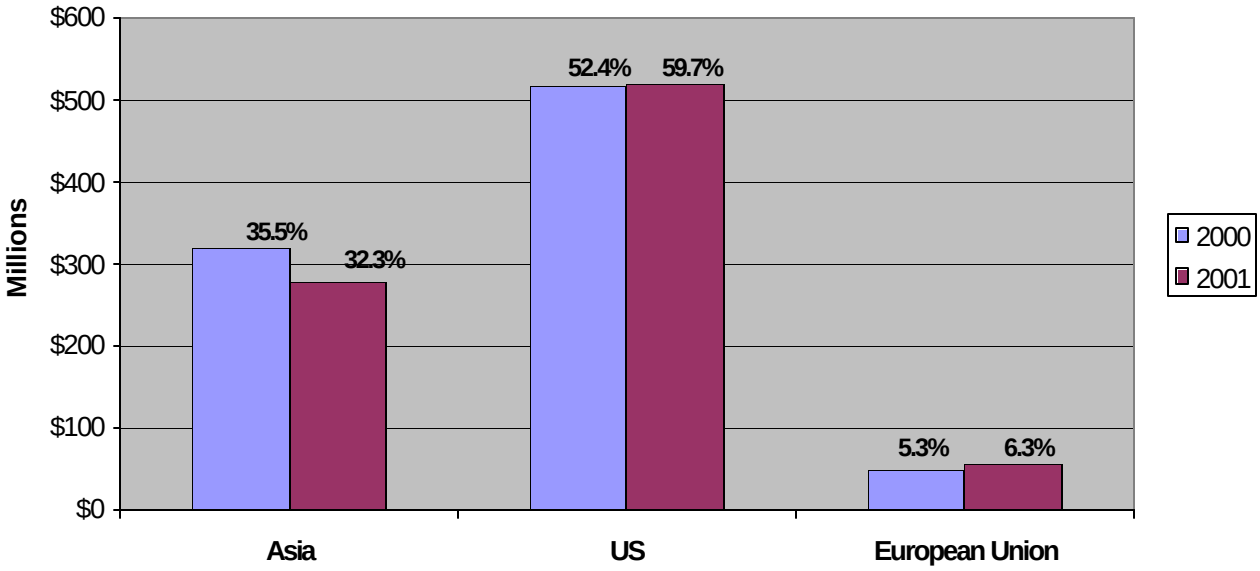
4.0 CURRENT CONDITIONS IN THE BC SEAFOOD INDUSTRY

4.1 BRITISH COLUMBIA SEAFOOD EXPORT MARKETS[12]

British Columbia exports over 90% (by value) of wild and farmed seafood production. Although the volume of seafood exported from British Columbia declined by about 10% during the 1990s (primarily due to the decline in wild salmon production), total export value increased by over 25% due to increased prices for shellfish and groundfish (including halibut). Almost 60% of BC's seafood export value is to the United States (Figure 4.1), an increase from 27% in 1990. About 35% of export value is to the Asian market (primarily Japan, Hong Kong and mainland China). Asian market share has declined from 45% in 1990, again due to the declines in wild salmon export volume and price. Exports to the European Union (EU) are approximately 6% of total export value, down from 21% in 1990.

Figure 4.1 Value of BC fish exports.



[12] **Sources**:
1. Price Waterhouse Coopers 2001. State of the BC Seafood Industry Report. Prepared for the BC Seafood Alliance.
2. GSGislason and Assoc. 2004 BC Seafood Sector and Tidal Water recreational Fishing: SWOT Assessment. Prepared for BC Min. of Agriculture and Fisheries Food
3. BC MAFF Trade Statistics, 2001
4. Carman Mathews, BC MAFF, pers. comm.

Figure 4.2 summarizes export value to the United States, Asia and the EU by product sector for 2001. The following points are noteworthy with respect to exports to these regions:

United States

- British Columbia's dominant export market, with both export volume and value growing substantially over the past decade,
- Dominant export market for groundfish, halibut, farmed salmon and some shellfish species (i.e. Dungeness crab and shrimp),
- Salmon is the largest product sector in terms of value (approximately 50% of total export value to the US). Over 80% of the salmon exported to the US is farmed product.

Asia

- Figure 4.2 includes exports to all Asian counties but values are dominated by exports to Japan, with growing markets in Hong Kong and mainland China,
- Herring (roe and spawn on kelp) is the largest valued product exported to Asia, 35 to 40% of total export value. In contrast exports of herring products to the US and EU are insignificant (<1% of total export value),
- Value of shellfish exports to Asia is dominated by highly valued products such as live geoduck and frozen at sea prawns,
- Value of wild salmon exports to Japan has declined over the past decade; currently 25 to 30% of salmon export value is farmed product.

European Union

- There is a significant downward trend in export value to Europe, which currently represents only about 6% of BC's seafood export value,
- Over 85% of export value to the EU is salmon, primarily canned and smoked, but also frozen product,
- Farmed salmon exports to the EU are insignificant with none are reported on recent BC Ministry of Agriculture, Fisheries and Food summaries,
- A small amount of halibut and groundfish are exported to the EU, but the value of shellfish exports is insignificant.

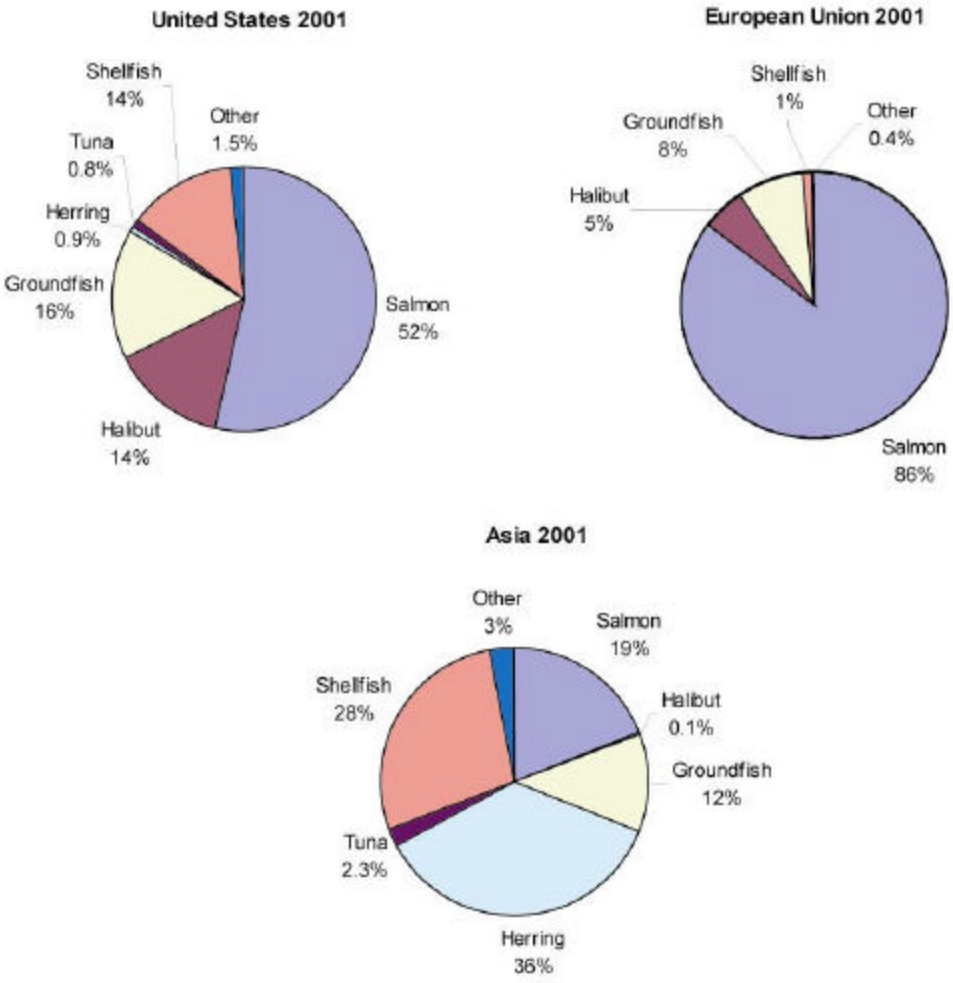


Figure 4.2 Relative value of BC seafood exports by product sector in 2001.

The status and trends in BC's seafood export market have important implications for traceability: The most relevant points are:

1. The EU is a small export market for BC ($55 million in 2001) and is dominated by processed (canned and smoked) salmon products. The introduction of the EU Food Law in 2005 will directly impact only a small and selective portion of the BC seafood export market, including traditional canned salmon exports. However addressing EU traceability regulations will be important in order to open new markets for BC seafood exports to Europe. The addition of eastern European countries to the EU may have some implication on traceability requirements for processed fillets such as hake.

2. The US is British Columbia's highest valued export market as well as the region where market growth (both volume and value) has been greatest over the past decade. The US is

also BC's most diverse export market, taking significant quantities of all seafood product sectors except herring. Although the EU appears to be the main "driver" for traceability initiatives in Canada (i.e. Can-Trace) it should be recognized that, for British Columbia, compliance with US export and traceability requirements (COOL and US Bioterrorism) will be more immediately significant for the seafood industry.

3. Although exports to Japan have declined over the last decade, exports to China and Hong Kong have increased. Traceability regulations for seafood in Asian countries have yet to be defined, but it is important to consider upcoming initiatives in these important export markets. Interviews with BC processors suggest that the Japanese market is demanding traceability information, whereas the Hong Kong/China market is quality driven but currently does not emphasize traceability.

4.2 DETERMINATION OF TRACEABILITY DATA REQUIREMENTS FOR BC FISHERIES AND AQUACULTURE INDUSTRIES

A key component of this project was to determine the data elements required to establish full product traceability within BC fisheries and aquaculture industries. This was a difficult task because there is no one document which lays out these traceability requirements for all markets. Our approach was a three-step process involving:

1. examination of an existing seafood traceability guideline,
2. analysis of relevant traceability regulations, and
3. consultations with industry members.

Each of these steps is described in detail in the following sections.

4.2.1 Tracefish Project Data Set

As food buyers, consumers and regulators demand increasing volumes of information about seafood products, seafood industries around the world have recognized that there are an infinite number of data elements that *could* be recorded. The struggle that each industry faces is to determine what data elements *should* be recorded. The most significant initiative yet undertaken to define the data elements appropriate for the wild harvest fisheries and aquaculture industries is the *Tracefish* initiative funded by the European Commission. As part of the Tracefish project[13], over 100 major European fish exporters, processors, importers and research institutes participated in establishing a European consensus on what data should be recorded and transmitted in European seafood supply chain. The data elements deemed by Tracefish to be appropriate for full traceability of the wild harvest and aquaculture supply chains are presented in the following two documents:

[13] http://www.tracefish.org/

- *Traceability of fishery products – Specification of the information to be recorded in captured fish distribution chains*[14]
- *Traceability of fishery products – Specification on the information to be recorded in farmed fish distribution chains.* (November 2002)

The full traceability data elements presented in these documents were primarily intended for companies operating in EU Member States and Non-EU countries exporting to EU Member States. However, the traceability standards established by the Tracefish data set have now formed the global benchmark for full traceability within seafood supply chains. These standards now form the basis for numerous traceability implementations in the seafood industry as well as in publicly funded pilot R&D projects.

As a result of its global endorsement, the Tracefish traceability data sets were adopted by this project as the *basic level of traceability* that BC fisheries and aquaculture industries should aim for when developing/evaluating their traceability systems. The Tracefish traceability data sets, therefore, form the basis of three important tables contained within this report:

- Table 4.1 entitled *Wild Harvest Fisheries: Traceability Requirements and Definitions* is based upon the tabular information presented in the Tracefish 'Captured Fish' document.
- Table 4.2 entitled *Finfish Aquaculture: Traceability Requirements and Definitions* is based upon the tabular information presented in the Tracefish 'Farmed Fish' document.
- Table 4.3 entitled *Shellfish Aquaculture: Traceability Requirements and Definitions* contains only the identity-related traceability elements presented in the Tracefish 'Farmed Fish' document. The Tracefish farmed fish document was designed specifically for the finfish aquaculture supply chain. Therefore, the production history/quality/safety data elements defined in this document are not applicable to shellfish aquaculture. Tracefish has not undertaken a similar identification of shellfish-specific data requirements.

These tables are located at the end of Section 4.0.

Data elements identified within these tables as **mandatory** are required to track/trace the identity of a trade unit along the supply chain from producer to processor. Data elements more associated with food safety and quality assurance are identified as either **recommended** or **optional**.

Tables 4.1-4.3 do not indicate how or where information is to be stored. Instead, the specific product identity information requirements (e.g. name, address, phone) are detailed for each step in the chain. How information is stored will depend upon the traceability system implemented.

4.2.2 Data Elements Required By Relevant Regulations

For industry to supply BC seafood to key international markets, traceability requirements stipulated in the regulations of some of BC's major seafood trading customers will have to be met. Globally and domestically there are many other regulations and initiatives aiming at

[14] Source http://193.156.107.66/ff/po/EUTrace/WGCaptured/WGC_StandardFinal.doc.

developing traceability systems for seafood. Indications are this list will continue to grow in the future.

Recognizing that the Tracefish traceability data set may not satisfy all of the traceability regulatory requirements placed upon BC fisheries and aquaculture industries, an additional twelve regulations that have important traceability-related implications were investigated including:

- US Bioterrorism Act (USBTA)
- US Country of Origin Legislation (COOL)
- Canadian Food Inspection Agency *Quality Management Program (QMP)*
- Canadian Food Inspection Agency *Canadian Shellfish Sanitation Program (CSSP)*
- Canadian Food Inspection Agency *Vibrio Parahaemolyticus Program (Vp)*
- EU General Food Law (EC 178/2002)
- European Council Regulations 2001/2065, 2003/804, 2004/319, 2004/852, 2004/853, 2004/854

The following subsections summarize the traceability-related implications of these regulations. The dates when these regulations come into effect vary (Table 4.4) and there will likely be a grace period during which time industry will be expected to adjust their operations and comply with the regulations.

Table 4.4. Effective dates for traceability regulations, see Section 4.2.2 for details of specific regulations

Name of Regulation	Effective Date
US Bioterroism Act	December 2003
US Country of Origin Legislation	March 30, 2005
CFIA Quality Management Program	1992
CFIA Canadian Shellfish Sanitation Program	April 1997
CFIA Vibrio Parahaemolyticus Program	Summer 2000
EC 2002/178 – EU General Food Law:	January 1, 2005
EC 2001/2065:	October 2001
EC 2003/804:	May 1, 2004
EC 2004/319:	May 1, 2004
EC2004/852:	No earlier than January 1, 2006
EC 2004/853:	No earlier than January 1, 2006
EC 2004/854:	No earlier than January 1, 2006

4.2.2.1 US Bioterrorism Act (USBTA)[15]

Section 306 of the US Bioterrorism Act requires the establishment and maintenance of records for one-up, one-down traceability and specifies a 4 hour (during business hours) and 8 hour (during non-business hours) time limit to respond to a Food and Drug Administration (USFDA) demand for information.

