders to prevent impact to wild finfish. In particular, the conditions require that licence holders take immediate action to control any escape (or suspected escape); report the incident to the Department; and provide a report regarding the incident as well as rectify any problems that may have contributed to the escape.

3.4.7 Annual Aquaculture Statistical Report

This condition outlines the requirement for licence holders to complete an Annual Aquaculture Statistical Report on an annual basis. These reports contain valuable production and economic data that are shared with Statistics Canada and the Province of British Columbia and used in trends analysis and the development of annual economic reports.

3.4.8 Records

This section of the licence provides an overview of records which the licence holder must maintain and provide upon request.

3.4.9 Conditions related to finfish destined for marine grow-out

This section of the licence outlines requirements specific to bringing finfish to the hatchery which may be eventually transferred to the marine environment for grow-out.

The transfer finfish from a finfish hatchery to a marine net pen is either governed under the provisions on the marine finfish aquaculture licence or under a separate Introductions and Transfers Licence.

3.4.9.1 Fish Health

These provisions of the licence outline the requirement to submit and follow a Health Management Plan (HMP), and to comply with requirements related to mortality events.

The HMP addresses aspects of farming that can affect the health of the animals within the aquaculture facility, and serves to minimize any potential impact on the surrounding ecosystem. The HMP lays out the protocols to ensure cultivated fish are regularly monitored for signs of infection

and disease. It also includes protocols for keeping fish healthy, monitoring aspects of fish health, euthanasia, as well as procedures to record, store and submit fish health information. Facility operators are required to regularly report on losses.

3.4.9.2 Transfer of Fish

This section outlines specific requirements relating to the transfer of eggs or salmon to or from a facility, and requirements related to record keeping.

3.4.9.3 Fish Stocking, Fish Health, and Therapeutant Use

These conditions relate to the requirements to maintain records, to provide adequate training, to ensure review of reporting by a certified Veterinarian and/or fish health staff. It also provides requirements relating to the archiving of files.

3.4.10 Freshwater Lake Net Pen Culture

Freshwater lake net pen sites have a number of site specific conditions that relate to the maximum size of the pen, anchoring, facility inspections and records, boat operations, predator control and escapes.

3.4.11 Land-based Bivalve Shellfish Culture

In order to minimize the potential health risks associated with consuming bivalve shellfish and to protect public health, it is necessary to survey water quality in shellfish areas and identify actual and potential sources of pollution. In British Columbia, this is facilitated through marine shellfish harvest codes, which are reviewed by the federal or provincial shellfish processing plant prior to sale for food.

3.4.12 Site Specific Conditions of Licence

Additional licence conditions may be applied on a site-by-site basis where additional conditions are required to manage specific issues.

3.4.12.1 Fish Health

Specific aspects of a Health Management Plan (HMP) may be required in particular cases. Site Specific HMP requirements address aspects of farming that can affect the health of the animals within the aquaculture facility, and serves to minimize any potential impact on the health of the surrounding ecosystem. Among other things, the HMP lays out the protocols to ensure cultivated fish are regularly monitored for signs of infection and disease. It includes protocols for keeping fish healthy, monitoring aspects of fish health, euthanasia, as well as procedures to record, store and submit fish health information. Facility operators are required to regularly report on losses.

DFO implements these HMP measures through the licence to minimize the risk of disease transfer and possible harm to wild fish populations, and to mitigate risks to the health of cultivated and wild fish stocks.

A HMP is required for all freshwater culture in lakes, hatcheries rearing finfish for marine growout as well as for species that are susceptible to diseases of fisheries management concern including arctic char. For these licences, licence holders to provide and comply with a detailed HMP attached to their licence. For those licences governing culture in lakes and for the culture of arctic char, this requirement is a site specific condition.

A HMP is required for all culture of whiteleg shrimp, white sturgeon, sturgeon and signal crayfish. For these licences, licence holders are to provide and comply with a detailed HMP which may or may not be attached to their licence.

3.4.12.2 Bivalve culture

In Canada, all bivalve shellfish (e.g. oysters, clams, scallops and mussels) for the food market are required by law to be landed at a federally regulated processing plant, and that the processing plants refer to the aquaculture site's harvest restriction codes to assure the growing waters will produce a product that is safe for human consumption. This harvest oversight is governed by the Canadian Shellfish Sanitation Program (CSSP), and is delivered jointly by DFO, Environment and Climate Change Canada and the Canadian Food Inspection Agency. Currently, shellfish hatchery water intakes are not monitored as part of the CSSP for harvest. As a result, shellfish hatcheries have a prohibition on their licence to ensure their product is only transferred for marine growout in approved growing waters and not sold directly to processors for human consumption.

