Seafood Traceability in Canada

Traceability systems, certification, eco-labeling and standards for achieving sustainable seafood

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January 2009

Ecology Action Centre

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About Sustainable Seafood Canada and SeaChoice

Sustainable Seafood Canada is a coalition of five leading Canadian conservation organizations working together via the SeaChoice program to raise public awareness about the threats to oceans and the solutions that sustainable fisheries offer. Sustainable Seafood Canada is made up the Canadian Parks and Wilderness Society, David Suzuki Foundation, Ecology Action Centre, Living Oceans Society and Sierra Club BC. SeaChoice uses the best available science and communications, as well as develops strategic partnerships to mobilize sustainable seafood markets in Canada.

About this Document

In a world that is moving quickly towards demanding better traceability of food products, developing a clear and transparent chain of custody can help seafood businesses ensure a healthy future. Recognizing that traceability requirements, systems and services are rapidly evolving and changing, the authors have assembled this document in collaboration with SeaChoice to help interested businesses begin their exploration of seafood traceability options as they exist in early 2009. Though far from exhaustive, it is hoped that the document provides a useful set of tools and first steps. By working together, businesses, fishermen, aquaculturalists and communities can create a sustainable seafood future in Canada.

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The research, data synthesis and writing of this report were sponsored by Ecology Action Centre and the David and Lucile Packard Foundation.

Canadian Cataloguing in Publication Data

Magera, Anna. 1983–
Beaton, Sadie. 1978–

Seafood Traceability In Canada.
Anna Magera and Sadie Beaton.

Includes bibliographic references.
ISBN 978-0-9734181-8-7.
Printed in Canada.

Executive Summary

Traceability: the basics

In today's highly globalized world food market, keeping track of information on highly traded products can be tricky. Fish often follows a long and winding path from the ocean to the consumer. It is often shipped great distances, visits multiple ports, and changes hands among various brokers, processors and retailers before it finally reaches the consumer's plate. At the same time, the seafood industry is facing an increasing number of challenging global issues. These include: an overall decline in seafood supply, shaky consumer confidence in seafood labeling and product safety, increasing regulatory demands by local and foreign markets, uncertainty about sustainability, environmental concerns about the aquaculture industry, and increasing questions about the health of the world's oceans. Companies today need to be able to meet their customers' demands for quality, healthy, safe and environmentally conscious products, as well as uphold the reputation and long-term viability of their brand.

A crucial component of a sustainable seafood future will be the implementation of traceability systems that are capable of detailing the journey of a seafood product along the entire supply chain. Pioneering businesses are already adopting traceability systems, allowing a transparent response to rising consumer concerns while improving the quality, safety and reputation of their products.

Traceability, is defined as *the ability to systematically identify a unit of production, track its location and describe any treatments or transformations at all stages of production, processing and distribution* (Archipelago, 2005). According to the International Organization of Standardization (ISO), traceability can also be defined as *the ability to trace the history, applications, or location of that which is under consideration* (ISO, 2000).

This document is intended to be a practical, educational resource for Canadian businesses. It outlines background information on seafood traceability and seafood. In no way is the information exhaustive, and as companies and countries develop new traceability requirements some of the information and recommendations in this guide may change. However, this guide does provide a set of tools that will help businesses that buy and sell seafood to start exploring traceability options as they exist in early 2009.

Types of traceability systems

There are two main categories of traceability systems: internal and external.

Internal traceability systems are already common within the seafood industry; they allow companies to trace what happens to a product within a business' operation.

External traceability systems require more complex information-sharing systems, and allow one to trace what happens to a product through all parts of the supply chain, or part of the supply chain outside of one business entity.

Tracing **upstream** means looking back along the supply chain towards the harvester/producer steps, while **downstream** looks forward towards distribution and consumption. As seafood supply chains become longer and more convoluted, there is rising demand for external traceability data, both by regulators and consumers.

Different types of traceability systems also exist: (1) from simple **paper traceability** records, to increasingly common (2) **electronic traceability** systems that allow data to be managed with computers. Electronic traceability systems may be **web-based** and accessible over the internet, or **module-based**, with specialized software and occasionally hardware that is installed in computer networks at various points along the supply chain. Each type of traceability system has its advantages and disadvantages.

Traceability systems typically make use of a set of tools that aid in traceability—from **identifiers**, or codes that can be scanned and stored, to **carriers**, which are physical tags that contain identifier data, such as *bar codes or radio frequency identification tags* (*RFIDs*). **Readers** are devices that record and interpret the information stored on carriers and register products.