[15] Source: http://www.cfsan.fda.gov/~acrobat/fr03059a.pdf

Non-Transporter Sources – a processor shipping to the US must be able to provide specific information on all *"immediate non-transporter previous sources"*. In other words, the USBTA requirements apply specifically to the processor – who must be able to provide information on all sources 'one-step' upstream. To meet the one-up traceability requirement where product moves directly from harvester to processor, the harvester would be considered the 'one-up' non-transporter previous source. It would, therefore, be the responsibility of the harvester to record and share certain information to allow the processor to comply with the USBTA requirements. The harvester-related USBTA information required by the processor is shown in Tables 4.1- 4.3.

Where product moves from harvester to buyer to processor, the buyer would be the 'one-up' non-transporter previous source; the buyer would, therefore, assume the responsibility of providing the processor with USBTA-related information. The buyer-related USBTA information required by the processor is shown in Tables 4.1- 4.3.

Transporter Sources – a processor shipping to the US must also be able to provide specific information on all *"immediate transporter previous sources."* The one-up transporter-related USBTA information required by the processor is shown in Tables 4.1- 4.3.

The USBTA has been implemented, and so far, little attention has been directed toward the record keeping component of this legislation in contrast to the prior notice provisions, which are considered onerous by many exporters and transporters.

4.2.2.2 US Country of Origin Legislation

The US Country of Origin Legislation (COOL) requires fish products to bear labels identifying their country of origin and method of production (wild/farmed). However, in addition to this labelling requirement, the USFDA also requires country of origin and production method to be verifiable through additional supporting documentation. COOL requires that all suppliers possess, or have legal access to, records that substantiate origin claims – and that they maintain records unique to each transaction for 2 years. The records must identify the previous source and subsequent recipient of all products.

With regard to finfish aquaculture, the hatchery must provide enough information for an auditor to verify the origin and ownership of all shipments of fry/fingerlings and must properly record all hatchery production according to origin designation. Finfish grow-out facilities must identify and segregate fingerlings according to the origin designation. They must properly label and identify all marketable size fish sold as well as maintain all ownership transfer records.

With regard to shellfish aquaculture, the hatchery must provide adequate information for an auditor to verify the origin of all seed, eyed larvae and set cultch. The shellfish grow-out facility must be able to identify and segregate seed according to the origin designation and manner of production. The grow-out facility must also maintain and identify origin designation information as well as maintain ownership and transfer records.

Examples of the type of documents that the USDA considers would be "useful" to verify country of origin and method of production for wild harvest, finfish aquaculture and shellfish aquaculture are shown in Table 4.5. As indicated by the lists of "useful" verification documents shown in

Table 4.5, the basic labelling requirements under COOL would not satisfy the COOL verification requirements. However, on the basis of the suggested verification documents, it is considered that a basic traceability system would readily provide adequate verification.

The USDA issued an interim final rule for the mandatory country of origin labelling program for fish and shellfish on September 30, 2004. This rule became effective on March 30, 2005. All cooked and canned fish and shellfish products, including such items as canned tuna and canned sardines and restructured fish products (e.g. fish sticks and surimi), are excluded[16]. Similarly, processed products where the fish or shellfish is an ingredient (e.g. sushi, crab salad, and clam chowder) are excluded from COOL legislation.

Table 4.5. Documentation useful to verify country of origin and method of production under COOL legislation.

Supply Chain Stage	Wild Harvest[17]	Finfish Aquaculture[18]	Shellfish Aquaculture[19]
Hatchery		Hatching records Broodstock records Purchase records Sales receipts Feed bills Feeding records Site maps Production estimates Health records Ownership records	Spawning records Broodstock records Seed/eyed larvae purchase records Feeding records Ploidy records Cultch purchase records Growth records Spat collection records Site maps Production records Import permits Health records Crop records and reports
Grow-out/ harvest	Catch area Vessel ID Harvest records Transportation records Dispatch/Reception records	Transportation records Receiving records Purchase records Sales records Feed bills Feeding records Stocking records Replacement activities Segregation plan Feed per acre rate Cage yield rate Location Site map Harvesting records	Seed/eyed larvae records Cultch purchase records Seed transfer records Inspection monitoring records Dive records Transfer permits Transplant records Site maps Harvest records Landings reports Crop records and reports Sales records Sampling records Bulk tagging transaction records

[16] Source: http://www.ams.usda.gov/COOL/ls0213.pdf
[17] Source: http://www.ams.usda.gov/COOL/coolwfish.pdf
[18] Source: http://www.ams.usda.gov/COOL/coolfish.pdf
[19] Source: http://www.ams.usda.gov/COOL/coolshellfish.pdf

4.2.2.3 EU General Food Law (Decision 2002/178/EC)

The EU General Food Law lays down the general principles and requirements of food law, establishing the European Food Safety Authority and establishing procedures in matters of food safety. According to Article 18 of Decision 2002/178/EC, the traceability of food shall be established at all stages of production, processing and distribution. According to Article 2(5), transport businesses are considered to be 'food businesses' and must therefore comply with the traceability requirements of Article 18. The article requires that a food business be able to identify any *person* from whom they have been supplied with a food product. This person can be an individual (e.g. fisher or shellfish grower) or a legal entity (e.g. business). The food business must also be able to identify legal entities that it subsequently supplied with this product[20].

Article 18 does not detail the specific data elements that the EU would demand to meet its traceability requirement. However, the document entitled *"Guidance On The Implementation Of Articles 11, 12, 16, 17, 18, 19 And 20 Of Regulation (Ec) N° 178/2002 On General Food Law"* (see footnote 16) more clearly stipulates the data requirements. These data requirements appear in Tables 4.1-4.3. For highly perishable products destined directly to the final consumer, this document states that records should be kept for the period of 6 months after date of manufacturing or delivery. For products with a specified shelf life, records should be retained for six months beyond the specified shelf life. Records for products without a specified shelf life must be retained for 5 years.

The 'guidance document' cited above states clearly that the traceability provisions of Article 18 do not have an extra-territorial effect outside the EU. In other words, exporters in non-EU trading partner countries are not legally required to fulfill the traceability requirement imposed within the EU. According to this document, the objective of Article 18 is sufficiently fulfilled because the requirement extends to the importer. Since the EU importer shall be able to identify the exporter in the third country, the requirement of Article 18 and its objective is deemed to be satisfied.

While BC fishery and aquaculture supply chains may not be legally required to fulfill the traceability requirements of the EU General Food Law, the data requirements of this regulation have been included in this report for the following reasons:

- Exporters must be prepared to provide the traceability-related information that may be needed by the importer for compliance with the regulation. Some of the product-related information required by the importer may extend back to the harvester.
- The traceability requirements of the General Food Law will likely become the template for other countries seeking to implement traceability legislation. In other words, a level of traceability – similar to that required by this law – may soon become necessary for access to many other important markets.

[20] http://europa.eu.int/comm/food/food/foodlaw/guidance/guidance_rev_7_en.pdf

4.2.2.4 Decision 2002/2065/EC

Decision 2002/2065/EC lays down *"detailed rules for the application of European Council Regulation (EC) No 104/2000 in regards to informing consumers about fishery and aquaculture products"*. This regulation requires the recording of the following information:

- Commercial name of the species
- Method of production (i.e. wild or farmed)
- Catch Area. Products caught at sea have to show the area of capture (taken from the FAO list, in annex of the above EU regulation). However, only the general area has to be mentioned (e.g. "Pacific Ocean") and not the "Area codes". Operators may provide additional information on the area.

These required data elements are noted in Tables 4.1- 4.3.

4.2.2.5 Decisions 2003/804/EC & 2004/319/EC

Decision 2003/804/EC lay down *"the animal health conditions and certification requirements for imports of molluscs, their eggs and gametes for further growth, fattening, relaying or human consumption."*

Decision 2003/804/EC applies only to

- live molluscs, their eggs and gametes, for further growth, fattening or relaying
- live molluscs and non-viable molluscs for immediate human consumption or further processing before human consumption.

According to this regulation, EC member states shall authorize the importation into their territory of live molluscs intended for immediate human consumption, or for further processing before human consumption, only if:

- the molluscs originate and have been harvested in a territory listed in Annex I of the regulation.
- the consignment complies with the guarantees, including those for packaging and labelling and the appropriate specific additional requirements, as laid down in the animal health certificate in Annex II of the regulation.

At the time of adoption of Decision 2003/804/EC, no non-EU countries could be listed in Annex I to the Decision. In order to avoid interrupting trade with third country exporters, the EC adopted Decision 2004/319/EC which amended Annex I of 2003/804/EC to include a list of countries temporarily approved as exporters to the EU. Countries – such as Canada – that appear on this list must allow EC regulators to conduct inspections regarding their compliance with 2003/804/EC. These inspections were to have been completed by January 2005.

Through this regulation, the EU requires that the exporter can attest to the disease status of the animals being exported. According to the 2004 report by the Centre for Coastal Health entitled *"Capacity of the British Columbia shellfish industry to meet European Union health requirements for exports: Preliminary situation assessment"*, Decision 2003/804/EC (implemented May 2004) had an immediate impact on BC's shellfish aquaculture exports by blocking the import of products into the EU – thereby causing economic losses for Canadian shellfish producers. This report emphasized that there continues to be limited scientific data or systematic surveillance upon which to base assurances that specific diseases are absent in BC wild or farmed shellfish stocks. The lack of a systematic coordinated shellfish health program to

verify compliance with Decision 2003/804/EC will therefore continue to present challenges to BC companies seeking to export shellfish to the EU.

The key traceability-related requirements of this regulation include:

A. Farms must maintain up-to-date records that are open to scrutiny on:
- Observed mortalities of molluscs, eggs or gametes entering or leaving the farm
- All information on the delivery and dispatch of molluscs, eggs or gametes
- The number or weight, size, origin, suppliers and destination of molluscs, eggs or gametes

B. In order to meet EU requirements, reliable evidence of freedom from particular diseases is needed. Farm shellstocks must have been free of unexplained or abnormal mortalities for two years prior to shipment; as well, the regulation requires that the farm be capable of providing evidence that it is free from specific diseases (one of these diseases, Denman Island Disease, does occur in BC).

The data elements associated with Decision 2003/804/EC appear in Table 4.3.

4.2.2.6 Decisions 2004/852/EC, 2004/853/EC & 2004/854/EC

Decisions 2004/852/EC, 2004/853/EC and 2004/854/EC represent a trio of related regulations that deal with food hygiene "*laying down specific rules for the organisation of official controls on products of animal origin intended for human consumption*". While these regulations focus on animal health certification, they do contain a limited number of requirements that would demand the existence of a traceability system for verification of compliance. These requirements appear in Tables 4.1- 4.3.

4.2.2.7 Canadian Food Inspection Agency *Quality Management Program*

QMP plans are quality control plans required for federally registered seafood processing plants. The QMP uses the internationally recognized HACCP (Hazard Analysis and Critical Control Point) principles for ensuring safe food production. The shellfish harvester and/or buyer must provide the processor with certain information for the QMP requirements to be met. In the case where the buyer does not transform the original trade units, it is assumed that the only additional information requirements (over that provided by harvester) would be 'buyer name'. However, where the buyer transforms the original trade units into new units, the complete QMP information requirements must be re-stated (re-recorded).

The data requirements associated with the QMP are listed in Tables 4.1 and 4.3.

4.2.2.8 Canadian Food Inspection Agency *Canadian Shellfish Sanitation Program*

Harvesters are legally obligated to identify and label shellstock in accordance with CFIA CSSP requirements. In the event of contaminated product entering the market, proper CSSP tagging and recording currently provide the only way of tracking product back to the source harvester and lease area.

Shellfish growers must attach harvest tags to each shipping unit (e.g. sack, crate, bin, cargo net) of their product. When smaller sacks are placed inside a larger sack or cargo net, only the larger unit requires a tag if the larger unit will not be broken down until it reaches the processor.

However, for purposes of liability and tracking, some industry members interviewed for this project recommended that all containers be tagged.

The data elements that the CSSP requires to be recorded on the harvest tag are included in Tables 4.1 and 4.3.This tag is to remain attached to the product unit until the unit is empty – and thereafter kept on file for 90 days.

4.2.2.9 Canadian Food Inspection Agency Vibrio parahaemolyticus (Vp) Control Program

During the summer months (generally June to September, depending on water temperature) half shell oyster growers and transporters must record information as required by the Vp Control Program. The information required by the Vp Control Program appears in Table 4.3.

4.2.2.10 Data Elements Added Through Industry Consultation

Additional data elements were added to Tables 4.3 and 4.4 as a result of industry consultation. These data elements were:

- Table 4.2: while the Tracefish 'farmed fish' document specifies data elements associated with the manufacture of aquaculture feed, it does not specifically indicate the data elements to be recorded by feed users in order to provide a link between specific units of fish and the units of food that they consumed. Therefore, Table 4.2 has been 'enhanced' with data elements essential to provide this feed manufacturer-feed user link.
- Table 4.3: since the Tracefish 'farmed fish' document did not contain production history/quality/safety data elements appropriate for shellfish aquaculture, Table 4.3 has been 'enhanced' with additional data elements derived through discussions with leaders in the BC shellfish aquaculture industry.

4.2.3 Cumulative Traceability Data Set for BC Fisheries and Aquaculture Industries

A cumulative data set appropriate for BC fisheries and aquaculture industries was determined as follows:

- Tracefish data set was used to establish a baseline level for full traceability
- Baseline level of traceability was enhanced with traceability data requirements from regulations relevant to BC fisheries and aquaculture industries
- Baseline level traceability was further enhanced through industry consultation

The resulting cumulative traceability data requirements, appropriate for BC fisheries and aquaculture industries, are presented in the final columns of Tables 4.1, 4.2 and 4.3. The 'cumulative requirements' column of each table specifies the information that must be recorded at each step in the supply chain, by each data responsible party each time a trade unit is transformed, transferred, sold or transported, in order to achieve full traceability between stages.

In addition to Tracefish, two other organizations (CanTrace[21] and EAN[22]) have produced seafood traceability guidelines. The cumulative traceability data set determined by this project for the

[2121] A discussion of the CanTrace initiative is given in Appendix C

[22] A description of the EAN numbering system appears in Appendix A including a demonstration of how the EAN system could be used to record the traceability data elements for BC fisheries is presented in Table W.

wild harvest fisheries was compared with the CanTrace and EAN guidelines. This comparison showed that the wild harvest cumulative data set determined by this project provides for a more comprehensive level of traceability than either the CanTrace or the EAN guidelines.

4.3 OVERVIEW OF HARVEST FISHERIES TRACEABILITY PRACTICES

4.3.1 Data Sources

A number of data programs are in place in the BC fishing industry to collect catch, landing and sales data. Most of the information is collected for fisheries management, enforcement and stock assessment purposes and mandated by Fisheries and Oceans Canada (DFO). Additional programs collect information for food health and safety, business transaction, invoicing and traceability purposes. These programs have been implemented over time in a cumulative fashion, with new systems added to old systems to address issues or management initiatives within specific fisheries. The initial information systems were harvest logs and sales slips. More recent additions have been validation records and transit slips as part of dockside monitoring programs for individual quota fisheries. A brief explanation of these programs is provided in the accompanying inset box.

