Traceability Within the British Columbia Halibut Industry
A Review of Traceability Practices, Readiness, and Opportunities

July 2012
TRACEABILITY WITHIN THE BRITISH COLUMBIA HALIBUT INDUSTRY
A Review of Traceability Practices, Readiness, and Opportunities

July 2012

Scott Buchanan and Brian Emmett
Archipelago Marine Research Ltd.
525 Head Street
Victoria, British Columbia V9A 5S1 Canada
+1 250 383 4535
amr@archipelago.ca
www.archipelago.ca

Helge Kittelsen
TraceTracker Canada Inc.
2 Bloor Street West, Suite 2120
Toronto, Ontario M4W 3E2 Canada
+1 519 241 0726
helge.kittelsen@tracetracker.com
www.tracetracker.com

© 2012 Archipelago Marine Research Ltd.
Cover photograph courtesy of Jeff K. Reynolds
**Acknowledgements**

Many people have helped in the research and preparation of this report. Guy Dean (Albion Fisheries Ltd.), Ruth Ciccone (Areeo Trading Co. Ltd.), and Carl Nordman (S.M. Products) participated in the traceability workshop and led the project team though their respective facilities. Their interest in traceability and willingness to share experiences and information both among themselves and with the project team has contributed greatly to the findings of this project. The Pacific Halibut Management Association (PMHA) supported this project from the outset and Chris Sporer, Executive Director of the PMHA, participated in the initial industry workshop. Financial support for this project was provided by the BC Seafood Alliance, and Christine Burridge of the Alliance was instrumental in initiating the project. Barron Carswell, Fiona MacRaild, and Bob Williams (Fisheries and Seafood Policy, British Columbia Ministry of Agriculture) have long held an interest in sustainability and traceability within the British Columbia seafood sector and their support is gratefully acknowledged.
**Summary**

Traceability of seafood products is driven by concerns for food safety, market demand, and regulatory requirements. The Canadian Council of Fisheries and Aquaculture Ministers (CCAFM) established a Traceability Task Group (TTG) in 2008 to address demands for traceability of seafood products from Canadian wild fisheries and aquaculture sectors. The TTG initiated three projects in Canada to assess traceability in three fisheries: Pacific halibut in British Columbia, walleye and yellow perch in Ontario, and lobster in eastern Canada.

The Pacific halibut fishery was selected for the British Columbia traceability assessment as it was identified as one of the best candidates in a 2005 analysis of traceability readiness across the BC wild harvest seafood sector. The general objective of this project is to establish the foundation for the development of a whole-chain traceability system for the BC halibut industry which can also be used to meet the needs of other Canadian fisheries.

The project team reviewed traceability practices in the BC halibut industry against standards defined in the National Fisheries Institute “Traceability for Seafood - U.S. Implementation Guide” and the ISO International Standard 12875 "Traceability of Finfish Products - Specification on the Information to be Recorded in Captured Finfish Distribution Chains." This review was carried out through consultation with the BC halibut industry as well as others involved in the halibut supply chain during a two-day workshop, individual site visits to participating processors, and by ongoing dialogue during the project. Information collected was used to define the key data elements (KDE) associated with halibut products that are collected and reported by each business for each specific step or critical tracking event (CTE) in the halibut supply chain. The resulting roadmap for traceability in the BC halibut supply chain can be used by industry participants to enhance their traceability practices, and will benefit other industry sectors who are seeking to adopt traceability practices.

Through the supply chain, participants in the BC halibut industry collect and record data that support internal traceability and address CTEs. These data are collected to meet regulatory requirements and fulfill specific business objectives including the need to trace product quality both up and down the supply chain. A number of factors have facilitated the development of traceability practices within the British Columbia halibut sector, including a robust fishery monitoring and tagging program, the large size and high value of the product, and exposure to regulatory and fishery certification programs that require the collection of data required for traceability. With respect to internal and one up, one down traceability, the BC halibut industry has moved beyond the “readiness” stage and has essentially fully implemented this type of traceability. While a number of challenges remain, the BC halibut industry is generally prepared to move to whole-chain traceability once there is a compelling business case for adoption.
2 Introduction

2.1 Project Rationale

Food security and supply chain traceability are emerging as critical issues in securing access to export markets and assuring consumer confidence. Traceability provides a mechanism to demonstrate the origin, constituent ingredients, proper food safety and handling, as well as opportunities for industry regarding branding, product recalls and process management. With the bulk of Canada's fisheries products destined for export markets, it is critical to ensure market access and competitive advantage1.

The Canadian Council of Fisheries and Aquaculture Ministers (CCAFM) established a Traceability Task Group (TTG) to address traceability of seafood products from Canadian wild fisheries and aquaculture sectors. The initial concern of the TTG was the European Union regulation on Illegal, Unregulated and Unreported (IUU) fisheries which came into effect January 1, 2010, requiring Canadian government certification that wild fisheries imports to the EU were traceable to a legally licensed vessel fishing in a legal manner. Over the longer term there is a need to address other regulatory and non-regulatory requirements of export and domestic markets as well as ways traceability can contribute to enhancing the competitive advantage of Canadian seafood products in the global market.

One initiative of the TTG is to assess traceability in three fisheries in the Atlantic, Great Lakes and Pacific regions of Canada. The key objectives of these three projects are2:

1. To confirm the needs and business drivers for traceability for seafood suppliers, retailers and government regulators
2. To identify a core set of requirements for the implementation of traceability in the seafood supply chain
3. To map existing seafood traceability practices against current traceability standards and, through this gap analysis, indentify key areas (traceable entities and associated key data elements and critical tracking events)3 requiring attention in order to develop a standards-based traceability system

In 2005, an analysis of traceability readiness in the BC seafood sector (Archipelago Marine Research Ltd., 2005) indentified Pacific halibut as one of the best candidates for a traceability assessment for the following reasons:

- The BC halibut fishery’s management regime and tagging program facilitate traceability
- The fishery’s dockside monitoring program provides comprehensive offload

---

1 The business case for traceability in the seafood industry is driven by a number of factors:
1. Improved supply chain management
2. Market access - import regulatory requirements
3. Health and safety assurance and recall effectiveness (particularly for shellfish and canned products)
4. Improved product quality and quality assurance
5. Eco-labelling requirements (e.g. MSC chain of custody requirements)
6. Brand support

2 CCFAM Traceability Task Group - Draft Objectives for the Traceability Projects.

3 See Section 3 for definitions of these terms
information

- Tagging whole fish with uniquely numbered tags permits direct product tracing to a specific offload
- There are few product transformation steps; most halibut are delivered to the retailer headed and gutted, with the offload tag intact

For these reasons the BC halibut fishery was selected for the Pacific region traceability assessment.

2.2 Project Objectives

The general objective of the project is to establish the foundation for a generic blueprint for the development of a whole-chain traceability system for the BC halibut industry which can be adapted to meet the needs of other Canadian fisheries. Specific objectives are:

- To build a template for mapping whole-chain traceability in the BC halibut industry and conduct a “readiness/gap analysis” of the industry sector’s ability to meet relevant business objectives
- To use the results of the above analysis to develop a general requirements specification for whole-chain traceability for the BC halibut industry
- To compare current practices to existing traceability standards
- To identify opportunities to add value to the current industry-funded BC halibut tagging program

The project team’s approach was to review the BC halibut industry’s practices in comparison with the National Fisheries Institute “Traceability for Seafood - U.S. Implementation Guide” (NFI) and the ISO International Standard 12875 “Traceability of Finfish Products - Specification on the Information to be Recorded in Captured Finfish Distribution Chains” (ISO). This analysis builds on the work already done in British Columbia on traceability readiness within the BC seafood sector (Archipelago Marine Research Ltd. 2005, 2010).