Traceability and seafood

Seafood is a major industry in Canada. In 2007, seafood exports were valued at $3.9 billion (DFO, 2007). It is estimated that over 80% of Canada's seafood, by value, is exported, with the United States as the largest export market (62-63 % of traded seafood). Current traceability regulations require that all Canadian businesses buying and selling seafood keep internal supply chain records. These records may be sufficient to comply with today's regulations, but with more stringent traceability requirements emerging in some of Canada's key export markets—the United States, the European Union and Japan—current traceability information required by the Canadian government may soon be insufficient to meet foreign market standards.

Beyond fulfilling legislative requirements, traceability can provide businesses with a number of competitive advantages, including efficiency in recalls, safety reassurance, market access, safeguarding of the company's brand name, enhanced consumer trust and improvement of efficiency of product data collection and tracking.

Accomplishing seafood traceability is also not without its challenges. Full chain of custody information and specific data related to certain fisheries may be difficult to obtain. In addition, there are often further expenses associated with establishing improved traceability; these extra costs may limit market access, especially for small businesses. Given the potentially significant challenges of accomplishing seafood traceability, each business should evaluate the information in this document in light of its own marketing approach.

Sustainable seafood traceability

Consumers today are not only concerned with the quality, healthfulness, price and safety of their seafood purchases—they are also increasingly concerned about ecological impacts and sustainability. **Sustainable seafood** is fish or shellfish that is caught or farmed with consideration for the long-term viability of harvested populations and for the health of marine ecosystems.

There are a number of environmental factors to consider when choosing sustainable seafood. When buying wild fish, one needs to know whether their choices are coming from healthy, well-managed wild populations. The fish should also be harvested in a way that minimizes negative habitat impacts, bycatch and discards, and do not promote overfishing. When it comes to farmed seafood, one needs to take into account the risk of escapes, disease transfer to wild populations of fish, pollution and habitat effects on the natural environment, as well as management effectiveness and fish feed impacts.

The ability to verify how and where a seafood product was caught or farmed is a crucial facet of sustainable seafood marketing. This has naturally led to a rise in the prominence of eco-labeling for seafood products. An **eco-label** is "a seal or logo indicating that a product has met a set of environmental or social standards." A third party certifying organization usually (but not always) assesses and certifies the product and the process is a voluntary one; it does not entail direct government involvement.

The scope of sustainable seafood efforts has gained considerable momentum over the years since these movements began in the 1990s, mainly in the United States and Europe. Several groups provide useful resources for information on sustainable seafood, both for business and consumers, including SeaChoice in Canada (www.seachoice.org).

There are already a number of partnerships to promote sustainable seafood flourishing in Europe and North America. For example, many groups associated with the Conservation Alliance for Sustainable Seafood (www.solutionsforseafood.org) already have active partnerships with retailers, food service providers and restaurants. These relationships provide helpful examples of what is possible when businesses and nongovernmental organizations (NGOs) that specialize in researching sustainable seafood and fisheries issues work together to help bring about change.

Within Canada, some retailers and food service providers are beginning to establish sustainable seafood procurement strategies. As awareness about sustainable seafood grows, great opportunities are arising for businesses to engage with NGOs and certification schemes to develop labeling and traceability programs for the Canadian market. Developing sustainable procurement policies and better traceability systems are two ways for businesses to meet rising market expectations, support environmentally friendly practices on the water, and ensure our ocean resources last into the future.

Current traceability resources

There are several electronic traceability systems that may be helpful for Canadian businesses that buy or sell seafood. These traceability systems are not required by the Canadian government, but they may help businesses comply with domestic and export government regulations, meet market demands, and improve operational efficiency. Many of the systems have been developed in partnership with governments or NGOs, but private industry has also responded to the growing demand for comprehensive traceability systems.

Once a traceability system has been chosen, the next step to consider is independent verification of the seafood's chain of custody. Third party **verification**, by an auditor for example, assures the credibility of marketing claims among consumers, and is a necessary component of trustworthy eco-labeling.

Certification of a fishery, aquaculture operation, or chain of custody for a product, goes one step further than verification. This is a voluntary process that

involves an assessment of a fishery or aquaculture operation to determine whether it meets a given standard. If successful, products from the fishery are usually entitled to use an eco-label in the marketplace after a traceability audit. Certification is more rigorous than verification, and typically requires visibility ito the entire chain of custody auditing and verification processes.