DFO Fisheries Data Programs

Hail - Hail reporting may be required prior to fishing and/or after fishing. "Start fishing" hails are used to keep track of which vessels are fishing where, when and for what species. "End fishing" hails may be used for notification that the vessel has left the fishing grounds, for reporting catch totals and/or notifying when and where catches will be offloaded. The harvester is responsible for hail reporting and, with the exception of roe herring packers (where certified scales are required on board), catch amounts are estimates.

Harvest Log - Harvest logs are a record of fishing events that document what was caught, where and when. Species and amounts reported are estimates made by the harvester. The location of catch is usually documented as latitude and longitude coordinates.

Validation Record - Validation records are completed by dockside observers, who independently record and report how much of each species (or species aggregate) was offloaded from each vessel and from each area fished. Weights are obtained from certified weigh scales at the offload site and are used for business transactions. Validations are used to maintain an official accounting of vessel and area quotas. Validation information is regarded as the most accurate and reliable fish landing information.

Transit Slip - A transit slip is completed by a dockside observer for halibut and sablefish offloads and may sometimes be used for rockfish hook and line, Schedule II species, and groundfish trawl offloads. The transit slip is similar to a bill of lading, documenting the transport company, when and where product was picked up, what the product is, the number of containers, the total weight, and where and when the product was delivered.

Sales Slip (Fish Slip) - A sales slip is a record of sale between the fisher and the buyer of his product. Typically, sales slips are completed and submitted to DFO by commercial buyers. Weights reported in fisheries with dockside validation are usually validated weights. Amounts reported on sales slips in fisheries without dockside validation are taken either before or after the product is processed (e.g. shrimp harvesters are generally paid on processed or peeled weight). Sales slips may also document fishing area and harvest date, but this information is generally considered to be unreliable. Sales slips are used for estimating the economic value of the fisheries.

At-Sea Observer Catch Estimation - An at-sea observer independently records the catch (species kept as well as discarded), time and area of fishing. Other information such as gear specifications, weather and biological sampling information may also be recorded. Catch weights are usually estimated based on standard catch estimation methodologies. At sea observer catch estimates are not carried out in all fishing sectors and, with the exception of groundfish trawl where observer coverage occurs on 100% of the fishing trips, observer catch estimates are only carried out on a portion of fishing trips.

Other data programs, such as delivery records, processing records, storage records and sales records may also be used by buyers or processors depending on the type of operation and product(s) produced. Examples of some of these non-DFO programs are given in the accompanying inset box.

Other Data Programs

Offload Tally

Offload tally sheets are used by custom offloading companies to record the catch landed by a vessel. If a dockside monitoring program is in place, observers will have a separate tally sheet for the validation record, and the weights on the offloader's tally sheets will be verified by the dockside validation observer. The information on the offloader's tally sheet may be organized differently from a validation record because the tally sheet functions as a business transaction record possibly based on grade or quality categories rather than species and area categories used for fisheries management purposes. Typical information recorded on an offload tally includes offload company, vessel and buyer, product description, container weights, number of containers, and transport company.

Bill of Lading

A bill of lading is a business record kept by transporters documenting what packages they picked up, who they picked them up from and to whom, where and when the packages were delivered. The information contained on the bill of lading is used for invoicing purposes by the transport company.

4.3.2 Date Review

Fisheries and Oceans Canada currently requires large amounts of information to be collected and reported through one or more of the data systems outlined in the previous section. The responsibility for this information is placed at the harvester level, as other agencies have jurisdiction over other business partners in the supply chain. DFO data requirements for each commercial fishery in BC were reviewed and an inventory of these requirements is provided in Table 4.6 (see end of Section 4.0). Sources examined for these requirements included commercial fishing management plans and conditions of licence, third party validation records and data forms, harvest logs, sales slips, and personal communications with fishery managers and harvest association representatives.

The emphasis of the review was placed on fisheries with the significant volume or value relative to total seafood production in BC. Table 4.7 provides a summary of the number of active licences, volume landed and value for each fishery included in the review. Intertidal clam wild harvest is also of significant volume and value but has not been included in the review because the reporting data requirements were essentially the same as shellfish aquaculture under the Canadian Shellfish Sanitation Program.

Table 4.6 provides the comprehensive data requirements applying to all participants, all the time. Partial requirements were not documented because such programs do not provide the comprehensive data set required for traceability purposes. The party (skipper, observer, buyer) that collects the information is also indicated in Table 4.6.

It should be recognized that some fisheries have more than one level of licensing category (e.g. Option A and Option B designations in the rockfish hook and line and groundfish trawl fisheries) Each licence level is accompanied by a specific set of requirements. The data provided in Table 4.6 represents what is collected consistently across the entire fishery, regardless of licence level.

Table 4.7. Summary of landed weight and value of BC fisheries included in the traceability data review[23]

Fisheries Sector	No. Licences	Landed Wt. (tonnes)	Landed Value ($ millions)
Halibut	435	5,450	48
Sablefish	48	1,900	15
Rockfish	262	790	5
Schedule II	541	5,280	3
Groundfish Trawl	142	98,100	66
Herring Roe	1523	24,600	37
Herring SOK	46	390	9
Tuna	209	5,140	18
Salmon (Gillnet, Seine, Troll)	2221	33,100	57
Geoduck	55	1,820	39
Prawn Trap	252	1,700	18
Red Sea Urchin	110	4,770	8
Green Sea Urchin	49	120	1
Sea Cucumber	85	1,150	2
Crab	222	4,090	28
Shrimp Trawl	245	2,000	5
Total		**190,400**	**358**

4.3.3 Traceability Issues – Harvest Level

A gap analysis between the traceability requirements (Table 4.1) and the fisheries data requirements (Table 4.6) was used to identify whether the required traceability information is being collected for specific fisheries. Identified data gaps for specific fisheries are provided in Table 4.8 (end of Section 4.0) and in the State of Readiness report cards (Section 5.1). This analysis, and subsequent interviews with processors (Section 4.3.4) identified a number of general data issues at the harvest level of the supply chain which are summarized below.

A. Most of the required data at the harvest level is collected but product identifiers are lacking

Product description information – Generally this information is complete and well documented. Usually this is the same information used for fisheries management purposes.

Business identification information – Harvester and buyer identity information is documented but transportation details such as who the transporter is, when and where products were picked up, by which vehicle, and when and where they were delivered is not well documented within existing fisheries data programs. Better transportation documentation exists in validated fisheries than non-validated fisheries. Bill of ladings and buyer delivery records are not included in Table 4.6, and are likely a better source of transportation information than fisheries management sources, therefore the integration of this information is required.

Product identification – The identification of products by batch numbers, trade unit ID's and logistic unit ID's are virtually non-existent in most fisheries except for spawn-on-kelp where there are shipment numbers and tote numbers to identify products. Validation numbers used in dockside monitoring programs could serve as batch numbers. Product identification is one of the

[23] Source: GSGislason and Assoc. Ltd. 2004. BC seafood sector and tidal water recreational fishing: a strengths, weaknesses, opportunities and threats assessment

most important elements for traceability and the lack of product identification from harvester to processor is a major constraint to meeting traceability for this level of the supply chain.

B. Data systems vary greatly and data transfer is often ineffective

The required traceability data elements are recorded by a variety of data systems and data parties. If this information is not stored and readily accessible with a data responsible party at a single location for each step in the supply chain, the traceback of a product will be slow and inefficient.

Creation and maintenance of records – All the data systems investigated were paper based with most information subsequently entered into either spreadsheets or databases. Using paper based systems requires data to be recorded in a timely manner; however, the timeliness of subsequent data entry into electronic data systems can be quite variable. For example, some harvest logs may not be entered into an electronic system for over a month after the fishing event. Although there is no *requirement* to have data in an electronic format, it is more efficient to search for data electronically in the event of a trace back.

Accessibility of records – The accessibility of fisheries data is variable. Some harvest information is sent directly from the fisher to DFO. This information would not be considered accessible, nor would likely be accessible in a timely manner. The accessibility of information is dependant to some degree on the nature of third party catch monitoring contracts. Some contracts are through DFO while others are through industry associations. The information collected under fisheries monitoring programs is protected under the Privacy Act. Information from these programs can be used publicly provided it is not specific to an individual. For traceability purposes, it is important to know the identity of the business (or harvester) as well as the product information, suggesting a problem may exist in using fisheries information for traceability purposes. However, personal identity information is already being provided by harvesters to transporters and buyers for business transaction and invoicing purposes, which suggests harvesters should be able to give consent to allow their information to be used for purposes other than fisheries management.

Compatibility and redundancy of data systems – The level of data system compatibility that exists through the supply chain is limited to paper records passed from one business to the next. There is virtually no communication of data electronically from water to buyer and there are duplicate systems in place recording similar information for different purposes. Processors do not generally use validation records as part of their internal data records (dive fisheries may be an exception). Two tally sheets are often created for an offload, one completed by an observer for fisheries management purposes and one created by the offloading company for business and invoicing purposes. Offload tallies and validation records are reconciled at the offload but the validation record is generally not used by the processor, leading to duplicate entry of offload information into separate data systems. The integration of these data systems would generate efficiencies for both processors and catch monitors.

Although the scope of this project does not cover the entire supply chain, it should be noted that traceability must extend throughout the supply chain (i.e. record keeping must be seamlessly linked throughout the chain to allow for effective and efficient communication). The traceability system eventually implemented at the harvester/buyer level should be compatible with the systems of all downstream players in the chain (all the way to the retail level). Since this need for compatibility extends to players in export markets, the use of globally recognized standards (e.g. the EAN numbering system) would improve compatibility with global partners.

C. Data systems are only partially verifiable.
At certain points in the supply chain, some data systems are verifiable. Dockside monitoring programs would be considered verifiable as they are carried out by a third party, but these programs are currently focussed on collecting data for fisheries management purposes. QMP systems are audited by federally authorities to ensure food is processed in a safe manner. Hails or fish slips are not be considered verifiable since there is no way to prove the information is accurate.

D. Data responsible parties are not clearly defined.
Much of the required information for traceability is collected through a variety of systems and parties in the supply chain including harvesters, monitoring service providers, transporters and buyers/processors. Although the traceability data required for any one party may be collected, that data is typically being collected, and held by two or three different parties. This situation is clearly not efficient in the event of a trace back nor is it acceptable according to verification requirements of the US Bioterrorism Act and COOL. It is important that a data responsible party be specified for each partner in the supply chain.

4.3.4 TRACEABILITY ISSUES - PROCESSING LEVEL

Since much of the response to changing export regulations lies with the processing sector, a series of interviews were conducted with processors to determine current traceability practices at the processing level in order to identify issues of concern to the BC seafood industry in meeting new traceability requirements. Processors were selected for an interview based on the species, product and export markets focus of their business. A total of seven processors were interviewed (Table 4.9).

Issues and themes related to opportunities and barriers to implementing traceability in the BC seafood industry identified as a result of the interviews are summarized below.

Table 4.7. List of processing companies interviewed about traceability practices.

Processing Company	Interview Contact	Products Sold	Primary Export Markets
Seaworld Fisheries	Tony Wong	Geoduck, crab, prawns	China, US, Asia
Aero Trading	Yuki Hamakawa	Roe herring, spawn on kelp, sablefish, tuna, prawns, halibut, salmon, crab	Japan, US, EU
Canadian Fishing Company	Ralph Drew and Kate Abraham	Salmon, herring	US, Canada, EU, Japan
Ocean's Fisheries	Doug Safarik	Salmon, herring, groundfish	US, Canada, EU, Japan
Finest At Sea Ocean Products	Paul Chaddock	Salmon, sablefish, groundfish, tuna	Canada, US
Lions Gate Fisheries and S&S Seafoods	Carl Caunce, Ty Dewar,	Groundfish, halibut, shrimp, salmon	Canada, US
North Sea Products	Thomas Okuma	Roe herring, sablefish, tuna, prawns, halibut, salmon	Japan, US

A. Product pooling may occur at various stages of the supply chain

The moment that product is pooled, traceability to a specific boat is lost. In some fisheries such as salmon and roe herring, pooling of product is common as a result of the way those fisheries are managed. None of the regulations reviewed *require* traceability to a single vessel/harvester (except CSSP/QMP for bivalves). For example, the EU General Law requires the traceability of food at all stages (you must be able to say where it came from) however, this does not preclude mixing or pooling of product from multiple sources.

> *"The Tracefish scheme does not demand perfect traceability, i.e. that a particular retail product should be traceable back to a single vessel or farm and batch of origin, or vice versa from origin to destination. Pragmatically it is recognized that mixing of units is likely to occur at a number of stages in the distribution chains, e.g. in grading at auction markets prior to sale and in the processing of raw materials into products. Where such mixing occurs, the food business is transforming the trade units. The requirement for traceability is that the business records the IDs of the received trade units that may be input to each created trade unit, and vice versa. The particular product is then traceable back to a finite number of vessels or farms and batches of origin, and vice versa."*[24]

The notable exception is the requirement to segregate product by country of origin under COOL legislation. Currently, some Canadian packers and processors mix product caught in US and Canadian waters. According to representatives of the Agri-Food Trade Service, this mixing would not be acceptable under COOL; rather, all product will be required to remain segregated by country.

If the mixing of product units occurs, it is essential that the ID of each unit contributing to the mixed consignment be recorded. This would ensure that even if the physical traceability of the *individual* product units were lost, their presence within the mixed consignment would be known (in case a trace back was initiated). Interviews with salmon processors indicate that this form of pooled trace back could be achieved in the salmon fishery, however the trace back process would be time consuming, requiring queries from an number of different data sources.

Although traceability systems do not preclude pooling, risk is increased each time product is pooled. For example, if a food safety problem arises in pooled product sourced from a number of vessels, all of the vessels and all areas fished within the pool would be implicated in the problem. If product had not been pooled, the problem could be traced to a specific vessel or area, and the vessels fishing other areas would be unaffected.

B. Traceability can facilitate improvements to product quality

For fisheries where harvesters are paid a differential price based on quality, "water to buyer" traceability systems have to be established. This is generally the case for groundfish trawl, but not the salmon fishery. In general, processors do not pay harvesters based on product quality for salmon because much of the product is pooled on packers and traceability to individual vessels is lost. Under this system there is no incentive for a harvester to deliver a product of higher quality. A good traceability system can help buyers with quality control, as it provides a tool to

[24] Source: http://www.tracefish.org/

determine which harvesters are meeting quality standards and which harvesters need to improve the quality of landed product.

Several smaller processors (Section 3.4) are using traceability information from harvesters (vessel, date of catch, method of harvest) to access higher valued niche markets (i.e. the restaurant trade). Some processors are appealing to the consumers' appetite for knowledge by marketing information such as where and when the fish were caught and how they were stored on board the vessel. In addition, sector wide initiatives (product labelling on frozen-at-sea prawns) are seen as a definite advantage in markets like Japan.

C. Traceability is often implemented on an "as required" basis

Many processors react to regulatory changes or consumer demand. Concern about costs means that only minimum requirements are met. Proactive, non-regulatory business case advantages are often not recognized.

D. Most processors do trace product through the plant

In general, processors have traceability systems in place within the processing facility by use of batch numbers, lot numbers or sales order numbers. Current data systems in processing plants consist of paper and spreadsheets. Bar code systems were not used by any of the processors interviewed. Most of the required traceability information from water to buyer is being collected, but effective one-up, one-down traceability is lacking.