2.3 Methods

A representative group of the halibut processors and distributors were invited to participate in this project:

- SM Products: a major buyer and primary processor of Canadian and Alaskan Halibut located in Delta, BC
- Aero Trading: a major buyer and primary processor of seafood products (including halibut) located in Port Edward and Vancouver, BC
- Albion Fisheries: primarily a secondary processor and distributor of a diversity of seafood products (including halibut) in western Canada. Located in Vancouver and Victoria, BC

Collectively these three companies buy and handle a significant portion of the halibut landed by the BC fishery. As well they are representative of the diversity of players handling halibut within the BC wild fish processing and distribution sectors.

The traceability analysis focused on the readiness of the industry sector as a whole through a sectoral workshop process which included all project participants. In addition, an assessment of individual participant readiness was conducted by a subsequent set of participant interviews and processor facility
visits by the project team. These two project activities are described further below.

2.4 **Halibut Sector Workshop**

SM Products, Aero Trading and Albion Fisheries as well as the Pacific Halibut Management Association (PMHA) representing the halibut harvesting sector, participated in a two-day workshop with the project team, July 28-29, 2011. The main objective of the workshop was to develop a common foundation for understanding traceability and the application of whole chain traceability to the halibut fishery. Topics covered included:

- Overview of traceability principles, protocols, internal and external drivers
- Traceability mapping of the halibut sector supply chain (players, product flows and transformations, critical information flows)
- Assessment of traceability readiness, key issues (gaps) and decision points identified from the mapping exercise
- Update on current traceability trends (standards, regulations and players)
- Issues and opportunities for the halibut sector
- Preparation for individual participant site visits

Workshop presentations were provided to all participants, including the BC Seafood Alliance. The findings and output of this workshop is summarized in Section 4 “Supply Chain” and Section 5 “Readiness” of this report.

2.5 **Individual Company Analysis**

In October 2011, processing facility site visits were conducted with the participating companies. The visits focused on each processor’s “internal traceability readiness” and ability to meet the requirements for information sharing with the trading partners in the halibut supply chain.

At each facility the following process was followed:

- A summary of each processors products, markets, suppliers, product flow, traceability drivers and current practices was completed by each processor and reviewed during their site visit
- Tours of each facility were completed in order to map product flows, including any product transformations, from incoming shipments through processing to outgoing shipments
- Relevant information flows, including information sources, key documents and record keeping (paper-based data, IT systems) was reviewed on site with each participant
- Each processor’s internal product flows and traceability protocols was reviewed, including the definition of traceable entities, unique ID schemes, batch management practices, and reference to the relevant business objectives and their associated property or attribute data
- Each participant’s desired project outcomes was reviewed along with their vision for traceability in the halibut and BC seafood industry

Section 4 “Supply Chain” summarizes the general findings from these site visits, and each participating company has been provided with a more specific, confidential report providing an assessment of their own traceability readiness.
with recommendations for additional traceability planning and initiatives.
In addition to the site visits in British Columbia, discussions were held with two secondary processors/distributors, and a major retailer in Ontario that sources halibut from BC.
3 Traceability

This section is intended to establish a basic framework that would support a common understanding of traceability, and provide an approach to defining and implementing traceability within a company and along supply chains.

3.1 Definition of Traceability

There are many variations in the definition of traceability. For the purpose of this document, we will use the ISO 9000 definition of traceability:

The ability to trace the history, application or location of an item or activity by means of recorded identification. When considering product, traceability can relate to the origin of materials and parts, the processing history, and the distribution and location of the product after delivery.

3.2 Elements of Traceability

According to GS1 the traceability process consists of the implementation of three key sub-processes:

- Unique identification and labelling of all products (traceable entities) at source
- Data capture, recording and link management along the supply chain in such a way that any relevant information can be retrieved whenever necessary in a fast and accurate manner
- Communicating pre-determined traceability data along the supply chain to meet specific business objectives, such as accurate and rapid product withdrawal resulting from recalls

The main idea is to record relevant information (referred to as “key data elements” or “properties” or “attributes”) associated with the physical goods (referred to as “traceable entities” or “traceable items”) as they move through specific steps in the supply chain (referred to as “critical tracking events”) and to make the traceability information available in a timely fashion to achieve specific business objectives.

From an individual company’s perspective it is important to distinguish between “internal traceability,” i.e. tracing the goods through all internal operations, and “external traceability,” i.e. conducting traceability between immediate suppliers and customers (referred to as “one-up/one-down traceability”) or with trading partners across the entire supply chain (referred to as “whole-chain traceability”).

The main elements of traceability include:

- Definition of traceable entities
- Unique identification of traceable entities
- Critical tracking events (an specific steps in the supply chain where data needs to be collected)
- Key data elements (recording of relevant information at the various critical tracking events)
Surrounding these elements are the business objectives which a traceability program is designed to achieve. (For more on this, see Section 3.3 “Traceability Drivers - Business Objectives.”) These objectives determine the traceability model(s) deployed and the depth, breadth and precision of the information recorded at each critical tracking event.

### 3.2.1 Definition of Traceable Entities

As illustrated in Figure 1, what is considered a traceable entity will typically vary across the steps of the supply chain, as the needs and business processes of each participant in the chain are unique.

![Figure 1: Sample seafood supply chain (source: Nofima)](image)

For an individual company the definition of traceable entities can be a function of:

- Specific business objectives
- Agreement with one or more trading partners
- Standards/recommendations for business practices within an industry

#### External Traceability

- **Trading Partner**
- **Traceable Entity**
- **External Traceable Entities:**
  - Shipments
  - Logistics Units
  - Trade Units (Items)

#### Internal Traceability

- **Premise**
- **Traceable Entity**
- **Internal Traceable Entities:**
  - Batches (Lots)

#### External Traceability

- **Trading Partner**
- **Traceable Entity**

![Figure 2: External and internal traceable entities](image)

As illustrated in Figure 2 there are three types of external traceable entities:

- **Trade unit or trade item** (the terms are synonymous): any item upon which there is a need to retrieve pre-defined information and that may be priced, or ordered, or invoiced at any point in the supply chain. The Trade Unit is the most granular external traceable entity traded between supply chain members. An example could be a box of product.
- **Logistics unit:** an aggregation of Trade Units established for transport and/or storage that needs to be managed through the supply chain.
example would be a pallet containing several boxes of product

- **Shipment**: an aggregation of Logistics Units. An example could be a shipping container with several pallets containing boxes of products

In contrast there is generally one type of internal traceable entity (as illustrated in Figure 2):

- **Batch or lot** (the terms are synonymous): Unit products/items that have undergone the same transformation process. Internal traceability may consist of many process steps resulting in several batches with their associated unique batch IDs

In addition to the traceable entities, a physical location is an integral element of traceability. A physical location or “Premise” is defined as a place where traceable entities are or could be located (i.e. a place of production, handling, storage and/or sale).

### 3.2.2 Unique Identification of Traceable Entities

Each company, premise and traceable entity must be uniquely identified within its trading community. There are two basic types of ID schemes:

- A unique string of characters and/or digits with no intrinsic meaning. An example would be the batch ID “1234567”

- A unique “intelligent string” of characters and/or digits which contains information elements. An example would be the batch ID “PR2345-20120125” where “PR2345” could be a product ID and “20120125” could be the date when the batch was processed

While the purpose of the ID is to have a unique key for identifying, tracking/locating, and entering/retrieving information about a traceable entity, an “intelligent string” ID could have the added benefit of providing some information about the product in human readable form.