The CSSP requires the grow-out period for spat or seed collected within a chemically contaminated prohibited area (including spat or seed raised in a hatchery that intakes water from chemically contaminated prohibited area) by a licence issued under the Management of Contaminated Fisheries Regulations (DFO, 1990) must be a minimum of twelve months unless a chemical contaminant reduction study demonstrates elimination in a shorter time period. As a result, shellfish hatcheries that intake water from chemically contaminated prohibited area have a precautionary site specific condition to require their seed be grown out in clean growing waters for a minimum of twelve months.

3.4.12.3 Lake net pens

Culture in lakes has additional regulatory requirements pertaining to the maximum size of their containment array structure area, its anchoring, prevention of escapes, and the requirement for daily containment array above-water inspections. Prior to the initial introduction of a new group of fish, an underwater inspection of the containment array is required, and another underwater inspection is required every 90 days. Records are required to be maintained for all inspections. All boats at the aquaculture facility must be operated so as to prevent damage to the containment structure and its anchoring system, and the site must have designated docking stations for boats not involved in the cultivation of fish, as well as restricted use signs for boats not to access certain areas. Licencees are also required to deploy predator control gear to prevent access to birds, otter, mink and other predators, and to ensure that this control gear can withstand adverse weather conditions.

3.5 Management Priorities

In addition to the management tools and measures outlined above, DFO has identified issues and areas that continue to be addressed. These priorities have been informed by both science work and consultation and engagement with First Nations, industry, stakeholders and others.

Following an adaptive management approach, the Department works with First Nations, industry, stakeholders and other levels of government in order to facilitate continuous improvement in these priority areas.

It is anticipated that this list of management priorities will be revised and updated over time, based on new science and/or feedback through engagement and advisory processes.

The following management priorities and initiatives have been identified by DFO for the freshwater/land-based aquaculture sector in British Columbia:

- continue development of Health Management Plans for priority freshwater/land-based species;
- improving streamlining and effectiveness in management of the sector; and
- review approach for new and emerging species.

The following section provides a brief overview of the issue, management approach, and potential considerations moving forward.

3.5.1 Health Management Plans for Priority Freshwater/ Land- based Species

In order to mitigate any potential risks with the culture of freshwater/ land-based species, the Department is working with industry to develop templates for Health Management Plans for priority species. These documents will set out precautionary management measures for various species and eventually may form a part of the licence.

3.5.2 Improving Streamlining and Effectiveness

Working with industry and other stakeholders, DFO is working to make improvements to the freshwater/ land-based Conditions of Licence. Issues being reviewed include:

- improving streamlining and effectiveness in the management of the sector;
- reducing duplication and redundant Conditions of Licence.

3.5.3 New and Emerging Species

A number of freshwater and land-based licence holders have indicated interest in cultivating new species for which comprehensive assessments or reviews may not yet have been conducted within British Columbia. DFO intends to look at how this issue should be best handled in the future to allow transparency and expediency in review of applications, while ensuring there is sufficient evidence to ensure practices are sustainable.

4. REPORTING ON RESULTS

DFO has committed managing aquaculture in British Columbia in an open and transparent manner. In part, the Department works to achieve this objective through the regular release of information reported by the aquaculture industry and data gathered through DFO's monitoring and enforcement activities.

4.1 Public Reporting

DFO has committed to an open and transparent approach to the management of aquaculture in British Columbia. In part, the Department works to achieve this objective through the regular release of information reported by the aquaculture industry and data gathered through DFO's own environmental monitoring and fish health reporting.

The Conditions of Licence for freshwater/land-based aquaculture require licence holders to submit a number of reports on a regular basis which relate to ongoing facility operations. Information related to these reports may be released publicly by DFO through its aquaculture public reporting website. Published information for freshwater/land-based aquaculture is available on the DFO website: http://www.pac.dfo-mpo.gc.ca/aquaculture/reporting-rapports/index-eng.html.

The following types of information are made publicly available:

- General Licence Information – The general Freshwater/Land-based Aquaculture Conditions of Licence are updated online whenever conditions are changed. More detailed conditions may be added to a licence on a site-specific basis or within a particular geographic area.
- Licence Holder Information – Information includes licence holder/operating party name, site and general location, species licensed for cultivation and maximum allowable peak biomass.
- Compliance inspection information.

4.2 Evaluation of Performance

DFO is committed to a process of adaptive and continuous improvement in the management of freshwater/land-based aquaculture. The FW/LB-IMAP sets out general direction and guidance with respect to management objectives, management measures, and public reporting/industry performance. The management of aquaculture takes place within a broader framework of the objective of ensuring sustainability of the aquaculture industry by the Government of Canada.

As the freshwater/land-based aquaculture management framework continues to develop, information gained through reporting required by the Conditions of Licence, information compiled from the Aquaculture Annual Statistics Report, along with DFO collected data, will be used to assist in ongoing reviews of both the performance of freshwater/land-based industry and the freshwater/land-based management framework.