In the body of this document, we have listed a number of eco-labels, certifiers, and other helpful resources. We encourage companies to explore other options as well.

Summary—selecting a traceability system

The main steps to keep in mind when selecting a traceability system are:

1. Determine the need of your business and its current capacity for traceability.
2. Choose a traceability system.
3. Decide upon how to address verification and/or certification.
4. Communicate your traceability efforts to business partners, customers and the NGO community.

Contents

1. Introduction

"How was this fish caught or farmed? Where did this fish come from?" Consumers, retailers and the food service industry today are increasingly demanding information and assurance about the safety and sustainability of their seafood purchases.

Fish are among the most challenging food products to trace. They often follow long and winding paths from the ocean to consumers' plates. Globalized trade and complex supply chains make identifying the origin and history of many seafood products a challenge. Seafood often visits multiple ports, travels great distances, and changes hands among various brokers, processors, and retailers. An average of five to seven different steps in the distribution of fish have been identified, from removing the fish from the water to the time that it is eaten (Lovejoy, 2003). During all of this travel and processing, often referred to as the chain of custody, information about how and where a particular seafood product was sourced is sometimes lost. In fact, by the time it has arrived at the supermarket counter, or on a restaurant menu, the seafood may have even changed names a few times (Jacquet and Pauly, 2007).

At the same time, around the globe the seafood industry is facing critical challenges. The first challenge is the state of the oceans and declining seafood supply. As many in the business are well aware, wild caught species are under more pressure than ever before. While global seafood demand continues to increase, the United Nations Food and Agriculture Organization (FAO) has pronounced over 75 percent of the world's fisheries to be fully exploited, overfished or depleted (FAO, 2007). Alarmingly, scientists have predicted that there will be no wild seafood left to eat in less than 50 years at current rates of exploitation (Worm et al., 2006). While we are seeing diminishing seafood supplies, we are diverting approximately one quarter of the world's wild caught and farmed seafood from the human food supply to "non-food uses," including fish meal and fish oil for use in aquaculture or other animal feed, or fertilizer (FAO, 2007).

Aquaculture, the practice of farming seafood, is expanding rapidly all over the world, and is often viewed as a logical replacement for dwindling wild stocks. The FAO estimates that aquaculture provided 43% of the worldwide fish supply—106 million tonnes in total—in 2004 (FAO, 2007). Over 90% of this total came from Asian nations (FAO, 2007). While this "blue revolution" may hold promise for the future of seafood, there are currently numerous environmental, social and health concerns associated with some types of aquaculture (Ford and Myers, 2008; Solidarity Center, 2008; Jacobs et al., 2002; Naylor et al., 2000). To date, it is uncertain whether aquaculture will have the capacity to meet

The Survey Says…

A 2008 Deloitte survey found:

- 76% of American consumers surveyed were more concerned about food choices than they were five years ago.
- 57% indicated they had stopped eating a particular food temporarily or permanently after a product recall.
- 33% of survey participants responded that they felt fresh fish is "not at all" or "somewhat" safe (Seafood.com News, June 10, 2008).

Also in 2008, a national survey conducted by Leger Marketing for Greenpeace Canada revealed:

- Nearly 7 out of 10 Canadians surveyed felt they did not have adequate information from their grocery stores about the harvest methods of seafood products.
- 74% of respondents indicated that if supermarkets provided adequate information, they would choose seafood from sustainable sources (Greenpeace Canada, 2008).

In a 2007 survey of U.S. and U.K. Consumers, the IBM Institute for Business Value found that two out of five respondents buy different brands today because of food safety concerns (IBM Institute for Business Value, 2007).

Drivers for Increased Traceability

Regulatory

- Food safety—e.g. Canadian Food Inspection Agency (CFIA) requirements such as HACCP (Hazard Analysis and Critical Control Points)
- Access to international markets—e.g. EU General Food Law regulations, U.S. Country of Origin Labeling (COOL) regulations and the Bioterrorism Act

Market

- Consumer-driven market initiatives demanding sustainability—e.g. Marine Stewardship Council (MSC) or SeaChoice
- Brand profile—exhibiting Corporate Social Responsibility and environmental consciousness has become a part of doing business in today's world

the world's demand for seafood today or in the future (Lubchenco, 2003; Naylor et al, 2000).