For internal traceable entities a company can deploy an ID scheme which is unique to their organization:

**Batch ID**: a unique reference ID assigned by the company to each batch for internal traceability purposes; for example, a unique serialised number or a unique ID composed of the product code and the processing date and/or time for each batch
For external traceable entities, the role of standards is a key factor for effective and efficient implementation along and across industry sectors. As illustrated in Figure 3, GS1 distinguishes between “Generic,” “Specific” and “Unique or Serialised” IDs. The bold orange fields provide examples of GS1 ID schemes for the various types of external traceable entities:

- **Shipment ID**: each shipment is uniquely identified with a GS1 issued “Shipment Identification Number” (SIN)
- **Logistics unit ID**: each logistics unit is uniquely identified with a GS1 issued “Serial Shipping Container Code” (SSCC)
- **Trade unit/trade item ID**: there are several options available, depending on the degree of granularity which is needed to meet the business objectives. Consider 20 cases of the same product (“Stock Keeping Unit” or SKU) resulting from two processing runs (batches):
  - **Generic ID (non-serialised)**: each case has an ID consisting of a GS1 issued “Global Trade Item Number” (GTIN). In this example, the ID on each box does not contain any reference to any specific batch (i.e. internal process)
  - **Specific (non-serialised) ID**: each case has an ID consisting of a GS1 issued GTIN + the batch ID from the processing step. In this example, the ID on each box contains a reference to the specific processing batch; however, it does not further distinguish between the boxes with the same Specific ID
  - **Serialised ID**: each case has an ID consisting of a GS1 issued GTIN (optional: + the batch ID from the processing step) + a unique serial number. In this example, each box has an ID which makes it uniquely identified

Closely associated with the ID schemes is the labelling of the traceable entities. Labels typically contain the traceable entity ID plus any further information which could satisfy regulatory requirements or other business
objectives. Labels could be readable by a person only, which requires manual intervention, or by a machine (bar code, RFID tag) which could automate information recording and retrieval.

As with ID schemes, there is a trade off with respect to the amount of information to be put on a label versus using the ID to access and retrieve information about the traceable entity in electronic or manual records.

3.2.3 Critical Tracking Events

Critical tracking events (CTE) refer to events of product movement and transformation which have implications for both internal and whole-chain traceability in the supply chain. CTEs include:

- Product received from supplier
- Product shipped to customer
- Product transformation (origination, aggregation, disaggregation, conversion, split/mix or commingle)
- Product depletion (consumption)
- Product disposal (destruction)

A CTE is a point in time and location where data needs to be collected and potentially shared. As well, a CTE may result in the creation of a new traceable entity ID. In such a case the “input” and “output” IDs of the CTE must be recorded and cross referenced so that the traceability links in the supply chain are maintained.

3.2.4 Key Data Elements

Key data elements (KDE) refer to data which are captured at a CTE to maintain a chain of traceability of an item as it travels through the supply chain and to meet specific business objectives.

As illustrated in Figure 4, it is considered useful to group KDEs into the following categories:

- **Master data:** information about company, premises, products, etc. which remain relatively static over time
- **Transactional (or event) data:** information about the traceable entities associated with a CTE event
- **Public information:** information which a company has agreed to share with external parties (authorities, trading partners, stakeholders, consumers, etc.)
- **Private information:** information which a company captures and keeps for internal purposes
3.3 Traceability Drivers - Business Objectives

While traceability as a disciplinary and business category is maturing, the adoption of traceability by industry varies greatly. From an individual company perspective, there could be a number of drivers, i.e. business objectives, for the implementation of internal and external traceability.

Figure 4: Key data element categories (source: GS1)

Further information regarding KDEs is contained in Appendix A and B.

As Figure 5 illustrates, there are both defensive and offensive business objectives which could drive the adoption of traceability. These are further expanded in Appendix B: “Planning and Implementing Traceability.” A key element is the positioning of traceability among a company’s internal and external business solutions as a productivity tool and a collaboration platform with trading partners.

Figure 5: Sample business objectives
4 Supply Chain

4.1 BC Halibut Industry Overview

The commercial BC halibut fishery operates primarily in offshore waters of BC. Most harvesters use longline gear for the directed capture of Pacific halibut while a small number use troll gear. Pacific halibut can also be retained in BC’s integrated groundfish fishery by harvesters targeting other groundfish with longline, troll and trap gear. Annual allowable halibut quotas for the BC fishery are set along with quotas for the west coast of the USA and Alaska by the International Pacific Halibut Commission using data from surveys, commercial fisheries and other biological studies.

In 2011, the commercial halibut quota for BC waters was 6.7 million pounds. DFO and the IPHC are responsible for the in-season management of the fishery. Industry has strong leadership with representation by the Pacific Halibut Management Association (PHMA) as well as the Commercial Industry Caucus (CIC) which represents all groundfish harvesters in BC. The Canadian Pacific halibut fishery was awarded MSC certification in 2009.

The BC halibut fishery has been managed under an individual quota (IQ) system since 1991 and managed as part of an integrated groundfish fishery with IQ management of all quota managed groundfish stocks in BC since 2006. Halibut fishers are responsible for fishing within individual quotas for both Pacific halibut as well as indirect catch such as rockfish, lingcod and other groundfish. The commercial halibut fishery typically opens each year in March with a closing date in November. Fishing effort is driven by market demand and scheduling around other fishing activities. Each harvester is limited to their quota holdings. Each year, 150 to 200 harvesters land Pacific halibut as either directed catch or indirect catch when harvesting other groundfish species. These vessels complete approximately 600 landings each year. Vessels land halibut at more than 10 different landing ports and over 40 different facilities within BC each year. There are a relatively small number of buyers (<50) that purchase halibut directly from each individual harvester.

4.2 BC Halibut Fishery Monitoring Programs

Since 1991, all commercial halibut landings have been subject to dockside validation by certified fishery observers provided by an independent third-party contractor. Archipelago Marine Research Ltd. has provided dockside validation, tagging and data processing services to the BC halibut fishery since 1991.

Dockside validation includes the verification of weight of all halibut landed as well as the application of individual serial numbered tags on each halibut landed. Dockside validation data includes pieces, weight, product form, and halibut tag numbers for each offload event. Offload location and buyer information is also collected. Dockside validation information is paper-based and stored electronically. Dockside validation information is provided to the harvester and buyer to facilitate their workflow processes.

In addition to dockside validation, at-sea monitoring of all fishing activity has been required since the implementation of the integrated groundfish fishery in 2006. At-sea monitoring in the BC halibut fishery is achieved using electronic monitoring (EM) systems provided by a certified independent third party contractor. EM data includes GPS, winch and drum sensor data as well as...
imagery of each hauling event. Fishing effort and catch data derived from the EM data are used to verify the accuracy of each harvester’s fishing log. At-sea catch information includes catch location, date, time and the number of pieces captured by species for each fishing event. All at-sea catch and landing data including halibut tag number information, are linked to trip and hail data in an operational fishery data system. Together the monitoring data collected at sea and dockside meet existing traceability data standards and required elements for the harvester. Many of these data are also made available to the buyer/primary processor and used for traceability purposes.

4.3 BC Halibut Supply Chain

This section contains a general description of each of the halibut supply chain categories. For each category there is a flow diagram outlining the product flow steps and potential CTEs represented by red stars. In addition, when describing traceability aspects of each halibut supply chain category, the following model is used:

For each relevant step in the model we will describe practices concerning CTEs and the definition and identification of the traceable entities as well as the associated KDEs.

4.3.1 Vessel Fishing Trip and Landing (Offload)

Commercial harvesters participating in BC’s integrated groundfish fishery that are permitted to catch and retain Pacific halibut will conduct one or more fishing events from which halibut of legal size are retained. In most cases, the halibut are gutted and bled on board the vessel. Fresh halibut is kept on ice until offload. In some cases the fish is frozen on board and, in rare cases, the fish are held in live holding tanks until offload.