E. Market driven fisheries have a traceability advantage over opportunity driven fisheries

The fisheries management regime can be a barrier to addressing quality and traceability issues due to the "rush" to move large amounts of product to the processor in a short period of time. In general, IQ managed fisheries are slower paced with fishing activity more closely linked with market demand. Some IQ fisheries focus on product quality through better product handling. One of the best examples of market based fishing is the geoduck fishing. Each day, an order is placed by buyers to harvesters for how many geoducks to harvest. Fisheries such as salmon are not as fortunate. The current salmon management regime forces fast paced fishing and product pooling in order to transport the high volumes of fish caught in short periods of time. The latter scenario is clearly more challenging for implementing an effective traceability system.

F. Consumer driven demand for product information/history is not a major driver in many BC fisheries

Globally, there is an increasing demand from consumers to know more about food products and their production history. At present, consumer demand for BC seafood seems to be driven more by quality issues rather than by product knowledge or history. This may change with increased recognition of MSC certification and the development of product information systems such as cell phone links to product data in Japan (Sections 3.1 and 3.5).

G. Cold storage facilities are a "weak link" in the traceability chain

Processors remarked that inventory information systems vary considerably among cold storage facilities, and that frozen product (especially salmon) is often stored by processor, species, grade and year, with no further identification to facilitate trace back to processor batch numbers or the harvester. Although this step is beyond "water to buyer" level in the supply chain, addressing

this weak link will be a major challenge to meeting full supply chain traceability for frozen product. Cold storage facilities were also identified as one of the biggest problems for Fisheries Officers attempting to determine origin or ownership and legitimacy of stored seafood products, as it is very easy to mix legal and illegal product with current record keeping practices (S. Roxburgh, Speyside Environmental Consultant, pers. comm.).

H. There is a cost associated with transporting and storing partial containers

Due to space constraints and the associated costs of transporting and storing seafood products, totes may be topped up (product pooled) to gain cost efficiencies. With the implementation of traceability, this practice may be more difficult or undesirable. For fisheries where production volumes are low and catch is commonly separated into species or grades, consideration should be given to using smaller containers for transportation and storage rather than the standard large sized, insulated fish totes.

I. Live product is often not segregated by harvester or fishing area and batching may be poorly documented

It is more difficult to segregate live product during transportation (live rockfish) and at the processing plant (Dungeness crab). In many facilities it is not routine practice to document batching for live holding tanks (except possibly by harvest area). Although this "gap" can be addressed at the transportation/processing level by improved batching records, the pooling of live product through distribution chains will prove to be a major obstacle to full traceability (R. Bulmer, Ron Bulmer Consulting Inc., pers. comm.)

J. The health and safety rationale for increased traceability requirements is considered questionable by many seafood processors.

Processors commented that existing QMP programs based on HCCAP adequately deal with the health and safety risks associated with seafood processing and distribution (i.e. existing batch traceability for canned products, QMP programs for bivalves and cooked shellfish). Several processors commented on the ability of the BC salmon canning industry to track every can of salmon back to a specific plant, date and retort batch from the can label. From a health risk management perspective many processors do not consider it necessary to incorporate full "water to buyer" traceability into QMP programs. This adds a "resistance factor" for implementing these traceability measures.

K. There is a need to integrate information technology with fish processing operations.

The cost of implementing traceability is a concern to processors. Processors are cautious to adopt new technologies (i.e. bar codes) due to concerns over how they integrate with the existing processing line operations (including the dynamics of supplying fresh market demand). Those processors who had investigated technological solutions (e.g.. bar codes) were not confident that they were presented with a workable system. This is in part due to poor understanding of technology on the part of processors and poor understanding of fish processing operations by technology suppliers.

It is clear from the issues outlined above that challenges exist for BC fisheries to transform their current data recording systems into an effective traceability system.

4.4 OVERVIEW OF FINFISH AQUACULTURE TRACEABILITY PRACTICES

4.4.1 Data Sources

Each link in the upstream finfish aquaculture supply chain (feed manufacturer to breeder to fish processor door) is responsible for collecting traceability-related information. The following inset box provides overview of the type of information collected by each supply chain link to facilitate traceability.

Feed manufacturer **-** To provide "one up" traceability for each ingredient incorporated into the feed, the fish feed manufacturer is responsible for recording the source, transporter, and receipt of each ingredient. "One down" traceability is achieved by recording the destination, transporter and delivery of each unit of feed dispatched.

Breeder **-** The breeder provides "one up" traceability by maintaining the ability to identify each fish or animal in its breeding stock and by maintaining accurate records of the collection, fertilization, and storage of eggs linked to individual from the breeding stock. "One down" traceability is achieved by recording the destination, transporter and delivery of each unit of eggs dispatched.

Hatchery **-** The hatchery provides "one up" traceability by maintaining the identity of the source of its eggs and the genetic identity of each unit of fish in the hatchery. In addition, a hatchery maintains detailed traceability records of all feed, medication and other inputs (e.g. water conditions) for each unit of fish as they grow and are transferred into progressively larger rearing tanks. "One down" traceability is achieved by recording the destination, transporter and delivery of each unit of juvenile fish dispatched.

Farm (Grow-out facility) **-** Maintaining the identity of the units of fish transferred from the hatchery provides "one up" traceability for the farm. In addition, the farm maintains detailed traceability records of all feed, medication, and other inputs for each unit of fish as they grow. "One down" traceability is achieved by recording the destination, transporter and delivery of each unit of fish dispatched.

Live fish transporter **-** Live fish transporters maintain traceability by recording the source, destination, reception and delivery of each unit of fish transported. Any pooling of pens of fish to accommodate transport is also recorded.

4.4.2 Traceability Systems and Practices

The following review of current traceability systems and practices were identified primarily from interviews with the following BC aquaculture companies:

1. Marine Harvest – provided information covering upstream finfish aquaculture supply chain from breeder to processor.

2. Target Marine – provided information covering upstream finfish aquaculture supply chain from breeder to processor.

3. Aquatec Seafoods Ltd. – provided information covering farm to processor link of finfish aquaculture supply chain.

4.4.2.1 Type of Information Collected

The types of information recorded by BC finfish aquaculture companies can be characterized into three categories (A) fundamental traceability information, (B) specifically required information and (C) commercially desirable information.

A. Fundamental traceability information

Fundamental traceability information is that information required to identify the product and trace its physical movement through the supply chain. For each stage in the supply chain, the fundamental information recorded includes:

- Unit (e.g. hatchery, farm site etc.) ID and location
- Quantity, nature and unit IDs of product received by the business
- ID's of the previous food businesses from whom those units were received
- Dates/times and places of reception
- Quantities, nature and unit IDs of product dispatched by the business
- ID's of the next food businesses (to whom those units are dispatched)
- Dates/times and places of dispatch
- 'Mapping' relationships between the units received and the units dispatched (when units are transformed by the business).

B. Specifically Required Information

Information required by legislation to be recorded at appropriate stages of the finfish aquaculture supply chain includes:

- Species, method of production and area of origin – required by US Country of Origin legislation. Therefore, it must be passed along the supply chain from production onward.
- Product description as required by US Bioterrorism legislation
- Animal health and disease control information including therapeutant usage

C. Commercially Desirable Information

Commercially desirable information about the nature of the product and the circumstances of its production is recorded by finfish aquaculture companies for a variety of reasons. These reasons include maximizing the efficiency of operations; limiting liabilities under product liability and safety legislation; assuring the safety and quality of products; enabling accurate labelling; and substantiating marketing claims. Examples of commercially desirable information include much of that listed above as well as:

- Details of raw materials, products, processes and controls
- Ethical information on the nature of the fish farming, on their sustainability and on their environmental impact
- Date of harvest of the fish
- Data on temperature control through the chain
- Information on quality/safety programs

4.4.2.2 Evaluation of Traceability Practices

Product identification - Depending upon the specific stage in the supply chain, the identification of products within the finfish aquaculture supply chain is based upon batch numbers, tray numbers, tank numbers, pen numbers and lot numbers. Identity based upon these designations provides an excellent level of identity traceability from broodstock to processing (and beyond) and is readily equated to the EAN trade unit/logistic unit system.

While identification begins at the breeding unit, with broodstock being individually identified, pooling and grading during the hatchery and grow-out phases generally prevents traceability back to an individual brood fish. Nonetheless, documentation of all pooling and grading does allow trace-back to a limited number of brood fish. Some of the finfish aquaculture managers interviewed acknowledged that pooling of penstock as a result of grading activities increased the potential for record keeping errors as well as increased the potential impact of a food safety issue

occurring further downstream. However, they indicated that the existing extent of pooling was dictated by essential hatchery and farm management practices.

The level of pooling in the BC finfish aquaculture industry is completely compatible with the benchmark traceability requirements that were reviewed during this project (see Table 4.2 for complete list). As stated previously, Tracefish does not preclude pooling of product - it only requires that the ID of the pooled product be linked to the ID's of all inputs. Traceability requires only that the mapping relationship is known.

Business identification - The identity of each business unit (e.g. hatchery, farm site, processing plant) is well identified and linked to product identities by all finfish aquaculture companies interviewed. Transportation business identity information is also well documented.

Product description and production information - There is a huge range of information of potential interest to downstream players in the finfish aquaculture supply chain and regulatory agencies. Given this fact, as well as country-specific production and market requirements, Tracefish states that its information specifications (presented in Table 4.2) cannot itemize the specific information that may possibly be required in every situation. As a result, Tracefish 'recommended' and 'optional' product description/production data elements shown in Table 4.2 should be viewed as the general 'type' of information that should be recorded rather than the specific data elements to be recorded by the BC finfish aquaculture industry.

By relying upon the Tracefish data elements as a guide, this study considers that the BC finfish aquaculture industry is currently recording an appropriate set of product description/production information.

Transportation related information - In addition to documenting the identity information of transporters, finfish aquaculture businesses and transport businesses link product identity information to data elements related to source and destination; time/date of reception and dispatch; and quality control checks.

4.4.2.3 Evaluation of Data Systems

The BC finfish aquaculture industry records its traceability data elements in computer-based data recording systems. In some cases, paper-based records are also maintained. The rationale for the duplicate paper records is that, while computer based systems are more efficient, system failure could result in the loss of essential information.

A. Traceability Software Solutions

Examples of the computer-based traceability systems used in finfish aquaculture include NuTrace, FarmControl (now know as WiseFarming) and Superior Control (also see Section 2.9.2).

As part of Nutreco, Marine Harvest represents a vertically integrated company with business units at all production stages of the finfish aquaculture supply chain. Through the implementation of their ***NuTrace*** system, Marine Harvest has a traceability system that provides fully transparent traceability from feed-to-fork. The underlying concept for NuTrace is that of a

data warehouse: data from each stage of the value chain is submitted on a continuous basis to a central server. The NuTrace software is designed to identify, link and cross link data to create a chain of knowledge from feeding and breeding to delivered product.

FarmControl (WiseFarming) is a Windows-based fish farm management system designed to meet the EU traceability requirements. This system imports data from other fish farm equipment, imports/exports data to follow fish transfers to other sites, and exports data to other systems and programs. The FarmControl *History Report* demonstrates (in text and graphic form) the movements of fish while on the farm. By identifying fish movements associated with grading and harvesting etc., the integrity of the fish in any unit is ensured. In addition, each unit of fish sold or transferred to another facility can be given a *Product Certificate* which summaries all the key indicators for that group in the period required. In addition, the FarmControl *Production Report* gives a detailed account of all activities in a summarized front page as well as detailed backup documentation.

In addition to providing product identity traceability, FarmControl also provides important animal health and husbandry functions. Both the *History Report* and the *Product Certificate* detail medication and vaccine usage. In addition, the system warns the user if fish units with incompatible health/treatment histories are about to be mixed. Feed types and volumes of feed and pigment are shown on the *Feed Report* and *Production Report*.

FarmControl instantly updates after each registration. As a result, the user has the assurance that information in reports is as up to date as possible. The FarmControl reports can be used to follow a unit or group of units for set periods of time – thereby enabling performance comparisons between both unit and period. The period can be further broken down by day, week or month.

FarmControl can be integrated with other systems and sophisticated modes of operation. For example, it can be used on-site or linked to terminal server applications in larger multi-site operations. This capability enables centrally based managers to access current data on-site, thereby providing information on single units, sites or the whole operation for management decisions.

B. Accessibility of records

As indicated by the previous examples, the implementation of a single traceability system by all units of a vertically integrated business provides managers with easy access to unit-specific information. Moreover, while not all finfish aquaculture companies have full vertical integration, the degree of integration greatly reduces the confidentiality concerns that can arise through easy accessibility.

C. Compatibility of data systems

The implementation of a single traceability system by all units of a vertically integrated business also eliminates issues related to the incompatibility of data systems. As a result, data system incompatibility was not an issue for the finfish aquaculture businesses interviewed.

D. Verification of data systems

As indicated previously, Marine Harvest has recently been certified by the ISO 9001 Quality Management Program. As part of this program, its traceability system will be verified by a third party auditor. Due to the competitive nature of the finfish aquaculture industry, it is likely that other BC companies will undertake similar certification in the future. In addition, as indicated previously, several large volume retailers currently conduct audits of the traceability systems of their finfish aquaculture suppliers.

4.4.3 Summary Analysis

Most BC finfish aquaculture businesses exhibit a high level of vertical integration. Their involvement in many stages of the aquaculture supply chain allows them to implement effective traceability systems covering the entire upstream chain, from breeding to processor. In addition, data on feed, medication, and other inputs used in the rearing process are readily recorded by these systems. These traceability systems readily allow them to meet all of the traceability requirements presented in Table 4.2.

While the downstream finfish aquaculture supply chain was not encompassed by this project, representatives of both finfish aquaculture businesses interviewed indicated that post-processing cold storage may represent a 'weak link' in their product traceability. The representatives expressed concern that cold storage companies do not keep an accurate record of inventory. In addition, these cold storage companies may transform logistic units without recording the appropriate transformation information. Since a finfish aquaculture traceability system is only as strong as its weakest link, it would seem imperative that cold storage traceability be elevated to a level equivalent with that of the upstream portion of the chain.

Since finfish aquaculture companies throughout the world have implemented similar sophisticated traceability systems, BC companies do not necessarily derive a competitive advantage from the use of such systems. Instead, BC finfish aquaculture companies have implemented traceability systems for the following reasons:

1. Regulatory requirements. Traceability systems allow finfish aquaculture companies to meet both general production and export regulatory requirements, as well as species-specific regulatory requirements[25].

2. Market requirements. Some high volume buyers of farmed salmon apply rigorous traceability standards to their enterprises and demand the same standards of their suppliers (see Section 3.4).

3. Production/Management Tool. As 0utlined in Section 3.3 the finfish aquaculture industry relies on traceability to improve production and management practices.

[25] To protect wild sturgeon from over-exploitation through commercial trade, the species has been placed on the International Trade in Endangered Species List. To allow Target Marine to market farmed sturgeon, each fish must be tagged with a serial code. Moreover, families of Target Marine sturgeon have been DNA profiled. As a result, each sturgeon can be tested against the wild sturgeon DNA profiles to ensure that poaching has not occurred.

