

BCSFA Fish Health Database Quarterly Reports

A. INTRODUCTION

Fish health information is provided to MAFF on a quarterly basis through agreement with all parties contributing information to the BCSFA Database. This includes information from:

- Privately owned freshwater and marine finfish aquaculture sites
- Publicly owned freshwater and, where applicable, federal Salmon Enhancement facilities operated by Fisheries and Oceans Canada (DFO)
- Public freshwater and netpen facilities operated by Freshwater Fisheries Society (FwFS)

The purpose of the database is to manage fish health information submitted by both private and public sector fish culture facilities under new fish health management regulations in British Columbia. The database will provide baseline information for an objective picture of fish health in the Province.

There are currently 13 companies operating private aquaculture facilities in British Columbia. Eight of these (or 62%) are providing data to the database. This represents all the major Atlantic salmon operations and many of the Pacific salmon operations. The five remaining facilities are smaller operations producing mainly Chinook salmon.

The public sector facilities have agreed to also provide data to the database. As of October 2003, information has been provided from eleven Salmon Enhancement facilities operated by DFO and two FwFS hatcheries. While this does not represent all public facilities, it does provide a sampling of the fish health concerns facing the public sector operations.

The following information defines how the database information was collected, entered, collated, and analyzed. This information should be understood in order to properly interpret the quarterly fish health summaries.

B. DEFINITIONS

Zones:

Zone 1	Pacific Ocean
Zone 2	Vancouver Island
Zone 3	Mainland coast
Zones 4-9	Mainland BC

MAFF has subdivided zones 2 and 3 into sub zones and made minor modification to DFO-defined zones to accommodate the Fish Health Surveillance program.

Fish Group: The species or genetic grouping of a particular species of fish cultured in a private or public facility.

Species cultured in B.C. (common names):

- Atlantic salmon
- Brook trout
- Brown trout
- Bull Trout
- Chinook salmon
- Chum salmon
- Coho salmon
- Cutthroat trout
- Kokanee salmon
- Lake trout
- Pink salmon
- Rainbow Trout
- Rainbow x Steelhead
- Sockeye salmon
- Steelhead

Water types:

Anadromous salmon spend their lives in both freshwater and saltwater. Because diseases can be quite different in the two water types, water type is recorded and defined as:

Water Type	Definition
Freshwater	<10 ppt. salt
<ul style="list-style-type: none">• Surface• Ground• Mixed surface and ground	
Saltwater	
<ul style="list-style-type: none">• Brackish• Salt	10-25 ppt. for > than 90% of the year at 3-5 metres depth > 25 ppt. for > than 90% of the year at 3-5 metres depth

Fish Health Event: For the purposes of this database, a Fish Health Event is defined as: an active infectious disease or suspected infectious disease event that triggers (1) veterinary involvement and (2) an action such as treatment, husbandry change, further investigation and/or (voluntary) reporting to a regulatory authority, where such action is intended to reduce or mitigate risk associated with that event.

Key components of a Fish Health Event are the veterinary diagnosis, etiological agent (where applicable) and action after a veterinary opinion has been requested. A Fish Health Event may be associated with one or more actions, etiological agents, lab tests or veterinarians.

C. DATABASE CONTENT AND REPORTING

The information provided to the BCSFA database is proprietary and confidential and belongs exclusively to the BCSFA. All individual site information provided to the database is used to calculate reports that are, in turn, provided to MAFF. Data is entered monthly and all reports are retrospective based on the previous quarter's data.

It should be noted that in each quarter, the number of facilities providing data (i.e. the sample size) does vary, causing some variation in the calculations and results provided.

Zones and Sub zones:

The fish health zones used for database reporting and for the MAFF Audit and Surveillance program were established by DFO and are loosely based on watershed boundaries used for fish movements. These zones also follow natural geographical divisions of the aquaculture industry (see map). Companies reporting to the database fall into two major zones (2 and 3). Marine netpen operations are found in a series of sub zones within these (2-3, 2-4, 3-1, 3-2, 3-3, 3-4 and 3-5).

Zone-subzone	Geographic Area
2-3	Clayoquot Sound, South Vancouver Island
2-4	Nootka, Kyuquot and Quatsino Sound
3-1	Sunshine Coast
3-2	Campbell River and Johnstone Strait
3-3	Broughton Archipelago
3-4	North Vancouver Island and opposite Mainland
3-5	North Coast

Confidentiality

In order to protect confidentiality of information, reporting guidelines have been established. For freshwater land-based hatcheries, reports are provided on an "all zones" basis. Most of these facilities are located on Vancouver Island and there is no separation into sub zones/areas. For marine fish farms, reports are made by sub-zone, provided the sub-zone contains three or more companies. In the event that there are less than three companies, data are amalgamated into the next contiguous sub zone. When this has occurred, it is indicated in each report.