Harvesters are required to hail in to coordinate landing activities and dockside validation of their catch at the conclusion of each fishing trip. Harvesters will land their catch at custom offload businesses, primary processing facilities as well as at public and private docks throughout coastal BC. In all cases, catch is offloaded onto a sorting table where the catch is separated by species and all individual halibut are tagged with individual serial numbered tags. Offloaded halibut are also graded by size according to weight. The sorted and graded fish are placed in totes, weighed (approximately 900 lbs. per tote), labeled and transported to the buyer (such as a processor).

Independent records of landed catch are collected by the offload business, third party dockside monitoring company as well any transportation businesses that may be involved in transporting product. The different offload locations and number of businesses involved result in a number of different harvester-to-
processor delivery scenarios and CTEs which are outlined below. The activities undertaken by primary processors and the associated CTE’s are not detailed in this section but are outlined in Section 4.3.2 “Primary Processor Activities and Business Steps.”

A) Single vessel offload at a primary processing facility
The least complex supply chain pathway involves a fishing vessel offloading its catch at the primary processing facility. Harvesters will offload their catch at primary processing facilities if the primary processor is close to the fishing grounds or if the harvester decides to invest the time and effort to travel with their catch to a primary processing facility that is not close to the fishing grounds. The CTEs (indicated by red stars in this scenario) occur as fish are offloaded, sorted, tagged, placed into totes and weighed by the primary processor. Fish are then moved from the offloading dock and into the processing area as received product.

![Figure 6: Business steps and CTEs: vessel offload at primary processing facility](image)

B) Single vessel offload at a custom offload facility
The most common scenario for halibut landings in BC is at custom offload facilities that provide offload services to harvesters and are located in close proximity to the fishing grounds. Custom offload facilities will offload, sort, tag, weigh and place product into totes for trucking to the primary processing facility. This scenario shows all fish from a single vessel offload being sent by truck to a single primary processor. This supply chain introduces CTEs as halibut product move from the vessel, through the custom offload facility and via truck to the primary processor.

![Figure 7: Business steps and CTEs: vessel offload at custom offload facility (with product sent by truck to a single primary processing facility)](image)

C) Multiple vessel offloads at a primary processing facility
Some primary processors have the ability to offload the catch from more than one vessel at a time. Product offloaded from each vessel must be kept separate until they are toted and weighed in order to meet the fishery monitoring and management requirements of the BC halibut fishery. The product may then be lotted separately by vessel within the processing facility or pooled from more than one vessel into a day batch within the processing facility, depending on the traceability practices of the processor. The CTEs (indicated by red stars) are the same as outlined in Scenario A; however, with fish from multiple vessels moving into the facility for processing, care is required to keep product and document product separately for each vessel.
D) Vessel offloads at a custom offload facility with fish from multiple vessels sent by truck to one or more primary processor

Custom offload facilities and primary processors may transport fish from more than one vessel on a single truck for a number of different logistical reasons. In this case, the product from different vessels must be kept in separate labeled totes with supporting documentation for traceability and business purposes. Individual tag numbers applied to halibut and linked to a single vessel offload also aids product tracking and verification once it is received by the primary processor. As outlined in the figure below, the business steps and CTEs are similar to scenario B) but are made more complex by the pooling of product on a single truck for transport.

E) Vessel offloads at a custom offload facility with fish then sold and trucked to more than one primary processor

In some cases a single harvester may sell their landed catch to more than one buyer/primary processor. In this case the product is offloaded and verified as a single offload but assigned to multiple buyers by the custom offload facility, dockside monitoring company, and transporter. The transporter will be responsible for delivering the product to the correct buyers/primary processing facilities.
F) Vessel offloads at a custom offload facility with fish then taken to cold storage before being sent to primary processor

The harvester or buyer/primary processor may direct landed product to a cold storage facility after offload. The cold storage facility may be at the primary processing facility, or in many cases it is an independent business. This supply chain introduces an additional business with product documentation requirements to meet service delivery requirements as well as traceability requirements. Product can be stored for varying amounts of time before being released to the processor as a whole or partial batch/lot.

G) Vessel offloads catch and reloads product onto vessel for public sales or personal use

Harvesters in BC’s commercial halibut fishery may elect to retain catch for public sales or personal use. They are still required to offload their catch at a custom offload facility or public dock in order to have their landed catch validated to meet fishery management and monitoring requirements. As with all halibut offloads, halibut are sorted, individually tagged and weighed. Offload verification paperwork is provided to the harvester by the custom offload facility and dockside monitoring service provider.
4.3.2 Primary Processor Activities and Business Steps

A primary processor will source products directly from harvesters (with offload at a processing site dock or a custom offload facility), from an independent buyer or from other processors. In the case of a buyer taking ownership but not physically handling the product, a CTE would record the ownership change(s) but the traceability model for the physical movement of the product would not change. Primary processors sell their products to other processors, distributors or directly to customers (such as retailers and food services).

Figure 13: Business steps and CTEs: primary processor

Figure 13 illustrates the primary processor’s receipt of incoming shipments (a CTE). The incoming shipments of fresh or frozen halibut (with most product being whole, head-on, gutted) typically arrive in labeled totes. Following verification of the shipment, a batch number is typically assigned for Received Product before it is moved into the processing area directly, into the cold storage area/reefer for intermediate storage or to a freezer for longer-term storage. This is a second CTE. Each batch of halibut product received by the primary processor is verified for weight and size grade and checked for chalk before being sent to storage or the processing room. During this stage, the heads may also be removed and sent for the removal of cheeks for human consumption.

The processing of halibut is done to fill a specific sales order, or for intermediate or longer-term storage to for sales at a later date. Processing of a batch can consist of one or several steps, each of which may be considered a CTE with a different resultant batch ID. A processing batch can consist of part of the fish from a single offload, all of the fish from a single offload or fish from more than one offload. At the primary processing facility, halibut undergo a number of transformations into a number of different product types. Figure 14 illustrates the different transformations and their associated KDEs.

As illustrated in Figure 14, fish received from a single vessel offload may be processed into the following finished products (fresh or frozen) by the primary processor before they are sent on by sales order to the next food business:

- Whole dressed fish (head off gutted) packaged in labeled totes or 50 or 100 lb boxes
- Fillets packaged in labeled boxes or in labeled shelf-ready packaging

---

4 The flesh of chalky halibut is an opaque white color, rather than translucent like normal flesh. Chalkiness may take up to 7 days to be seen in halibut held on ice. Chalky halibut are lower valued and are generally processed for fillets and steaks, however some may be shipped whole to retailers as the chalky condition can develop during shipment and storage post processing. Retailers will make claims to processors for chalky halibut and processors wish to ensure that the claim actually originated from fish shipped from their facility. For halibut harvested from Canadian vessels the individual halibut tag applied at the offload is critical to validating chalkiness claims as a processor can trace the tag number back to a specific vessel offload.
- Steaks packaged in labeled boxes or in labeled shelf-ready packaging
- Cheeks in labeled packaging
- Heads
- Frames and trimmings

Figure 14: Halibut transformations and key data elements for the primary processor

In the case of whole dressed fish sent to the next food business, the serial numbered halibut tag applied to Canadian product at the vessel offload often remains intact. In most cases, packaged whole dressed fish, fillets and steaks are assigned a batch/lot number that is unique to the single vessel offload. Finished product is labeled with species, product form, processing date and a unique number which can be used internally by the processor to trace back to the single vessel offload.