Although meeting traceability requirements does not impart a general competitive advantage to the BC finfish farming sector, several related initiatives such as third party audits and organic certification may do so.

4.5 OVERVIEW OF SHELLFISH AQUACULTURE TRACEABILITY PRACTICES

4.5.1 Data Sources

Elements of traceability are present in the records of the upstream shellfish aquaculture supply chain partners (hatchery to processor). The following inset box provides an overview of the type of traceability information that may be held by specific supply chain partners.

Hatchery - A minimal level of "one down" traceability may be achieved through invoices identifying the destination and the transporter. The invoice number would also serve as a unique identification number for the 'batch' of product shipped. All shellfish seed businesses are identified by a unique certification number.

Nurseries - "One up" traceability may be achieved through invoices identifying the source, transporter and date of reception of hatchery seed. The invoice number should also serve as a unique identification number for the 'batch' of product received. "One down" traceability may be achieved through invoices or nursery records of the destination and date of dispatch of each unit of boosted seed dispatched.

Farm - "One up" traceability may be achieved through invoices identifying the source and date of reception of nursery seed. The invoice number should also serve as a unique identification number for the 'batch' of product received. Where the nursery and the farm are vertically integrated, "one up" traceability may be achieved through records linking the grow-out raft number and date of reception to the FLUPSY bin number of the boosted seed. "One down" traceability is achieved through the information recorded on harvest tags and bills of lading in compliance with the requirements of the CSSP and the Vp Control Program.

Live shellfish transporter - Invoices and packing slips should provide live shellfish transporters with a degree of traceability by recording the source, destination, and date of reception. As a requirement of the Vp Control Program (see Section 4.4.2 below), the traceability-related information recorded by the transporter is substantially increased for half shell oysters during the summer months.

4.5.2 Traceability Systems and Practices

The following review of current traceability systems and practices were identified primarily from interviews with the following BC aquaculture companies:

1. Aquatec Seafoods Ltd. – provided information covering farm to processor link of finfish aquaculture supply chain
2. Odyssey Shellfish Ltd./Stellar Bay Shellfish Ltd. – provided information covering the upstream shellfish supply chain from hatchery to processor.

4.5.2.1 Type of Information Collected

The types of information recorded by BC shellfish aquaculture companies can be characterized in a manner similar to finfish aquaculture: fundamental traceability information; specifically required information and commercially desirable information.

A. Fundamental traceability information

The type of fundamental traceability-related information that may be recorded in the shellfish aquaculture supply chain includes:

- Name and location of business enterprise (e.g. hatchery, farm site etc)
- Quantities, nature and "lot numbers" (e.g. invoice numbers) of product received by the business
- Name and location of previous food businesses from whom those units were received
- Dates of reception
- Quantities, nature and "lot numbers" (e.g. invoice numbers) of product dispatched by the business
- Dates of dispatch

B. Specifically Required Information

- Shellfish farms, transporters and processors record specific information as required by the QMP, CSSP and Vp Control Program. This information appears in Table 4.3.

C. Commercially Desirable Information

Some of the information recorded to meet regulatory requirements could also be considered as 'commercially desirable information' in other words, this information would limit liabilities under product liability and safety legislation, assure the safety and quality of products and enable accurate labelling. However, little information is recorded to gain a competitive advantage in the marketplace.

4.5.2.2 Evaluation of Traceability Practices

A. Product identification information

The identification of products using the specific designations of lot/batch numbers, trade unit ID's and logistic unit ID's is not used extensively in the upstream shellfish aquaculture supply chain (hatchery to processor). Currently, batches of shellfish lots are identifiable via invoice numbers, delivery slips and bills of lading, and harvest tags. The information recorded on harvest tags accommodates the traceability of batches of shellfish lots between the farm and the processing plant. The Vp Control Program implements a further degree of formality to the farm-to-processor traceability through the designation of unique lot numbers. Since the information on the tag and bill of lading is retained by the processing plant, traceability of shellfish lots between farm and plant is accomplished.

The current level of identity traceability within the upstream supply chain does not uniquely identify individual units of shellfish. Therefore, this level of traceability does not meet the requirements of the sophisticated level of traceability envisioned by Tracefish-related schemes. However, the current industry product handling practices could theoretically accommodate enhanced levels of traceability. For example, product is transferred between supply chain participants in smaller 'units' (e.g. bags/sacks, boxes, totes etc.). Multiple smaller units are shipped in a larger 'unit' (e.g. seed shipments from hatchery to nursery) or are transported as part of a larger shipment (e.g. shell stock shipments from farm to processor). This method of shipping product could readily accommodate an EAN numbering system where the smaller units would be designated as 'trade units' while the larger shipping units would be designated as 'logistic units'.

Nursery rearing systems and raft culture systems depend upon extensive grading and sorting to achieve consistent rates of growth and development. This grading/sorting necessitates a

considerable amount of product pooling. Current record keeping at the nursery and farm do not meet Tracefish requirements for documentation that maps transformations that occur between inputs and created units. For example, neither the transformations of specific units (lots) of seed within the nursery nor the transformations of units/lots of brood stock on the farm are fully documented. Many growers may currently view this level of traceability as unnecessary. Moreover, even the most progressive growers may encounter difficulty in approaching this level of traceability mapping until greater automation and technological innovation are achieved.

Beach culture of shellstocks also presents a formidable challenge to mapping and verifying the relationships between inputs and created outputs. For example, a significant portion of harvested beach cultured shellfish may originate from wild seed.

B. Business identification

The farm is well identified – and linked to product 'lots' – by the harvest tag and the Vp Control Program bill of lading. Since the information on the tag and bill of lading is retained by the processing plant, "one-up" traceability to the farm is readily accomplished. "One-up" traceability linking the hatchery identity to product received at the farm is much less formal and depends largely upon invoices and bills of lading. Transportation business identity information also lacks the formal documentation envisioned by Tracefish. With the exception of half shell oyster shipments during summer months, the identification of transport businesses relies on shipping records.

C. Product description and production information

There is a range of information of potential interest to downstream players in the shellfish aquaculture supply chain. Given this, as well as country-specific production and market requirements, the information requirement presented in Table 4.3 cannot itemize the specific information that may possibly be required in every situation. As a result, the 'recommended' and 'optional' product description/production data elements shown in Table 4.3 should be viewed as the general 'type' of information that should be recorded – rather than being regarded as the specific data elements that should be recorded by the BC shellfish aquaculture industry.

Overall, the BC shellfish aquaculture industry is currently recording most of product description and production information needed for safety and quality concerns. One food safety data element requirement identified by industry members interviewed was the regular recording of fecal coliform levels within shellfish meats. Currently, one aspect of the CSSP is based upon Environment Canada monitoring fecal coliform levels within growing waters, with CFIA conducting random tests of meat levels at the processing plant. Industry members cited instances where fecal coliform levels measured in growing waters permit harvesting, yet coliform levels measured in shellfish harvested from those waters exceeded permissible levels. As some important export markets rely upon testing coliform levels in shellfish meats, the documentation of meat testing data may be valuable for shellfish growers and processors.

D. Transportation related information

In addition to documenting the identity information of transporters via shipping records etc., shellfish aquaculture businesses and transport businesses link 'lot' identity information to date of reception and dispatch. Temperature and quality control information is recorded as required by the QMP and Vp Programs.

4.5.2.3 Evaluation of Data Recording/Storage Systems

A. Creation and maintenance of records

Data recording systems within the upstream supply chain are paper-based. There is no requirement to have data in an electronic format, although electronic systems may be more efficient than paper systems in the event of a trace back.

B. Compatibility of data systems

The level of data system compatibility that exists through the upstream supply chain is limited to paper records (invoices, bills of lading etc.) passed from one business to the next. There is virtually no communication of data electronically through the upstream supply chain.

Progressive grower/processors expressed interest in the implementation of computer-based traceability systems. However, the opinion expressed was, given the nature of the nursery/farm management practices, custom-built systems may be required. If custom systems were in fact necessary, it would be prudent to ensure that these systems are compatible with the data systems used by the downstream portion of the supply chain.

C. Accessibility of records

Information related to the farm-processor link of the chain is readily accessible. Harvest tag information is retained by the processor and this information provides a direct link to the farm. The accessibility of information upstream from the farm-processor link may be much more difficult to efficiently access. As indicated previously, most information recorded is paper-based and does not necessarily pass between supply chain participants.

D. Data responsible parties

The CSSP, processor QMP plan and the Vp Control Program clearly stipulate the data responsible parties for their specific data requirements within the farm-processor link of the supply chain.

E. Verification of data systems

As indicated in the finfish aquaculture section (Sect. 4.4) of this report, the BC finfish industry is beginning to seek certification by third party audited quality management programs. As an integral component of these programs, the program's traceability system will be verified by a third party auditor. Shellfish aquaculture industries in other regions of Canada (e.g. the Newfoundland mussel industry) are also seeking certification of their quality management programs. If BC shellfish aquaculture follows the lead of these other industries in the implementation of quality management regimes, their traceability systems would be verifiable.

4.5.3 Summary Analysis

The following issues have been identified with respect to meeting traceability requirements for shellfish aquaculture. Some of these issues (growout to processor) are also applicable to the wild harvest of intertidal clams.

A. US Bioterrorism Act Requirements

The USBTA "one up" traceability requirements for the processor are likely met through the CSSP/QMP/Vp requirements, depending upon how specifically the requirements are applied.

B. US Country of Origin Legislation

With regard to the US COOL, the upstream shellfish aquaculture supply chain may not currently be meeting the labelling or verification requirements of this legislation. For example, shellfish grown in BC from US-origin seed are considered a "mixed origin" product under COOL. Mixed origin products are defined as:

> *Products with an origin that includes processing steps (e.g. hatched, raised, harvested and processed) that occurred in more than one country, including the United States*

On the basis of the sample 'mixed origin labels' provided by the Canadian Agri-Food Trade Service, shellfish grown in BC from US-origin seed should be labelled as:

> *"Farm-raised [shellfish species] hatched in the USA and raised, harvested and processed in Canada."*

Moreover, if BC shellfish nurseries/farms are pooling seed from both US and Canadian sources, the shellfish would be considered "blended products" under COOL on the basis of their multiple countries of origin. According to the legislation, blended products must be labelled as follows:

> *Each specific origin included in the blend must be included on the label in alphabetical order.*

Given the importance of the US as a market for BC shellfish, it would also seem prudent for upstream supply chain participants to ensure that they are in compliance with the labelling and record keeping requirements of the US COOL. In addition, the current inability to track the pooling-related transformations in the nursery and farm (see below) may make the verification of origin very difficult.

C. Input/Output Linkages

'Mapping' relationships between the units received and the units dispatched (when units are transformed as a result of sorting and pooling activities) are poorly documented. One reason for this poor level of relationship mapping is that few shellfish growers recognize the value of mapping as a production tool. However, even the most progressive growers find the mapping of relationships challenging due to current methods of production and management.

D. Hatchery-to-Farm Traceability.

Traceability between these links in the shellfish aquaculture supply chain may only be possible through invoices. With regard to invoice based traceability, the EU General Food Law Guidance document[26] stated the following:

> *Food crises in the past have shown that tracing the commercial flow of a product (by invoices at the level of a company) was not sufficient to follow the physical flow of the products…it is essential that traceability system of each food/feed business operator is designed to follow the physical flow of the products…*

[26]Source: http://europa.eu.int/comm/food/food/foodlaw/guidance/guidance_rev_7_en.pdf

For these reasons the current level of traceability within the BC shellfish aquaculture industry differs significantly from the integrated traceability systems employed in the BC finfish aquaculture industry. Factors contributing to this difference include:

- Vertical integration within the shellfish aquaculture industry is very limited as the BC industry is made up primarily of independent growers.
- Many BC shellfish farms have traditionally operated as family or 'lifestyle' businesses. They have often employed a ranching approach to farming whereby the traceability of identities is difficult.
- As the industry has moved from a ranching approach to more intensive farming practices, with production moving from beaches to deep water systems, new challenges to product traceability have arisen. For example: raft cultured shellfish require considerable grading and sorting to ensure a consistent rate of growth and development. The amount of product pooling associated with grading/sorting makes the mapping of identity relationships extremely difficult.

The existing level of traceability within the upstream portion (hatchery to processor) of the BC shellfish aquaculture supply chain is largely a function of the need to meet food safety regulatory requirements. The value of traceability as a production/management tool and/or a means to meet market requirements plays a far smaller role within the industry.

1. **Regulatory requirements.** The traceability practices of shellfish aquaculture have primarily been implemented to allow growers to meet the food safety requirements of the Canadian Shellfish Sanitation Program (CSSP), the Quality Management Program (QMP) and the *Vibrio parahaemolyticus* (Vp) Control Program. Some members of the industry interviewed for this project could see little need for the implementation of a more sophisticated form of traceability. However, other members could clearly appreciate the value of a higher degree of product traceability – particularly as a production/management tool.
2. **Production/Management Tool.** As indicated, very few shellfish growers utilize traceability as a production/management tool. However, to assess its potential in this area, an interview was conducted with one of BC's more innovative and technologically advanced grower/processors. For this grower/processor, the driving force for a higher level of traceability (i.e. beyond that required by food safety regulations) has been the desire for improved internal management control. This grower/processor believes that only through improved traceability will businesses be able to determine the actual cost of growing product, and that automation and standardization (with its associated requirement for improved identity traceability) are the keys to competitiveness within the shellfish industry.
3. **Market requirements**. Even the more progressive grower/processors interviewed viewed market requirements and issues of competitive advantage as only indirect drivers for improved traceability within the upstream shellfish aquaculture supply chain.

The current level of traceability (including the farm-processor link) does not meet the level of sophistication envisioned by Tracefish-related systems. Globally, Tracefish-related standards are becoming the benchmark for evaluating traceability practices and many countries may eventually implement traceability requirements based upon Tracefish standards and it would be

prudent for the BC shellfish industry to become more cognizant of the basic standards for identity traceability as defined by Tracefish.