Each quarterly report consists of three sub reports:

1. Average mortality rate for each species in each sub zone
2. Proportional Mortality Rate by cause
3. Fish Health Events

Report 1. Average Mortality Rate

The average mortality rate is calculated as the total number of mortalities out of the total number of fish cultured in that zone or sub zone. This is reported for each species in the zone or sub zone for each category of water type. For example “all zones” Pacific freshwater data indicates the average mortality rate for all Pacific salmon cultured in all zones in fresh water.

Report 2. Proportional Mortality by Cause

The proportional mortality rate by cause is intended to provide a breakdown of the average mortality rate into the various causes of mortality. The proportional mortality rate should indicate what proportion of the average mortality is due to each of the causes provided. As these reasons vary in fresh and saltwater and by species, reports provided reflect these differential causes. For example, in quarter three for 2003, the average mortality rate for zone 2-3 Atlantic salmon in saltwater is 6.12%. The proportional causes making up that average rate were:

Proportional Cause	
Environmental	.34%
Fresh	4.13%
Handling/transport	.01%
Matures	.01%
Old	.78%
Poor performers	.85%
Predators	<u>.01%</u>
Total	6.13% *

* Subtotal may vary by .01% from average mortality rate due to rounding errors.

Mortality Causes – Freshwater

Data entry starts at the EYED EGG stage and is reported in monthly intervals to the Database.

Database Field	Description	Comments
Culls/ quality control	Includes all culls for inventory management (e.g., precocious males and non-smolts.)	This will be posted to INVENTORY
Systems-related	Rolled up category that includes all losses due to acute incidents, including: <ul style="list-style-type: none"> • systems/physical plant problems (e.g. power outage), • transport incidents, accidents • any acute disruption of “life support” for the fish. • vandalism and acute human-induced toxicological events 	
Background mortality	Rolled up category that includes all causes that are not culls, systems-related or fresh mortalities, including: <ul style="list-style-type: none"> • Poor performers (smalls, deformities, non smolts (died, not culled), pin heads etc.) • Water chemistry problems • Eye pick • Jumpers • Feed/ feeding problems • Handling • Old (not of histological (diagnostic) quality) • Fungus • Parasites • Bacterial Gill Disease • Predators 	DFO divides these into: <ul style="list-style-type: none"> • Husbandry related-- including feed/ feeding problems, handling, treatment errors • Routine/ daily mortalities—fungus, predators etc
Fresh	Rolled up category that includes total number of “fresh” mortalities <ul style="list-style-type: none"> • Mortalities due to suspected disease • Unexplained mortalities • Mortalities “of concern” 	DFO will put all fresh morts with unexpectedly high mortality levels and all suspect mortalities - including BGD, parasites, and other disease - into this category.

Mortality Causes – Saltwater

This will apply to all seawater farm sites, captive broodstock (DFO) and preliminary rearing of select stocks prior to saltwater release (DFO). These categories are intended for smolt and post-smolt life stages, including “smolt”, “immature/grow-out/harvest” and “broodstock”.

Field	Description	Comments
Predators	Total number of mortalities due to predators	
Environmental	Total number of mortalities due to environment (e.g. algae, low DO)	
Poor Performers	Total number of mortalities due to poor performers (includes precocious and maturing males and poor performers)	
Handling/Transport	Total number of mortalities due to handling, transport or mechanical damage	
Old	Total number of mortalities not of diagnostic quality (no reliable histological diagnosis)	
Fresh “silvers”	<ul style="list-style-type: none"> ○ Total number of fresh mortalities which may include suspected disease and/or parasite problems (fish sampled by the site/facility, MAFF or DFO would be included in this category) 	
Matures	Jacks	Pacific species only

Report 3. Fish Health Event

The Fish Health Event report provides an overview of the infectious agents that resulted in mortality. Based on information from the “fresh silvers” population of fish, this information provides details on the common infectious cause of mortality and how often these events occur that require action be taken to address them. Where there is an elevated rate in mortality, one can look to the Fish Health Events report (Report 3) to determine if there is a reason for the loss. For example, the results from second quarter 2003 Atlantic salmon saltwater mortality indicate elevated losses due to IHNV.

NOTE: Where a Fish Health Event occurs in one quarter and carries over to another quarter, this may, in some cases be reported as two events when in fact it is one ongoing event. However, if these are reported as one event, mortality rates may increase in the second quarter due to the previous quarter’s diagnosis.

In some cases, there is no fish health event reported, as the losses are reported via another regulatory mechanism. For example, in Zone 2-4 in the third quarter 2003, losses were elevated due to the occurrence of an algal bloom. This is not indicated in the Fish Health events report as no treatment or husbandry action could be taken to manage these losses but it is shown in the proportional mortality rate.