In some cases, the primary processor may pool halibut from more than one vessel in a processing or day batch, in which case product will only be internally traceable to a group of two or more vessels whose fish were included in the batch. Cheeks are typically batched by day and, as such, normally contain product from more than one vessel. Waste products from processing halibut include heads, trimmings and frames which may be sold for human consumption, for use as bait in crab fishing, or sent for reduction. Waste products are pooled from multiple vessel offloads and generally do not have the same product packaging, labelling, or data reporting standards as other finished products.

The finished product could be grouped into boxes of processed fish as an outgoing shipment for a specific sales order and sent by truck to a single secondary processor or distributor and then on to other food businesses (as outlined in Figures 15 and 16 below).

The transportation function can either be modeled as a separate business step or the relevant transport information can be recorded as KDEs for the outgoing
shipment. This applies for all categories of the halibut supply chain.

Some primary processors prefer to leave distribution responsibilities to secondary processors and distributors rather than managing the complexities of distribution themselves.

![Figure 15: Business steps and CTEs: primary processor supplies product to a single secondary processor](image)

In other cases primary processors will undertake distribution activities using either their own transportation or services provided by independent transportation companies. In these cases an outgoing shipment may contain pallets of products associated with one or more sales orders for one or more customers. The customers may be any combination of secondary processors, distributors, retail and food service businesses. Pallets of products are placed on a truck for transport, which is considered another CTE. Individual sales orders for individual customers are often organized on independent pallets in order to facilitate product delivery and tracking. In this case, the truck is responsible for the distribution of product from the primary processor to each next food business as detailed in Figure 17 below.

![Figure 16: Business steps and CTEs: primary processor supplies product to a single distributor](image)

![Figure 17: Business steps and CTEs: primary processor supplies product to a number of different customers with all orders contained on one or more trucks](image)
4.3.3 Secondary Processor Activities and Business Steps

A secondary processor sources product from a primary processor and may act as a distributor to market segments not served directly by the primary processor. The activities and CTEs for secondary processors are outlined in Figure 18 below.

![Figure 18: Business steps and CTEs: secondary processor](image)

From a product flow and traceability perspective, the operation of the secondary processor in the halibut supply chain is similar to that of the primary processor as described in Section 4.3.2 above, with the following differences:

- A common practice is to trace outgoing sales orders back to incoming purchase orders. At a more granular level, tracing can be done at a stock keeping unit (SKU) level from sales orders back to purchase orders.
- Depending on the requirement of customers, the ID and labelling of the outgoing trade units (such as boxes of product) may be general (groups of boxes traceable back to the batch) or serialised (each box uniquely identified).

4.3.4 Distributor Activities and Business Steps

In distribution, products normally do not get modified. The typical role of distribution is to receive incoming shipments (such as pallets with cases of products) from many suppliers and reassemble these into outgoing shipments to customers (as shown in Figure 19).

![Figure 19: Business steps and CTEs: distribution](image)

In the halibut supply chain, and the seafood supply chain in general, the secondary processor often performs the distribution function to retailers for fresh and frozen over-the-counter products and food service establishments.

4.3.5 Retail and Food Service Activities and Business Steps

Large retailers often operate their own distribution center(s) which supply products to their stores. A retailer can also make use of third-party distributors for all or part of the products supplied directly to their stores. Transport can be provided by their own fleet of trucks and/or third-party logistics companies.
In the halibut supply chain, retailers and food services may receive shelf-ready products from suppliers, but more often they will complete further processing or repackaging of halibut supplied. For example, individual retail stores may receive whole fresh halibut and process these into steaks and fillets for the store counter. Traceability practices and labelling at the retail level are driven by food safety regulations and product marketing initiatives including sourcing sustainable seafood.

4.3.6 Traceability Aspects in the Halibut Supply Chain

As discussed in Section 3.2 “Elements of Traceability,” key data elements (KDE) refer to data which are captured at a critical tracking event (CTE) to maintain traceability of an item as it travels through the supply chain, and to meet specific business objectives. The granularity of the traceability model is a function of the associated business objectives; for example, products which must meet the Marine Stewardship Council’s (MSC) chain-of-custody certification requirements must be handled separately through all steps with appropriate IDs, labels and record keeping.

In the BC halibut supply chain, the data collected for fishery management meet most existing traceability data requirements of the harvester and offloader. Primary and secondary processors of halibut record data to meet regulations (such as the HACCP Quality Management Program) and seafood certification programs (including MSC for sustainability and the IUU catch certificate regulations for exports to the EU; both certifications are subject to audits).

Halibut processors also keep detailed records for their halibut products in order to verify any claims made for chalk. Retailers and food services businesses will record data related to purchased halibut in order to track purchase date for rotation purposes and to meet reporting and labelling requirements for different seafood certification programs.

The following sections outline the types and sources of data (KDEs) collected and reported at each business based on best practices observed in the halibut supply chain. Figure 21 at the end of this section then summarizes this information. Many data elements related to the movement of halibut product through the supply chain overlap from one business to the next. The key data elements are organised into master data and transactional data (as described in Section 3.2.4, “Key Data Elements”).

In the following series of graphics and in Figure 21, master data are shown as symbols, data sources as green text boxes, trade unit definitions as pink boxes and transactional (event) data (KDEs) as grey text boxes and yellow boxes provide unique identifiers (trade unit IDs) for the data at each business in the supply chain. These unique identifiers are the data that must be shared between businesses to facilitate whole chain traceability. Data which are
Harvester

Commercial harvesters participating in the BC halibut fishery are required to keep detailed harvest logs for submission to Fisheries and Oceans Canada (DFO) upon trip completion. These logs are collected and entered by the independent third-party dockside monitoring company (Archipelago Marine Research Ltd.). The log data is audited for accuracy using data collected by electronic monitoring systems that are in operation for 100% of all fishing activity. While the detailed harvest information is provided to DFO, it is treated as protected information. Harvesters will generally share only a portion of the information with the buyer/processor receiving their halibut product. Harvesters will share detailed validation record data completed by the dockside monitoring company at the vessel offload.

- **Data sources**: harvester logbook, dockside validation record
- **Outgoing trade units**: a single landing; all individual halibut captured and retained during a trip are offloaded at once from the vessel
- **Master data**: vessel name, vessel registration number, licence type and number, harvester name, harvester registration number, MSC certification number
- **Transactional data (KDEs)**: days fished, areas fished, gear type, offload date, offload location, buyer(s), offloader, trip number, validation record number (unique serial), product state (live, fresh, frozen), product type and size grade, number of pieces of halibut offloaded, weight of halibut offloaded, individual halibut tag numbers, individual tote numbers

public information versus private information currently varies between businesses within the BC halibut industry and is therefore not specified below.
Offload Facility

The offload facility can be located at the primary processing facility or at an independent business location closer to the fishing grounds that provides offload services to industry. Offload facilities will record an independent dockside unloading tally with information specific to each individual offload event. The dockside unloading tally is maintained by the offload facility and provided to the harvester, dockside monitoring company, and to the next food business.

- **Data sources:** dockside unloading tally, dockside validation record
- **Incoming trade units:** individual halibut offloaded by a vessel at a single landing
- **Outgoing trade units:** numbered totes of graded halibut. Halibut are individually tagged with a serial numbered tag
- **Master data:** offload facility name, offload facility address, offload facility contact information, offload facility registration number, Provincial buyer’s licence number, MSC certification number
- **Transactional data (KDEs):** vessel name, vessel registration number, days fished, areas fished, gear type, offload date, buyer(s), shipping location, transportation company (if applicable), validation record number (unique serial), dockside unloading tally number (unique serial), product state (live, fresh, frozen), product temperature, product type and size grade, number of pieces of halibut offloaded, weight of halibut offloaded, individual halibut tag numbers, individual tote numbers

Transportation Business

The transportation business responsible for the delivery of product from an offload facility to the buyer/processing facility will receive copies of the dockside unloading tally and dockside validation record for delivery with the product to the buyer/processor. They may also be provided with a transit slip by the dockside monitoring company to support the delivery of product. The transportation business will be responsible for documenting their transportation of product in order to meet regulatory and business requirements.