Table 4.1 Wild Harvest Fisheries: Traceability Requirements for the Harvester

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish	US Bioterrorism - Effective December 2003	US Country of Origin Labelling Effective September 30, 2004	CFIA - CSSP Shellfish Specific	CFIA - QMP Shellfish Specific	EU General Food Law - Effective January 1, 2005	EC 2065/2001- effective October 2001	2004/852/EC, 2004/853/EC, 2004/854/EC - Effective no earlier than January 1, 2006	2003/804/EC 2004/319/EC Effective May, 2004	Cumulative Requirements
Vessel ID	M					M				M
Name of vessel owner/harvester	M	M		M	M	M			M	M
License Number				M	M					M
Name of Responsible Individual		M				M				M
Address	M	M				M			M	M
Telephone Number		M			M					M
Cell Phone Number		O								O
Fax Number		O								O
Email Address		O								O
Food Safety Certification ID	O									O
For each trade unit created by Vessel										
Identity Information										
Batch/lot #		M				R				M
Trade Unit ID	M	R								M
Descriptive Information										
Type of package	M	M				R				M
Net weight/quantity	M	M		M	M	R			M	M
Species (commercial and scientific names)	M	M		M	M	R	M		M	M
Age									M	M
Life cycle stage									M	M
Country of origin - Harvested	O		M						M	M
Country of origin - Processed			M							M
Product description (eg. Form, grade, storage condition etc)	M	M							M	M
Production history information										
Date of harvest	M				M					M
Catch Area	M			M	M		M		M	M
Method of production	R		M				M		M	M
CFIA Canadian Shellfish Sanitation Program Area designation (approved, conditionally approved etc)				M				R		M
Wild stocks free from unexplained/abnormal mortalities in 2 previous years (Y/N)									M	M
Wild stocks free from bonamiosis, marteiliosis, microcitiosis, perkinsosis, haplosporidiosis, witheirng syndrome in 2 previous years (Y/N)									M	M
Disease Record								M		M
Fishing method	R									R
Trawl or soak time	O									O
Ethical aspects of fishery	O									O
Size grading method	O									O
Weighing method	O									O
Stowage method	R				M					M
Storage temperature control method	R				M					M
Storage temperature record	R				R					R
For each logistic unit created										
Identity Information										
Logistic unit ID	M	R								M
Trade unit ID's that make up the logistic unit	M	R								M
Number of trade units in logistic unit		M								M
Number of logistic units in shipment		M								M
For each unit dispatched (either as a logistic unit or as a separate trade unit)										
Unit ID (either logistic or trade unit ID)	M	R								M
Destination Information										
Name of next food business	M					M			M	M
Name of Responsible Individual	M									M
Address	M					M			M	M
Transportation Information										
Date/time of dispatch	M					M				M
Place of dispatch	M									M
Name of transport firm						M				M

Table 4.1 (con't) Wild Harvest Fisheries: Traceability Requirements for the Buyer

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish	US Bioterrorism - Effective December 2003	US Country of Origin Labelling Effective September 30, 2004	CFIA - CSSP Shellfish Specific	CFIA - QMP Shellfish Specific	EU General Food Law - Effective January 1, 2005	EC 2065/2001- effective October 2001	2004/852/EC, 2004/853/EC, 2004/854/EC - Effective no earlier than January 1, 2006	2003/804/EC 2004/319/EC Effective May, 2004	Cumulative Requirements
Name of buyer business owner	M	M		M	M	M				M
DFO registration #				M						M
Name of Responsible Individual		M				M				M
Address	M	M		M		M				M
Telephone Number		M								M
Cell Phone Number		O								O
Fax Number		O								O
Email Address		O								O
Food Safety Certification ID	O									O
For each unit received by buyer (either a logistic unit or a trade unit)										
Identity Information										
Unit ID (either logistic or trade unit ID)	M									M
Trade unit ID's that make up the logistic unit	M									M
Lot/batch #						R				R
Source Information										
Name of previous food business	M					M				M
Name of Responsible Individual						M				M
Address	M					M				M
Transportation Information										
Date/time received	M									M
Control checks										
Temperature of unit when received	R				R					R
Unit temperature record	R				R					R
For each new trade unit created by buyer										
Source Information										
Name, address & telephone of harvester					M					M
Identity Information										
Trade unit ID	M	R								M
Lot/batch #		M				M				M
ID's of received trade units contributing to created trade unit	M									M
Descriptive Information										
Type of packaging	M	M								M
Net weight/quantity	M	M			M					M
Species (commercial and scientific names)	M	M			M		M		M	M
Method of production	R		M				M		M	M
Country of origin - Harvested	R		M						M	M
Country of origin - Processed (if processed on vessel)			M							M
Product description (eg. Form, grade, storage condition etc)	M	M								M
Product History Information										
Date of harvest					M					M
Catch Area	M				M		M		M	M
Size grading method	O									O
For each logistic unit created by buyer										
Identity Information										
Logistic unit ID	M	R								M
Trade unit ID's in logistic unit	M	R								M
Number of trade units in logistic unit		M								M
Number of logistic units in shipment		M								M
For each unit dispatched (either as a logistic unit or as a separate trade unit)										
Identity Information										
Unit ID (either logistic or trade unit ID)	M	R								M
Lot/batch #						R				R
Production history information										
Buyer temperature control method	R				M					M
Buyer temperature record	R				R					R
Destination Information										
Name of Processor	M					M				M
Address	M					M				M
Transportation Information										
Date/time of dispatch	M					M				M
Place of dispatch	M									
Name of transport firm						M		M		M
Vehicle Identification						M		M		M
Name of Responsible Individual						M				M
Address						M		M		M

Table 4.1 (con't) Wild Harvest Fisheries: Traceability Requirements for the Transporter

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish	US Bioterrorism - Effective December 2003	US Country of Origin Labelling Effective September 30, 2004	CFIA - CSSP Shellfish Specific	CFIA - QMP Shellfish Specific	EU General Food Law - Effective January 1, 2005	EC 2065/2001- effective October 2001	2004/852/EC, 2004/853/IEC, 2004/854/EC - Effective no earlier than January 1, 200	2003/804/EC 2004/319/EC Effective May, 2004	Cumulative Requirements
Name of transport business	M	M				M				M
Name of Responsible Individual		M				M				M
Vehicle Identification	M	M				M				M
Address	M	M				M				M
Telephone Number		M								M
Cell Phone Number		O								O
Fax Number		O								O
Email Address		O								O
Food Safety Certification ID	O									O
For each unit received (either a logistic unit or a trade unit)										
Shipper information										
Name of Shipping Food Business (vessel or buyer)	M	M				M				M
Name of Responsible Individual		M				M				M
Address	M	M				M				M
Telephone Number		M								M
Cell Phone Number		O								O
Fax Number		O								O
Email Address		O								O
Collection information										
Time/Date collected	M	M				M				M
Location of collection	M									M
Temperature of unit when received	R				R					R
Identity Information										
Unit ID (either logistic or trade unit ID)	M	R								M
Lot/batch #						R				R
Trade units ID's within logistic unit	M	R				M				M
Number of logistic units in shipment		M								M
For each new logistic unit created by the transporter										
Logistic unit ID	M	R								M
Trade unit ID's within logistic unit	M	R								M
Lot/batch #						R				R
For each trade unit (within all logistic units)										
Trade unit ID		R								R
Lot/Batch #		M								M
Descriptive information for trade units within logistic unit										
Type of packaging		M								M
Net weight/quantity		M								M
Species		M								M
Product description (eg. Form, grade, storage condition etc)		M								M
For each unit dispatched (either as a logistic unit or as a separate trade unit)										
Unit ID (either logistic or trade unit ID)	M	R								M
Tranportation history										
Mode of transport					M					M
Transporter temperature control method	R				M					M
Transporter temperature record	R				R					R
Destination Information										
Date of delivery	M	M				M				M
Location of delivery	M									M
Name of next food business	M	M				M				M
Name of responsible individual		M				M				M
Address	M	M				M				M
Telephone Number		M								M
Cell Phone Number		O								O
Fax Number		O								O
Email Address		O								O

Table 4.2 Finfish Aquaculture: Traceability Requirements for the Fish Feed Manufacturer

Data Requirement M=mandatory; R=recommended O=Optional	**Tracefish**	**Additional data elemetns to allow traceability between feed and fish**	**US Bioterrorism Effective: December 2003**	**US Country of Origin Labelling Effective: September 30, 2004**	**EU General Food Law Effective January 1, 2005**	**EC 2065/2001 Effective October 2001**	**2004/852/EC, 2004/853/EC, 2004/854/EC Effective no earlier than January 1, 2006**	**Cumulative Requirements**
Feed manufacturing business ID	M				M			M
Feed manufacturing establishment ID	M				M			M
Responsible Individual					M			M
Address	M				M			M
Feed manufacturing food safety certification	O							O
For each trade unit created								
Identity Information								
Lot or batch number	M				M			M
Trade unit ID	M							M
Source Information								
Previous Food Business ID	M				M			M
Responsible Individual					M			M
Address	M				M			M
Date and time of reception	M				M			M
Control Checks								
Quality control checks	O							O
Production history								
Temperature Record	R							R
Transformation Information								
Related created trade unit ID's	M							M
Fractions	R							R
For each new trade unit created								
Lot #					R			R
Unit ID	M							M
Descriptive information								
Net weight	M				R			M
Type of unit	O							O
Name/type of product	O				R			R
Production date	M							M
Product form	M				R			M
Compostion	M				R			M
GMO	M							M
Date of durability	R				R			R
Product specification	O				R			R
Species	R				M			R
Primary production method	R							R
Area/Country of origin	R							R
Production history								
Process specification	O							O
Production lines ID	O							O
HACCP	O							O
Hygiene checks	O							O
Temperature records	O							O
Product quality control checks	O							O
Transformation Information								
Related received trade unit ID's	M				M			M
Fractions	R				M			R
For each logistic unit created								
Identity Information								
Unit ID	M							M
Trade unit ID's	M							M
For each unit dispatched (either as logistic unit or separate trade unit)								
Identity Information								
Unit ID	M				M			M
Production history								
Temperature record	R							R
Destination Information								
Next food business ID	M				M			M
Address	M				M			M
Date and time of dispatch	M				M			M

Table 4.2 (con't) Finfish Aquaculture: Traceability Requirements for the Breeder

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish	Additional data elemetns to allow traceability between feed and fish	US Bioterrorism Effective: December 2003	US Country of Origin Labelling Effective: September 30, 2004	EU General Food Law Effective January 1, 2005	EC 2065/2001 Effective October 2001	2004/852/EC, 2004/853/EC, 2004/854/EC Effective no earlier than January 1, 2006	Cumulative Requirements
Breeder business	M				M			M
Breeding establishment	M				M			M
Responsible Individual					M			M
License Number	M				M			M
Address	M				M			M
Breeder food safety certification	O							O
For each unit of feed received from feed manufacturer (either logistic unit or trade unit)								
Identity Information								
Lot #					R			R
Unit ID		M						M
Trade unit ID's		M						M
Source Information								
Previous food business ID		M			M			M
Responsible Individual					M			M
Address		M			M			M
Date and time of reception		M			M			M
Control checks								
Temperature check		R						O
Temperature record		O						O
Quality control checks		O						O
Transformation Information								
Related created trade unit ID's		M						M
Fractions		R						R
For each trade unit created								
Identity Information								
Lot#					R			R
Unit ID	M							M
Descriptive Information								
Species	M				M			M
Day degrees	R							R
Viability	O							O
Spawning date	R							R
Genetic characteristics	O							O
Genetic ID	O							O
Genetically Modified Organisms (GMO)	O							O
Production History								
Country of origin				M				M
Method of production				M				M
Farm unit ID	R							R
Temperature Record	R							R
Salinity Record	O							O
Water flow record	O							O
Disease record	R							R
Weight of parental fish	O							O
Age of parental fish	O							O
Treatment record	O							O
For each logistic unit created								
Identity Information								
Lot#					M			M
Unit ID	M							M
Trade unit ID's	M							M
For each unit dispatched (either as logistic unit or separate trade unit)								
Lot#					R			R
Unit ID	M							M
Destination Information								
Next food business ID	M				M			M
Address	M				M			M
Date and time of dispatch	M				M			M

Table 4.2 (con't) Finfish Aquaculture: Traceability Requirements for the Hatchery

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish	Additional data elemetns to allow traceability between feed and fish	US Bioterrorism Effective: December 2003	US Country of Origin Labelling Effective: September 30, 2004	EU General Food Law Effective January 1, 2005	EC 2065/2001 Effective October 2001	2004/852/EC, 2004/853/EC, 2004/854/EC Effective no earlier than January 1, 2006	Cumulative Requirements
Food Business ID	M				M			M
Hatchery establishment ID	M				M			M
Responsible Individual					M			M
License Number	M				M			M
Address	M				M			M
Hatchery food safety certification	O							O
For each unit of feed received from feed manufacturer (either logistic unit or trade unit)								
Identity Information								
Lot#					R			R
Unit ID		M						M
Trade unit ID's		M						M
Source Information								
Previous food business ID		M			M			M
Responsible Individual					M			M
Address		M			M			M
Date and time of reception		M			M			M
Control checks								
Temperature check		R						R
Temperature record		O						O
Quality control checks		O						O
Transformation Information								
Related created trade unit ID's		M						M
Fractions		R						R
For each unit received from breeder (either logistic unit or trade unit)								
Identity Information								
Lot#					R			R
Unit ID	M							M
Trade unit ID's	M							M
Source Information								
Previous food business ID	M				M			M
Responsible Individual					M			M
Address	M				M			M
Date and time of reception	M				M			M
Control checks								
Temperature check	R							R
Temperature record	O							O
Quality control checks	O							O
Transformation Information								
Related created trade unit ID's	M							M
Fractions	R							R
For each new trade unit created								
Identity Information								
Lot#					R			R
Unit ID	M							M
Descriptive Information								
Average weight	R				R			R
Malformation	O							O
Production Information								
Country of origin				M				M
Primary production method				M				M
Farm unit ID	R							R
Disease record	R							R
Starving period	R							R
Temperature record	R							R
Oxygen record	R							R
Fish density record	O							O
Treatment record	O							O
Transformation Information								
Related received trade unit ID's	M							M
Fractions	R							R

Table 4.2 (con't) Finfish Aquaculture: Traceability Requirements for the Hatchery

Data Requirement **M=mandatory; R=recommended** **O=Optional**	**Tracefish**	**Additional data elemetns to allow traceability between feed and fish**	**US Bioterrorism Effective: December 2003**	**US Country of Origin Labelling Effective: September 30, 2004**	**EU General Food Law Effective January 1, 2005**	**EC 2065/2001 Effective October 2001**	**2004/852/EC, 2004/853/EC, 2004/854/EC Effective no earlier than January 1, 2006**	**Cumulative Requirements**
For each logistic unit created								
Identity Information								
Lot#					**R**			**R**
Unit ID	**M**							**M**
Trade unit ID's	**M**							**M**
For each unit dispatched (either as logistic unit or								
Lot#					**R**			**R**
Unit ID	**M**				**M**			**M**
Destination Information								
Next food business ID	**M**				**M**			**M**
Address	**M**				**M**			**M**
Date and time of dispatch	**M**				**M**			**M**