- **Data sources:** bill of lading, dockside transit slip
- **Incoming trade units:** numbered totes of graded halibut (halibut are individually tagged with a serial numbered tag)
- **Outgoing trade units:** numbered totes of graded halibut (halibut are individually tagged with a serial numbered tag)
- **Master data:** transportation company name, transportation company registration number, transportation company address and contact information
- **Transactional data (KDEs):** shipper name, shipper address and contact information, destination business name, destination business address and contact information, pickup date and location, delivery date and location, description of goods (number and weight of totes of halibut), temperature records
Primary Processor

Halibut are received by the primary processor in numbered and labeled totes, with graded halibut which have the individual serial numbered tags intact. The halibut product is accompanied by copies of the dockside validation record, dockside unloading tally and bill of lading (if applicable). These data are used to update the processor’s internal records and link to processing and sales order data. This data is reviewed to monitor product quality and yield and to complete a mass balance of processor activities. Upon receipt of product or during processing, the primary processor will take steps to verify the contents.

- **Data sources:** processing records, HACCP QMP records, purchase orders, sales orders, prior notices for product destined for the USA, EU IUU catch certificates for product destined for the EU
- **Incoming trade units:** numbered totes of graded halibut (halibut are individually tagged with a serial numbered tag)
- **Outgoing trade units:** labeled boxes of processed product or totes of individually tagged halibut destined to customers.
- **Master data:** processor name, processor address, processor contact information, processor registration/certification number, MSC certification number
- **Transactional data (KDEs):** customer name, customer address, customer contact information, date product was received, processing date, shipping date, lot/batch/sales order number (unique serial), product state (live, fresh, frozen), product type and size grade, product code, product weight, whole fish (gutted, head on or head off) have individual serial numbered tags intact

Secondary Processor

Halibut products received by the secondary processor are received in labeled boxes and totes and are accompanied by sales order information from the supplier. Whole halibut that are purchased will have the individual serial numbered tags intact. The sales order data are linked to purchase orders and used to update the secondary processor’s internal records before being linked to their processing and sales order data.

- **Data sources:** processing records, HACCP QMP records, purchase orders, sales orders, prior notices for product destined for the USA, EU IUU catch certificates for product destined for the EU
- **Incoming trade units:** labeled boxes of processed product or totes of individually tagged halibut
- **Outgoing trade units:** labeled boxes of product or totes of individually tagged halibut of finished product destined to customers
- **Master data:** secondary processor name, secondary processor address, secondary processor contact information, secondary processor registration/certification number, MSC certification number
- **Transactional data (KDEs):** customer name, customer address, customer contact information, date product was received, processing date, shipping date, lot/batch/sales order number (unique serial), product state (live, fresh, frozen), product type and size grade, product code, product weight, whole fish (gutted, head on or head off) have individual serial numbered tags intact
Distributor
The product flow and key data elements for the distributor are similar to those outlined for the secondary processor. In fact, in the seafood supply chain many secondary processors fulfill the distribution function.

Retailer/Food Services
Halibut products received by the retail and food services sectors can be in the form of labeled boxes, shelf-ready packaging or whole fish in boxes and are accompanied by sales order information from the supplier. Whole halibut that are purchased will still have the individual serial numbered tags that were applied at the vessel offload. Internally, sales order or invoice information is matched against purchase order data.

- **Data sources**: sales records, purchase orders, sales orders and invoices
- **Incoming trade units**: labeled boxes of processed product or boxes of individually tagged halibut
- **Outgoing trade units**: all halibut product sold to consumers
- **Master data**: retailer name, retailer address
- **Transactional data (KDEs)**: species name or common name, net quantity, product origin, product state (fresh, frozen, previously frozen), packaged on or best-before date

Halibut Supply Chain Summary
Through the supply chain, participants in the BC halibut industry collect and record data that supports internal traceability and addresses CTEs. These data are collected to meet regulatory requirements and fulfill business objectives. Figure 21 collates the information presented above and summarizes the data sources, traceable entities, unique identifiers and KDEs as described above for each participant in the halibut supply chain.

This outline may serve as a useful resource for:

- Participants in the BC halibut industry who are not currently meeting internal traceability requirements
- Standardizing traceability practices across all participants in the BC halibut industry
- Developing whole chain traceability in the BC halibut industry by identifying unique identifiers to be shared electronically across the entire supply chain
- Other seafood sectors who can benefit from this summary and the practices adopted by the halibut industry in developing traceability standards
Figure 21: Traceability in the BC halibut supply chain
5 Readiness

5.1 Internal and One-up, One-down External Traceability

A number of factors have facilitated the development of traceability practices within the British Columbia halibut sector, including:

- The nature of the product (high valued, large fish), the relatively short supply chain, few product transformations and end products which are generally not consumer-packaged make implementation of traceability relatively easy.

- The knowledge and awareness of the players about traceability is high.

- All halibut caught by Canadian vessels are tagged at offload with a unique number. This tag is generally retained on whole halibut to the retail level. As primary processors generally lot halibut by harvest vessel and retain a record of the halibut tag numbers associated with each lot, whole halibut at the retail level can be traced back to specific vessel offloads.

- Specific requirements (verifying retailers claims of chalky halibut, MSC certification and associated chain of custody; HACCP quality management, catch certificate requirements for export to the EU) have made implementation of internal traceability as well as the ability to trace back to the harvest vessel necessary for specific products and destinations.

- Meeting the above requirements requires reliable product identification links, management and record keeping for the affected products.

With respect to internal and one up, one down traceability, the halibut sector has moved beyond the “readiness” stage and these forms of traceability are essentially fully implemented.

5.2 Whole Chain (External) Traceability

The halibut sector in BC is well positioned to adopt whole chain traceability in that the key data elements (KDEs) for critical tracking events (CTEs) are recorded using unique identifiers and stored in a manner that could be readily uploaded to a whole chain data system; however, there are several inhibitors of implementation including:

1. A reluctance to share information with trading partners (competitive elements)
2. A lack of recognised benefits (drivers, business objectives)
3. The lack of an electronic infrastructure for simple and effective information sharing
4. Uncertainty with respect to costs of implementation and operation
5. A lack of agreed standards for identification of companies/premises and external traceable entities (shipments, logistics units, trade units) across the supply chain; such standards would facilitate the adoption of electronic external traceability
There is no consensus on what data to share (public information) and what data to keep (private information). Those down the supply chain (retailers, secondary processors) would like to have access to information that those up the supply chain (primary processors) consider to be private and not required for traceability purposes (for example, harvest vessel, landing date). By way of example, fresh halibut has a relatively long shelf life when processed and stored properly. Processors noted that retailers and consumers do not have an appreciation of this fact and sharing information such as landing date could mislead retailers and consumers to interpret that the product bought is not of the highest possible quality.

There is no strong driver for sharing standard public information (company, premises, processing date, batch, and lot numbers) over the entire supply chain. Sharing this information electronically would speed up product recalls, but recalls of halibut for health reasons are extremely rare.

A primary traceability driver (tracking chalkiness) is being met effectively by existing recordkeeping systems and use of individual halibut tags and there is less need for rapid trace back to identify the source of chalky product as compared to product recalls for health reasons.

As both internal and one up, one down traceability is essentially fully implemented in the major processing and distribution facilities handling halibut, the industry can move readily to whole chain traceability as soon as there is a compelling business case.