Table 4.2 (con't) Finfish Aquaculture: Traceability Requirements for the Farm

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish	Additional data elemetns to allow traceability between feed and fish	US Bioterrorism Effective: December 2003	US Country of Origin Labelling Effective: September 30, 2004	EU General Food Law Effective January 1, 2005	EC 2065/2001 Effective October 2001	2004/852/EC, 2004/853/EC, 2004/854/EC Effective no earlier than January 1, 2006	Cumulative Requirements
Farm ID	M				M			M
Name of farm owner	M		M		M			M
License Number	M				M			M
Name of Responsible Individual			M		M			
Address	M		M		M			M
Telephone Number			M					O
Cell Phone Number			O					O
Fax Number			O					O
Email Address			O					O
Food Safety Certification ID	O							O
For each unit of feed received from feed manufacturer (either logistic unit or trade unit)								
Identity Information								
Lot#					R			R
Unit ID		M						M
Trade unit ID's		M						M
Source Information								
Previous food business ID		M			M			M
Responsible Individual					M			M
Address		M			M			M
Date and time of reception		M			M			M
Control checks								
Temperature check		R						R
Temperature record		O						O
Quality control checks		O						O
Transformation Information								
Related created trade unit ID's		M						M
Fractions		R						R
For each unit received from hatchery								
Identity Information								
Lot#					R			R
Unit ID (logistic unit or individual trade unit)	M							M
Trade unit ID's (contained within logistic unit)	M							M
Source								
Previous Food Business (hatchery/transporter etc)	M				M			M
Address	M				M			M
Date and time of reception	M				M			M
Control Checks (either on logistic unit or separate trade units								
Temperature Check in received unit	R							R
Temperature record	O							O
Quality control checks	O							O
Transformation Information								
Related created trade unit ID's	M					M		M
Fractions	R							R
For each new trade unit created by fish farm								
Identity Information								
Lot#					R			R
Unit ID	M		R			M		M
Descriptive Information								
Location of fish farm	R			R		M		M
CFIA Canadian Shellfish Sanitation Program Area							R	R
Wet storage location								M
Species (commercial and scientific names)			M		M	M		M
Type of package			M		R			M
Size (grade) distribution	R		M					R
Condition factor	O							O
Fat content	O							O
Color	O							O
Flesh texture	O							O
Net weight/quantity	O		M		R			O
Average weight	O							O
Total weight per quality grade	O							O
Date of harvest	M							M

Table 4.2 (con't) Finfish Aquaculture: Traceability Requirements for the Farm

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish	Additional data elemetns to allow traceability between feed and fish	US Bioterrorism Effective: December 2003	US Country of Origin Labelling Effective: September 30, 2004	EU General Food Law Effective January 1, 2005	EC 2065/2001 Effective October 2001	2004/852/EC, 2004/853/EC, 2004/854/EC Effective no earlier than January 1, 2006	Cumulative Requirements
Production History								
Country of origin				M				M
Primary production method				M		M		M
Farm unit ID	R				R	M		M
Nature and origin of feed fed to fish							M	M
Starving period	R							R
Temperature record	R							R
Fish density record	O							O
Disease record	R						M	M
Treatment record	R						M	M
Transformation Information								
Related received trade unit ID's	M							M
Fractions	R							R
For each logistic unit created								
Identity Information								
Lot#					R			R
Unit ID	M							M
Trade unit ID's	M							M
For each unit dispatched (either as logistic unit or separate trade unit)								
Lot#					R			R
Unit ID	M		M					M
Destination Information								
Next food business ID	M		M		M			M
Name of Responsible Individual			M		M			M
Address	M		M		M			M
Telephone Number			M					M
Cell Phone Number			O					O
Fax Number			O					O
Email Address			O					O
Date and time of dispatch	M				M			M

Table 4.2 (con't) Finfish Aquaculture: Traceability Requirements for the Live Fish Transporter

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish	Additional data elemetns to allow traceability between feed and fish	US Bioterrorism Effective: December 2003	US Country of Origin Labelling Effective: September 30, 2004	EU General Food Law Effective January 1, 2005	EC 2065/2001 Effective October 2001	2004/852/EC, 2004/853/EC, 2004/854/EC Effective no earlier than January 1, 2006	Cumulative Requirements
Food Business ID	M		M		M			M
Transport vehicle/vessel establishment ID	M		M		M			M
Vessel/vehicle ID	M		M		M			M
Name of Responsible Individual			M		M			M
Address	M		M		M			M
Telephone Number			M					M
Cell Phone Number			O					O
Fax Number			O					O
Email Address			O					O
Food Safety Certification ID	O							O
For each unit received								
Identity Information								
Lot#					R			R
Unit ID	M		R					M
Trade unit ID's (contained within logistic unit)	M		R					M
Source Information								
Previous food business ID	M		M	M	M			M
Name of Responsible Individual			M	M	M			M
Address	M		M	M	M			M
Telephone Number			M					M
Cell Phone Number			O					O
Fax Number			O					O
Email Address			O					O
Date and time of reception	M		M	M				M
Control Checks (either on logistic unit or separate trade units								
Temperature check	R							R
Temperature record	O							O
For each new logistic unit created by transporter								
Identity Information								
Lot#					R			R
Unit ID	M		R		M			M
Trade unit ID's	M		R		M			M
For each trade unit within all logistic units								
Trade unit ID			R					R
Descriptive Information for trade units within logistic unit								
Net weight/quantity			M					M
Species			M					M
Production description			M					M
For each unit dispatched (either as logistic unit or separate trade unit)								
Identity Information								
Lot#					R			R
Unit ID	M		R		M			M
Production History								
Temperature control method	R							R
Temperature record	R							R
Disinfecting date	R							R
Water parameter record	R							R
Loading/unloading technology	O							O
Fish density	O							O
Destination Information								
Next food business ID	M		M		M			M
Name of Responsible Individual			M					M
Address	M		M		M			M
Telephone Number			M					M
Cell Phone Number			O					O
Fax Number			O					O
Email Address			O					O
Place of delivery	M		M					M
Date and time of dispatch	M		M		M			M

Table 4.2 (con't) Finfish Aquaculture: Traceability Requirements for the Transporter

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish	Additional data elemetns to allow traceability between feed and fish	US Bioterrorism Effective: December 2003	US Country of Origin Labelling Effective: September 30, 2004	EU General Food Law Effective January 1, 2005	EC 2065/2001 Effective October 2001	2004/852/EC, 2004/853/EC, 2004/854/EC Effective no earlier than January 1, 2006	Cumulative Requirements
Food Business ID	M				M			M
Transport vehicle/vessel establishment ID	M				M			M
Vessel/vehicle ID	M				M			M
Name of Responsible Individual			M					M
Address	M		M		M			M
Telephone Number			M		M			M
Cell Phone Number			O					O
Fax Number			O					O
Email Address			O					O
Food Safety Certification ID	O							O
For each unit received								
Identity Information								
Lot#					R			R
Unit ID (logistic unit or individual trade unit)	M		R					M
Trade unit ID's	M		R					M
Source Information								
Previous food business ID	M		M		M			M
Name of Responsible Individual			M					M
Address	M		M		M			M
Telephone Number			M					M
Cell Phone Number			O					O
Fax Number			O					O
Email Address			O					O
Date and time of reception	M		M					M
Control Checks (either on logistic unit or separate trade units								
Temperature check	R							R
For each new logisitic unit created by the transporter								
Identity Information								
Lot#					R			R
Unit ID	M		R					M
Trade unit ID	M		R					M
For each unit dispatched (either as logistic unit or separate trade unit)								
Identity Information								
Lot#			R		R			R
Unit ID	M		R					M
Production history								
Temperature control method	R							R
Temperature record	R							R
Destination Information								
Next food business ID	M				M			M
Name of Responsible Individual			M					M
Address	M		M		M			M
Telephone Number			M					M
Cell Phone Number			O					O
Fax Number			O					O
Email Address			O					O
Date and time of dispatch	M		M		M			M
Place of delivery	M		M					M

Table 4.3 Shellfish Aquaculture: Traceability Requirements for the Breeder/Hatchery

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish & industry suggestions	CFIA Canadian Shellfish Sanitation Program	CFIA - Quality Management Program	Vibrio Parahaemolyticus Control Program	US Bioterrorism Effective: December 2003	US Country of Origin Labelling Effective: September 30, 2004	EU General Food Law Effective January 1, 2005	EC 2065/2001 Effective October 2001	2003/804/EC, 2004/319/EC Effective May, 2004	2004/852/EC, 2004/853/EC, 2004/854/EC Effective no earlier than January 1, 2006	Cumulative Requirements
Breeder/hatchery business	M						M				M
Breeder/hatchery establishment	M						M				M
Responsible Individual							M				M
License Number	M						M				M
Address	M						M				M
Breeder food/quality safety certification	O										O
For each trade unit created											
Identity Information											
Lot#							R				R
Unit ID	M										M
Descriptive Information											
Species	M						M				M
Average weight/quantity	R						R				R
Product description	M						R				M
Viability	O										O
Genetic characteristics	O										O
Genetic ID	O										O
Breeder/Hatchery Production History											
Country of origin	M					M					M
Method of production	M					M					M
Zone source of broodstock	M										M
Set date	M										M
Farm unit ID	R						R				R
Temperature Record	R										R
Disease record	R										R
Treatment record	O										O
For each logistic unit created											
Identity Information											
Lot#							R				R
Unit ID	M										M
Trade unit ID's	M										M
For each unit dispatched (either as logistic unit or separate trade unit)											
Unit ID	M						M				M
Destination Information											
Next food business ID	M						M				M
Address	M						M				M
Date and time of dispatch	M						M				M

Table 4.3 (con't) Shellfish Aquaculture: Traceability Requirements for the Nursery

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish & industry suggestions	CFIA Canadian Shellfish Sanitation Program	CFIA - Quality Management Program	Vibrio Parahaemolyticus Control Program	US Bioterrorism Effective: December 2003	US Country of Origin Labelling Effective: September 30, 2004	EU General Food Law Effective January 1, 2005	EC 2065/2001 Effective October 2001	2003/804/EC, 2004/319/EC Effective May, 2004	2004/852/EC, 2004/853/EC, 2004/854/EC Effective no earlier than January 1, 2006	Cumulative Requirements
Food Business ID	M						M				M
Hatchery establishment ID	M						M				M
Responsible Individual							M				M
Aquaculture license Number	M						M				M
Address	M						M				M
Nursery food safety certification	O										M
For each unit received from breeder/hatchery (either logistic unit or trade unit)											
Identity Information											
Unit ID	M						M				M
Trade unit ID's	M						M				M
Source Information											
Previous food business ID	M						M				M
Responsible Individual							M				M
Address	M						M				M
Date and time of reception	M						M				M
Control checks											
Temperature check	R										R
Temperature record	O										O
Quality control checks	O										O
Transformation Information											
Related created trade unit ID's	M										M
Fractions	R										R
For each new trade unit created											
Identity Information											
Unit ID	M						M				M
Descriptive Information											
Species	M						R				M
Size	M										M
Average weight/quantity	R						R				M
Nursery Production History											
Country of origin						M					M
Primary production method						M					M
Farm unit ID	R										R
Temperature record	R										R
Oxygen record	R										R
Shellfish ish density record	O										O
Disease record	R										R
Treatment record	O										O
Transformation Information											
Related received trade unit ID's	M										M
Fractions	R										R
For each logistic unit created											
Identity Information											
Lot#							R				R
Unit ID	M										M
Trade unit ID's	M										M
For each unit dispatched (either as logistic unit or separate trade unit)											
Lot#							R				R
Unit ID	M										M
Destination Information											
Next food business ID	M						M				M
Address	M						M				M
Date and time of dispatch	M						M				M

Table 4.3 (con't) Shellfish Aquaculture: Traceability Requirements for the Farm

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish & industry suggestions	CFIA Canadian Shellfish Sanitation Program	CFIA - Quality Management Program	Vibrio Parahaemolyticus Control Program	US Bioterrorism Effective: December 2003	US Country of Origin Labelling Effective: September 30, 2004	EU General Food Law Effective January 1, 2005	EC 2065/2001 Effective October 2001	2003/804/EC, 2004/319/EC Effective May, 2004	2004/852/EC, 2004/853/EC, 2004/854/EC Effective no earlier than January 1, 2006	Cumulative Requirements
Farm ID	M	M		M			M		M		M
Name of farm owner	M		M	M	M		M		M		M
Aquaculture License Number	M	M	M				M				M
Name of Responsible Individual				M	M		M				M
Address	M			M	M		M		M		M
Telephone Number			M		M						M
Cell Phone Number					O						O
Fax Number					O						O
Email Address					O						O
Food Safety Certification ID	O										O
For each unit received from nursery											
Identity Information											
Lot#							R				R
Unit ID (logistic unit or individual trade unit)	M				R						M
Trade unit ID's (contained within logistic unit)	M				R						M
Source											
Previous Food Business (hatchery/transporter etc)	M						M		M		M
Responsible Individual									M		M
Address	M						M		M		M
Date and time of reception	M						M		M		M
Control Checks (either on logistic unit or separate trade units											
Temperature Check in received unit	R										R
Temperature record	O										O
Quality control checks	O										O
Transformation Information											
Related created trade unit ID's	M						M				M
Fractions	R										R
For each new trade unit created by shellfish farm											
Identity Information											
Unit ID	M				R		M				M
Lot #				M					R		M
Descriptive Information											
Location of shellfish tenure	R	M		M		R		M	M		M
CFIA Canadian Shellfish Sanitation Program Area designation (approved, conditionally approved etc)		M								R	M
Wet storage location		M									M
Species (commercial and scientific names)	M	M	M	M	M		M	M	M		M
Age									M		M
Life cycle stage									M		M
Type of package					M		R				M
Size (grade)	R			M	M				M		R
Net weight/quantity	O	M	M	M	M		R		M		M
Time & date of harvest	M	M	M	M							M
Farm Production History											
Farm unit ID	R										R
Country of origin						M			M		M
Primary production method						M		M	M		M
Farm stocks free from unexplained/abnormal mortalities in 2 previous years (Y/N)									M		M
Farm stocks free from bonamiosis, marteiliosis, microcitiosis, perkinsosis, haplosporidiosis, witheirng syndrome in 2 previous years (Y/N)									M		M
Area open for PSP (yes/no)				M							M
Area open for VP (yes/no)				M							M
Area open for Growing Water Classification (yes/no)											M
Harvest contol measure				M							M
Meat temperature at harvest				M							M
Air temperature at harvest				M							M
Temperature control method				M							M
Meat temperature at harvest			M	M							M
Temperature record	R		M								R
Disease record	R									M	M
Transformation Information											
Related received trade unit ID's	M										M
Fractions	R										R

Table 4.3 (con't) Shellfish Aquaculture: Traceability Requirements for the Farm

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish & industry suggestions	CFIA Canadian Shellfish Sanitation Program	CFIA - Quality Management Program	Vibrio Parahaemolyticus Control Program	US Bioterrorism Effective: December 2003	US Country of Origin Labelling Effective: September 30, 2004	EU General Food Law Effective January 1, 2005	EC 2065/2001 Effective October 2001	2003/804/EC, 2004/319/EC Effective May, 2004	2004/852/EC, 2004/853/EC, 2004/854/EC Effective no earlier than January 1, 2006	Cumulative Requirements
For each logistic unit created *Identity Information*											
Lot#							R				R
Unit ID	M										M
Trade unit ID's	M										M
For each unit dispatched (either as logistic unit or separate trade unit)											
Lot#							R				R
Unit ID	M				M						M
Destination Information											
Next food business ID	M				M		M		M		M
Name of Responsible Individual					M		M				M
Address	M				M		M		M		M
Telephone Number					M						M
Cell Phone Number					O						O
Fax Number					O						O
Email Address					O						O
Date and time of dispatch	M						M				M

Table 4.3 (con't) Shellfish Aquaculture: Traceability Requirements for the Live Shellfish Transporter