5.3 Constraints and Challenges

Through consultation with the BC halibut industry during the project workshop and processor site visits a number of constraints and challenges were identified by industry with respect to current traceability requirements. These include:

- Although both Alaskan and Canadian halibut are MSC certified, not all halibut are processed in MSC chain of custody (CoC) certified facilities. Some processors may only apply full traceability to halibut product originating from MSC-certified facilities. These products are then shipped to customers requiring MSC-certified product. In discussion with a major retailer and their distributor, MSC-certified fish are identified as such only if the client (the retailer) wants it and is prepared to pay for and use the MSC label on the product in the stores. Otherwise, it is treated as any other halibut product (even though it may be from an MSC-certified fishery).

- Processors are increasingly facing demands for use of a specific traceability tool and data system by retail clients with sustainability objectives (e.g., EcoTrust’s “ThisFish” tag). The multiplicity of these requirements, as well as the EU Catch Certificate reporting requirements for processors shipping to the European Union, adds time and expense to implementing traceability at the processor and distributor level.

- Processors commented that the “end game” for traceability appears to be both uncertain and highly dynamic. Both the ever-growing demand for use of specific traceability tools (as described above) and lack of a specific traceability standard creates uncertainty as to the degree and nature of investment that should be made to meet future traceability requirements.
5.4 Opportunities

The adoption of whole chain traceability by participants in the BC halibut industry may provide them with a number of benefits or opportunities including:

- Halibut product is scrutinized very closely by processors due to its high value and the strong economic and market drivers for traceability. Processors have invested in better internal data systems which have benefited their halibut traceability efforts. These systems are also used for other seafood products that present far greater traceability challenges when compared to halibut.

- Although the risk of recall for halibut is low (see above), it is possible that whole chain traceability could provide insurance benefits to the sector through recall risk reduction.

- Whole chain traceability systems may provide efficiencies to address the compounding information needs of regulatory (e.g. EU IUU) and market requirements (such as MSC audit and specific retailer requirements).

- Whole chain tractability does not need to start with full sector participation; leaders can initiate and others can join. This process will be facilitated by closer cooperation between the harvester and processor components of the supply chain and there are a number of historic barriers to overcome to achieve this outcome.


Appendices

Appendix A: Finfish Traceability Standards Summary

This appendix contains summaries of the ISO 12875 Traceability of Finfish Products and the National Fisheries Institute - Traceability for Seafood. US Implementation Guide.

ISO 12875 Traceability of finfish products — Specification on the information to be recorded in captured finfish distribution chains (First edition 15.09.2011)

In terms of scope, “this International Standard specifies the information to be recorded in marine-captured finfish supply chains in order to establish the traceability of products originating from captured finfish. It specifies how traded fishery products are to be identified, and the information to be generated and held on those products by each of the food businesses that physically trade them through the distribution chains. It is specific to the distribution for human consumption of marine-captured finfish and their products, from catch through to retailers or caterers”.

It is noted that “together with ISO 12877 for farmed finfish, this international Standard provides a basis for implementing chain traceability of finfish”. It is also noted that the specifications in the standard “are designed with electronic representation and communication of data in mind, but this is not a requirement when using this International Standard”.

The standard is based on a traceability model where Trade Units, as the most granular traceable entity traded between players in the supply chain, are identified by unique codes (Unique Trade Unit Identifier (UTUI) either globally or in the particular scope of the supply chain. These trade units can then be grouped together to make Logistics Units, also identified by unique codes (Unique Logistics Unit Identifier (ULUI)). While reference is made to GS1 as “the simplest way of implementing UTUIs and ULUIs” it is only a recommended and not a mandatory practice.

The standard identifies the following types of businesses which make up the distribution chains for captured finfish:

- Fishing vessels
- Vessel-landing businesses and auction markets
- Processors
- Transporters and storage facilities
- Traders and wholesalers
- Retailers and caterers

As well, the standard includes an “outside the domain” category for fish and materials received from businesses that are not operating according to the ISO standard specifications (including non-fish ingredients to processors).

For each of the supply chain business categories the standard uses tables to facilitate the identification of traceable entities and information to be
recorded. To explain the format and content of such a table an excerpt from the Processor section is illustrated in the table below.

<table>
<thead>
<tr>
<th>Data Element</th>
<th>Description</th>
<th>Examples</th>
<th>Shall</th>
<th>Should</th>
<th>May</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROCESSOR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPR101</td>
<td>Food business ID</td>
<td>GB - 123467890</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Country prefix plus unique national identification number for the organization, as well as name and address of the food business that operates processing establishment</td>
<td>The Seafood Co, 22 Prince Street, London, SE5 7TK, UK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPR 102</td>
<td>Processing establishment ID</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FOR EACH UNIT RECEIVED</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPR 201</td>
<td>Unit ID</td>
<td>006530055555555558</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>ULUI if received as a logistic unit or UTUI if received as a separate trade unit</td>
<td>0766.00001 0272</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table is divided into sections (the shaded rows) which include:

- Processor: Master data about the processor
- For each Unit received: The IDs and data about source, control checks (such as temperature, quality), production history and possible additional data
- For each Trade Unit created: The IDs and data about product description, production history, transformations and possible additional data
- For each Logistics Unit created: The IDs and possible additional data
- For each Unit dispatched: The ID and data about production history, destination and possible additional data

In terms of the data elements themselves, each element has assigned a unique number with a prefix which represents the supply chain category, such as “CPR” for the Processor. Each data element is defined and described with examples. As well, each data element is categorised according to:

- Shall: Data elements deemed necessary to ensure that traceability is possible (only applied to identifiers, not property information)
- Should: Data elements that describe and provide supporting information on the units being traded (property information) which are required by law or commercial requirements
- May: Property information not part of the “should” category but which may support other business objectives

Appendix A of the Archipelago’s 2010 traceability readiness report provides a detailed review of the draft ISO standard (12875) for the traceability of finfish products for BC’s wild harvest fisheries including the BC halibut industry. It details the data elements and categories for the harvester, buyer, transporter and processor.
The Traceability for Seafood Implementation Guide has been developed to aid in the adoption of consistent business practices to effectively manage traceability for the seafood industry. In addition to the requirements placed on the industry by the Bioterrorism Act requirements and the Food Safety Modernization Act, the guide recommends an additional voluntary approach in best practices for identifying and tracking of seafood from farm or vessel to point of sale.

The scope of the guide establishes minimum requirements and best practices to share information between distribution channel participants, including farms, vessels, processors, suppliers, exporters, distributors, retailers, and foodservice operators.

As well, the guide:

- Addresses traceability practices from the processing facility to the point of consumer sale to support critical tracking events (CTEs)
- Considers traceability practices upstream from the processing facility, including guidance for source tracking for sustainability
- Applies to all seafood products for human consumption
- Applies to all levels of the product hierarchy, including shipping logistics unit information, lots, pallets, cases, consumer items with data elements, etc.

The guide was developed in association with GS1 and the guidance recommended is based on GS1 global standards for supply chain management and product identification.

The guide offers information and guidelines at several levels:

- A section on GS1 traceability standards (ref. GS1)
- A section on GS1 traceability principles (ref. GS1)
- A section on the seafood supply chain including the roles of individual companies, with an emphasis on traceability protocols and practices, including labelling (ref. GS1) with sample CTEs and KDEs
- A section on seafood industry recalls procedures and practices

Compared with ISO standard 12875, the NFI guide does not provide the level of detail regarding data elements. The guide does, however, provide more detail in the areas of traceability principles, ID schemes, labelling and procedures/practices. The ISO standard 12875 and NFI guide are a good complement to each other. However, neither standard references specific business objectives or their potential affect on both traceability models (CTEs) and the associated information (KDEs).
Appendix B: Planning and Implementing Traceability

Publications such as “GS1 Global Traceability Standard: Business Process and Systems Requirements for Full Chain Traceability” provide checklists for planning and implementing traceability systems. The purpose of this appendix is to complement and add detail to parts of the GS1 document, including questions, suggestions and practical tools for a Company to plan and implement internal and external traceability.