Data Requirement M=mandatory; R=recommended O=Optional	Tracefish & industry suggestions	CFIA Canadian Shellfish Sanitation Program	CFIA - Quality Management Program	Vibrio Parahaemolyticus Control Program	US Bioterrorism Effective: December 2003	US Country of Origin Labelling Effective: September 30, 2004	EU General Food Law Effective January 1, 2005	EC 2065/2001 Effective October 2001	2003/804/EC, 2004/319/EC Effective May, 2004	2004/852/EC, 2004/853/EC, 2004/854/EC Effective no earlier than	Cumulative Requirements
Food Business ID	M			M	M		M				M
Transport vehicle/vessel establishment ID	M				M		M				M
Vessel/vehicle ID	M				M		M				M
Name of Responsible Individual					M		M				M
Address	M				M		M				M
Telephone Number					M						M
Cell Phone Number					O						O
Fax Number					O						O
Email Address					O						O
Food Safety Certification ID	O				O						O
For each unit received											
Identity Information											
Lot#							R				R
Unit ID	M				R						M
Trade unit ID's (contained within logistic unit)	M				R						M
Source Information											
Previous food business ID	M				M		M				M
Name of Responsible Individual					M		M				M
Address	M				M		M				M
Telephone Number					M						M
Cell Phone Number					O						O
Fax Number					O						O
Email Address					O						O
Date and time of reception	M				M		M				M
Control Checks (either on logistic unit or separate trade units											
Temperature check	R		R	M							M
Temperature record	O		R								O
For each new logistic unit created by transporter											
Identity Information											
Lot#							R				R
Unit ID	M				R						M
Trade unit ID's	M				R						M
For each trade unit within all logistic units											
Trade unit ID					R						R
Descriptive Information for trade units within logistic unit											
Net weight/quantity					M						M
Species					M						M
Production description					M						M
For each unit dispatched (either as logistic unit or separate trade unit)											
Identity Information											
Lot#							R				R
Unit ID	M			M	R						M
Production History											
Temperature Contol method	R		M	M							R
Temperature record	R		R								R
Disinfecting date	R										R
Transportation Information											
Mode of transportation			M								M
Destination Information											
Next food business ID	M			M	M		M				M
Name of Responsible Individual				M	M		M				M
Address	M				M		M				M
Telephone Number					M						M
Cell Phone Number					O						O
Fax Number					O						O
Email Address					O						O
Place of delivery	M				O						M
Date and time of dispatch	M			M	M		M				M
Meat temperature at dispatch				M							M

Table 4.6 Fisheries Management Data Requirements

	Data Requirement	Halibut	Sablefish	Rockfish H&L	Schedule II Lingcod, Dogfish, Skate	Groundfish Trawl	Herring Roe	Herring SOK	Tuna	Salmon Gillnet	Salmon Troll	Salmon Seine	Geoduck	Prawn Trap	Red Urchin	Green Urchin	Sea Cucumber	Crab	Shrimp Trawl
Who	Vessel name	R O G	R O G	R O G	R O G	R O G	O	R O	R G	R G	R G	R G	R O G	R G	R O G	R O G	R O G	R G	R G
	VRN	R O G	R O G	R O G	R O G	R O G		R O	R G	R G	R G	R G	R O G	R G	R O G	R O G	R O G	R G	R G
	Tab/Licence	R O		O	O	R		R O					R O		R O	R O	R O		
	Vessel operator/fisher/diver	R O G	R O G	R O G	R O G	R O G		R O	R G	R G	R G	R G	R O G	R G	R O G	R O G	R O G	R G	R G
	FRC									R	R	R							
	Crew size	R	R						R										
	Contact information	R G	G	G	G	G		R O G	G	G	G	G	G	G	G	G	G	G	G
	Pond number							R O											
	Pool ID						R O												
Where	PFMA	O G	O G	R O	O	R O	R O G		R	R G	R G	R G	R G	R G	R G	R G	R G	R G	R G
	PFMSA	O G	O G	R O	O	R O	R O G		R	R G	R G	R G	R G	R G	R G	R G	R G	R G	R G
	Licence Area			R O	R O	R O	R O		R	R	R	R O	R O	R O	R O	R O	R O		
	Species Mgmt Area	O		R O	R O	R							R O		R O	R O	R O		R
	Harvest location/coordinates	R	R	R	R	R O	O	R O	R				R	R	R	R	R	R	R
	Country of Origin	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	Area of Harvest (FAO,BC?)																		
	Depth	R	R	R	R	R O							R	R	R	R	R	R	R
	Pond location							R O											
	Depth under pond							R O											
	Water temperature								R										
When	Harvest date	R	R	R	R	R O	O	R O	R	R	R	R	R	R	R	R	R	R	R
	Date of ponding (fish/kelp)							R O											
	Date of fish release							R O											
	Date of SOK harvest							R O											
	Harvest time	R	R	R	R	R O	O	R O						R					R
	Fish transfer time							R O											
	Trip number	R	R O			R			R										
	Hail number	R	R O	O	O	R O	O		R	R	R	R			R O	R O	R O		R
Gear	Gear type	R G	R O G	R O G	R G	R O G	R O	R O	R G	R G	R G	R G	R G	R G	R G	R G	R G	R G	R G
	Gear specs	R	R	R	R	R O			R	R				R				R	R
	Wild or farmed	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	Environmental Cert.																		
	Bait/iritatant		R	R	R													R	
	Set/dive number	R	R	R	R	R O		R O		R		R	R	R	R	R	R	R	R
	Set/dive/fishing duration	R G	R O G	R G	R G	R O G		R O	R G	R G	R G	R G	R G	R G	R G	R G	R G	R G	R G
	Set/Tow distance	R		R	R	R O		R O											R
	Tow speed					R O													R
	Selectivity gear		R																R
	Gear lost	R		R	R														
	Gear performance					O													
	Pond type							R O											
	Pond dimensions							R O											
	Depth of web in pond							R O											
	Number of kelp lines							R O											
	Length of kelp lines							R O											
	Number of traps		R											R				R	
	Number of hooks	R	R	R	R				R										

R = Collected and reported by skipper

O = Collected and reported by observer

G = Collected and reported by buyer

Table 4.6 Fisheries Management Data Requirements

	Data Requirement	Halibut	Sablefish	Rockfish H&L	Schedule II Lingcod, Dogfish, Skate	Groundfish Trawl	Herring Roe	Herring SOK	Tuna	Salmon Gillnet	Salmon Troll	Salmon Seine	Geoduck	Prawn Trap	Red Urchin	Green Urchin	Sea Cucumber	Crab	Shrimp Trawl
Catch	Species(comm & sci) kept	R B G	R B G	R B G	R B G	R B G	R B	R B G	R G	R G	R G	R G	R B G	R G	R B G	R B G	R B G	R G	R G
	Species released	R	R	R	R	R B				R	R	R							
	Target species					R B													R
	Est. weight	R	R	R	R	R B	R	R B	R					R				R	R
	Est. Weight ponded							R B											
	Est. weight of SOK							R B											
	Est. weight of trim returned							R B											
	Est. weight of trim to FSC							R B											
	Est. pieces	R		R	R	B			R	R	R	R	R				R	R	
	Product condition							R B											
	Dry salt used per container							R B											
	Brine used							R B											
	Storage temp record																		
	Wt of fish in area																		
	Wt of fish set on																		
At-sea	At-sea Observer		R			R B		R B											
	Sampling method					B													
	Condition																		
	Length																		
	Sex																		
	Maturity																		
	Spawning activity level							R B											
	Depth of spawn on web							R											
	Layers of spawn on web							R											
	Estimated mortality							R											
	Date morts removed							R											
	Location of mort removal							R											
	Date web removed							R											
Packer	Date onto packer							B					R						
	Packer name or collector	G	G	G	G	G	R B	R B G	G	G	G	R G	R G	G	R G	R G	R G	G	G
	Packer VRN							G	G	G	G	G	G		G	G	G		
	Weight							B					R		R	R	R		
	percent full							B											
	product temperature							B											
	salinity of brine							B											
	No. of containers												R		R	R	R		
	Container type												R		R	R	R		

R = Collected and reported by skipper

B = Collected and reported by observer

G = Collected and reported by buyer

Table 4.6 Fisheries Management Data Requirements

	Data Requirement	Halibut	Sablefish	Rockfish H&L	Schedule II Lingcod, Dogfish, Skate, Groundfish Trawl	Herring Roe	Herring SOK	Tuna	Salmon Gillnet	Salmon Troll	Salmon Seine	Geoduck	Prawn Trap	Red Urchin	Green Urchin	Sea Cucumber	Crab	Shrimp Trawl
Offload	Date	R O	R O	R O	R O	R O	R O	O	R		R	R O		R O	R O	R O		R
	Time	R O	R O	R O	R O	R O	O					R O		R O	R O	R O		R
	Port	R O	R O	R O	R O	R O	O	R			R	R O		R O	R O	R O		R
	Offload location	R O	R O	R O	R O	R O						R O		R O	R O	R O		R
	Offloader			O	O	O												
	Buyer (incl public or FSC)	R O G	R O G	R O G	R O G	R O	O G	R G	G	G	R G	R O G	G	R O G	R O G	R O G	G	R O G
	Split Load											O		R	R	R		
	Number of parts											O		R	R	R		
	Observer	O	O	O	O	O	O					O		O	O	O		
	Validation number	O	O	O	O	O	O					O		O	O	O		
	Product Type	R O G	R O G	O	O	G	O	G	G R	G	G	O	G	G	G	O	G	R O G
	No. of containers						O	O			R	O		R O	R O	R O		
	Container/package type	O	O				O				R	O		R O	R O	R O		
	Container number						R O											
	Number of liners											O						
	Draining start time					O												
	Draining finish time					O												
	Gross weight											O		O	O	O		
	Container weight					O						O		O	O	O		
	Net weight	R O	O	O	O	O	O	R			R	O		O	O	O		R
	Weighing method																	
	Trip limit	O		O	O	O												
	Previous remaining quota	O	O	O	O	O						O		O	O	O		
	New remaining quota	O	O	O	O	O						O		O	O	O		
	Overage	O	O	O	O	O						O		O	O	O		
	Overage transfer to/from tab											O		O	O	O		
	Temperature of product						O											
	Salinity of brine						O											
	Spacers						O											
	Level of brine						O											
	Discolouration/odour						O											
	Tag number(s)	O																
	shipment number						R O											
	Num of Log Units in ship.																	
	Roe Yeild					O												
Trucking	Company	O	O															
	Address																	
	ETA	O	O															
	Truck seal number	O	O															
	Truck No																	
Sales	Address																	
	Sales date	R G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G
	Processing date						O											
	Plant	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G
	Crew share info	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G
	Fish quality/storage method	G	G	G	G	G		G	G	G	G	G						
	Temperature of storage						O											
	Location of storage						O											
	Number of pails						O											
	Pail wt						O											
	Product weight	G	G	G	G	G	O G	G	G	G	G	G	G	G	G	G	G	G
	Pieces	G	G	G	G	G	G	G	G	G	G							
	Size grading method																	
	Price per unit	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
	Total price	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
	Fish slip number	G	G	G	G	G	G	G	G	G R	G	G	G	G	G	G	G	G

R O = Collected and reported by skipper
O = Collected and reported by observer
G = Collected and reported by buyer

Table 4.8 Comparison of Traceability Requirements With Harvester Fisheries Data Requirements

Food Business	Data Requirement		Cumulative Req.'s	Halibut	Sablefish	Rockfish H&L	Schedule II Lingcod, Dogfish, Skate, Groundfish Trawl	Herring Roe	Herring SOK	Tuna	Salmon Gillnet	Salmon Troll	Salmon Seine	Geoduck	Prawn Trap	Red Urchin	Green Urchin	Sea Cucumber	Crab	Shrimp Trawl
VESSEL/HARVESTER																				
	Vessel ID	M																		
	Vessel name																			
	VRN																			
	Pool ID																			
	Name of vessel owner/harvester	M																		
	License Number	M																		
	Name of Responsible Individual	M																		
	Address	M																		
	Telephone Number	M																		
	Cell Phone Number	O																		
	Fax Number	O																		
	Email Address	O																		
	Food Safety Certification ID	O																		
	For each trade unit created by Vessel																			
	Identity Information																			
	Batch/lot #	M																		
	Shipment #																			
	Validation #																			
	Halibut tag #'s																			
	Trip number																			
	Trade Unit ID	M																		
	Descriptive Information																			
	Type of package	M																		
	Net weight/quantity	M																		
	Estimated weight																			
	Estimated pieces																			
	Offloaded wt																			
	Buyer wt																			
	Species (commercial and scientific names)	M																		
	Age (molluscs)	M																		
	Life cycle stage (molluscs)	M																		
	Country of origin - Harvested	M																		
	Country of origin - Processed (if processed on vessel)	M																		
	Product description (eg. Form, grade, storage condition etc)	M																		
	Product type																			
	Product grade																			
	Production history information																			
	Date of harvest	M																		
	Catch Area	M																		
	PFMA																			
	PFMSA																			
	Licence Area																			
	Species Mgmt Area																			
	Harvest location/coordinates																			
	Pond number																			
	Method of production (wild/farmed)	M																		
	CFIA CSSP area designation (approved, conditionally approved, etc.)	M																		
	Wild stocks free from unexplained mortalities in 2 previous yrs (molluscs only)	M																		
	Wild stocks free from bonamiosis, martelliosis, microcthosis, perkinsosis, haplosporidiosis, withering syndrome in 2 previous yrs (molluscs only)	M																		
	Fishing method	R																		
	Trawl or soak time	O																		
	Ethical aspects of fishery (e.g. environmental certification etc.)	O																		
	Size grading method	O																		
	Weighing method	O																		
	Stowage method	R																		
	Storage temperature control method	R																		
	Storage temperature record	R																		

Table 4.8 (con't) Comparison of Traceability Requirements With Harvester Fisheries Data Requirements

Food Business Data Requirement		Comokstice Reg.'s	Halibut	Sablefish	Rockfish H&L	Schedule II Lingcod, Dogfish, Skate	Groundfish Trawl	Herring Roe	Herring SOK	Tuna	Salmon Gillnet	Salmon Troll	Salmon Seine	Geoduck	Prawn Trap	Red Urchin	Green Urchin	Sea Cucumber	Crab	Shrimp Trawl
For each logistic unit created																				
Identity Information																				
Logistic unit ID	M								O O											
Trade unit ID's that make up the logistic unit	M																			
Number of trade units in logistic unit	M																			
Number of logistic units in shipment	M							O	O				O	O		O O	O O	O O		
For each unit dispatched (either logistic unit or trade unit)																				
Unit ID	M								O O											
Destination Information																				
Name of next food business	M	O O O	O O O	O O O	O O O	O O O	O O O	O O	O O	O O	O	O	O	O O O O	O	O O O	O O O	O O O	O O	O O O
Name of Responsible Individual	M																			
Email Address																				
Transportation Information																				
Date/time of dispatch	M																			
Date onto packer									O				O							
Date onto truck		O	O										O							
Place of dispatch	M																			
Packer																				
Truck		O O	O O	O O	O O	O O	O O	O	O				O	O O		O O	O O	O O		O
Name of transport firm	M																			
Packer																				
Truck		O	O																	
Name of Responsible Individual	M																			
Email Address																				

M =manditory R =recommended O =optional

O = reported by skipper O = reported by observe O = reported by buyer