B1 Traceability’s Position in a Company

This section contains questions which address the level of traceability readiness of an organisation.

Traceability and Strategy

- Is traceability an integral part of the Company’s overall business strategy?
- How does the Company position traceability as a business tool to achieve specific objectives?
- Does the Company have a strategy for implementing traceability?

Traceability and Organisation

- What is the level of executive ownership/sponsorship of traceability in the Company?
  - Board
  - C-level executives
  - Operational management
- Where in the Company organisation lies the responsibility for traceability?
  - Corporate vs. Business unit level
  - Cross-functional committee vs. Single department (such as QA)

Traceability Actions

- What is the status of implementation of traceability in the Company?
  - In planning stage
  - Partial or Full internal traceability
  - Partial or Full external traceability
- Does the Company participate in traceability initiatives or forums (industry, research, government, NGO)?
- Has the Company adopted industry standards for implementation of traceability?
- Has the Company agreed on traceability actions with trading partners (objectives, formats, contents and procedures for information sharing)?
B2 Traceability Drivers - Business Objectives

Depending on the nature of its business and position in the supply chain there could be a number of drivers, i.e. Business Objectives, for a Company to implement internal and external/whole-chain traceability. As illustrated in Figure A1 below, the Business Objectives may focus on managing risk or creating business opportunity. The Business Objectives may be the result of a Company’s own strategies or imposed on the Company by customers, regulatory bodies or other stakeholders.

<table>
<thead>
<tr>
<th>Manage Risk</th>
<th>Create Business Opportunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recalls/withdrawals</td>
<td>Market access</td>
</tr>
<tr>
<td>Regulatory compliance</td>
<td>Supply chain efficiency</td>
</tr>
<tr>
<td>Chain of custody</td>
<td>Waste/cost reduction</td>
</tr>
<tr>
<td>Customer demands</td>
<td>Building consumer/buyer trucks</td>
</tr>
<tr>
<td>Product quality</td>
<td>Product differentiation</td>
</tr>
</tbody>
</table>

**Figure B1: Sample business objectives**

The investment in, and returns from, traceability is also a function of the Business Objectives. Here are some examples.

- From an internal traceability perspective a Company may invest in IT systems for data capture, business process automation and administrative management to achieve greater efficiencies in internal operations. With proper planning the payback may come in terms of less manual effort, reduced error rates, improved productivity and quality - and with traceability implemented as a by-product.

- With efficient and effective internal traceability a Company is well positioned to embark on external/whole-chain traceability:
  - The Company can meet regulatory demands and respond to product recall situations more efficiently
  - The Company is better prepared to meet customer demands and possibly provide new or enhanced services to its clients
  - The Company can empower its own (or its trading partners’) products/brands by verifying product claims (variety, origin, sustainability, quality, etc.) by making relevant information available to stakeholders and consumers
  - The Company and its trading partners can achieve efficiencies in the supply chain through collaboration and information sharing product movement, condition monitoring, etc.

The identification of specific Business Objectives is important as they influence the traceability practices and models (critical tracking events (CTEs)) employed by a Company, as well as the breadth, depth and precision of the key data elements (KDEs) collected at the various CTEs.
B3 **Framework for Traceability Planning**

Traceability planning should start with the Supply Chain perspective:

- Understand the entire supply chain such as the players and the possible paths which the various products may take and the possible CTEs at each stage.

- Participate in industry sector initiative(s)/dialogue(s) with the aim of identifying/establishing standards, protocols and procedures for traceability.

- Approach individual supply chain players (in particular immediate suppliers, customers, logistics/service providers) for traceability dialogue and planning.

To address Company internal traceability readiness, start with overall planning:

- Establish organisational commitment (strategy/plan, executive sponsorship, resources, roles and responsibilities).

- Identify specific business objectives and priorities as outlined in Figure B2, including the affect each objective has on the traceability model (CTEs) and the KDEs to be captured to meet the objectives. In addition, prioritize the objectives for a phased implementation.

<table>
<thead>
<tr>
<th>Business Objectives</th>
<th>Affect on Traceability Model / CTEs</th>
<th>KDEs to be Captured to meet Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manage Recalls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory Compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Safety / HACCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bio-Terrorism Act</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Safety Modernisation Act</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU Catch Certificate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer demand(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chain-of-Custody</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verification of product claims</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable, Organic, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fair trade, Origin, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certificate of analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cold Chain Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Etc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure B2: Sample business objectives planning table**

The next step is to develop the detailed traceability protocols and practices.

- First document product flows, transformations, physical handling and record keeping (companies with HACCP certification typically have this in place).

- Develop an internal traceability model. Figure B3 represents a 5-step model in which each of the steps may contain several sub-steps, depending on the characteristics of the Company’s operations.

- Use the Table in Figure B4 to:
  - Identify and describe CTEs through all steps, from incoming shipments through all stages of handling and processing to outgoing shipments
  - Define external and internal traceable entities
  - Develop unique ID schemes for the traceable entities
• Determine the requirements for product (traceable entity) labelling including technologies for data capture, storage and processing.

Figure B3: Sample Business Process Steps and Associated Traceable Entities

Figure B4 provides a sample format for identification and description of CTEs and the associated traceable entities.

<table>
<thead>
<tr>
<th>Critical Traceability Event (CTE)</th>
<th>CTE Description</th>
<th>Traceable Entity Type</th>
<th>Traceable Entity Definition</th>
<th>Traceable Entity ID Definition</th>
<th>Traceable Entity ID Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTE1</td>
<td>Incoming shipment</td>
<td>Incoming Logistics Unit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE2</td>
<td>Received goods storage</td>
<td>Incoming Trade Unit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE3</td>
<td>First Production Step</td>
<td>Batch 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE4</td>
<td>Etc.</td>
<td>Etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE5</td>
<td>Last Production Step (n)</td>
<td>Batch n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE6</td>
<td>Finished goods storage</td>
<td>Outgoing Trade Unit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE7</td>
<td>Outgoing Shipment</td>
<td>Outgoing Logistics Unit</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure B4: Sample CTE and traceable entity definition table

The next step is to define the key data elements (KDEs) to be recorded at each CTE so that the specific business objectives outlined in Figure B2 will be achieved. Figure B5 provides a sample format with the information about each KDE to be recorded including a description of the KDE, the source of the KDE (document or IT system), a classification of the KDE as master or event data and whether the KDE is shared with trading partners. More detailed planning could include information such as the data format and value(s) of each KDE.
### Table: Sample KDE description table

<table>
<thead>
<tr>
<th>Critical Traceability Event (CTE)</th>
<th>CTE Description</th>
<th>Key Data Element (KDE)</th>
<th>KDE Description</th>
<th>KDE Source</th>
<th>Master or Event Data</th>
<th>Shared Yes or No</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTE1</td>
<td>Incoming shipment</td>
<td>KDE1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE2</td>
<td>Received goods storage</td>
<td>KDE2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE3</td>
<td>First Production Step</td>
<td>KDE3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE4</td>
<td>Etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE5</td>
<td>Last Production Step (n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE6</td>
<td>Finished goods storage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE7</td>
<td>Outgoing Shipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure B5: Sample KDE description table**

Planning external traceability readiness involves interaction with the Company’s trading partners, stakeholders and other external parties to agree on common objectives, standards and procedures for traceability information exchange.