A second major challenge for the seafood industry is consumer confidence. Inadequate food handling, tracking, and labeling have led to ever increasing food safety concerns as well as highlighting the need for increased traceability in our food systems. Food product recalls can also cost millions of dollars, and can damage product, regional and brand reputations. For example, listeriosis contamination of meat and deli products from Maple Leaf Foods led to the recall of hundreds of meat and deli products in Canada, over 40 cases of listeriosis, 20 deaths, and over $20 million in losses to the company (The Canadian Press, 2008; CBC News, 2008). South of the border in Florida, food distribution giant Sysco was ordered to increase product testing and verification, and pay hundreds of thousands of dollars in fines after the Florida attorney general's office found numerous cases of less expensive fish products that were labeled as 'grouper' (a popular and valuable seafood) and sold to local restaurants (Seafood.com News, September 4, 2008). The United States' top food editors pronounced a spate of food recalls, and the U.S. Food and Drug Administration's decision to restrict farmed seafood imports from China, to be the first and fifth top food news stories respectively of 2007 (Seafood.com News, December 17, 2007).

On the whole, public scrutiny has intensified dramatically in recent years around how and where seafood is grown, captured, processed, and transported. Consumers today are more educated and informed about environmental, health and food safety issues, and they are asking tougher questions. Regulatory requirements, particularly concerning product tracking for health and safety as well as bioterrorism prevention, present a third set of challenges for seafood buyers and sellers. Responding to recent outbreaks of Avian Flu, Bovine Spongiform Encephalopathy (BSE) and food recalls, various governments have enacted traceability legislation to protect public health and effectively manage epidemics. Concerns over national security have also spurred the United States to introduce bioterrorism regulations and trade processes to protect American citizens from food-related attacks. The resulting Public Health Security and Bioterrorism Preparedness and Response Act (2002) (from herein referred to as the U.S. Bioterrorism Act) has had serious ramifications for businesses, particularly those shipping fresh or live seafood to or from the U.S. on a tight time schedule.

To put it briefly, both legislators and free-market players are demanding more comprehensive information about the path of a piece of fish along the supply chain from the ocean to the dinner table. Innovative, forward-thinking businesses have the power to provide this information to their customers and affect major change along the seafood chain of custody. After all, retailing seafood products that are verifiably sourced in an ecologically sound and safe manner is not only a laudable ethical goal, but also a significant opportunity to ensure the sustainability of businesses that buy and sell seafood for years to come.

A crucial component of a sustainable seafood future will be the implementation of traceability systems that are capable of detailing the journey of a seafood

product along the entire supply chain. Pioneering businesses are already adopting traceability systems, allowing for a transparent response to rising consumer concerns while improving the quality, safety and reputation of their products. Establishing and assuring chain of custody is often complex, but it is also a smart investment in the long-term viability of a seafood business.

This document is intended to be a practical, educational resource for Canadian businesses. It outlines background information on traceability and seafood. Specifically, this guide defines the basics of traceability, including a number of key terms, major traceability systems, standards, auditors and other players. It also provides useful examples of organizations that deliver seafood traceability services in Canada. Finally, a traceability checklist has been included that summarizes some of the key steps, questions and actors to consider when developing a traceability system.

In no way is the information in this document exhaustive, and as companies and countries develop new traceability requirements some of the information and recommendations in this guide may change. However, the guide does provide a set of tools that can help businesses that buy and sell seafood to start exploring traceability options as they exist in 2008. In a world that is moving quickly towards demanding better traceability of food products, developing a clear and transparent chain of custody can help seafood businesses ensure a healthy future.

2. Traceability

2.1 Defining Traceability

In a nutshell, traceability is *the ability to systematically identify a unit of production, track its location and describe any treatments or transformations at all stages of production, processing and distribution* (Archipelago, 2005). According to the International Organization of Standardization (ISO), traceability can also be defined as *the ability to trace the history, applications, or location of that which is under consideration* (ISO, 2000).

The definition of traceability is unavoidably broad. After all, traceability is a complex notion. As well, this important supply chain tool can be used to achieve several different objectives. As described by Huss (2003), when considering any given product, traceability encompasses:

- the source of materials
- the processing history
- the distribution and location of the product after delivery.

To some extent, the concept of traceability is not new to the seafood industry. Recording information about the sources and destinations of materials and products makes good business sense. **Internal traceability**, which records product data within a particular operation, is legally required in Canada, and often highly developed. However, **external traceability,** or traceability between supply chain partners, is where the process tends to become murky in the seafood business. This ability to track a seafood product both forward and backward along the supply chain is vital in the event of a product recall, or to file an insurance claim (Petersen and Green, 2004).

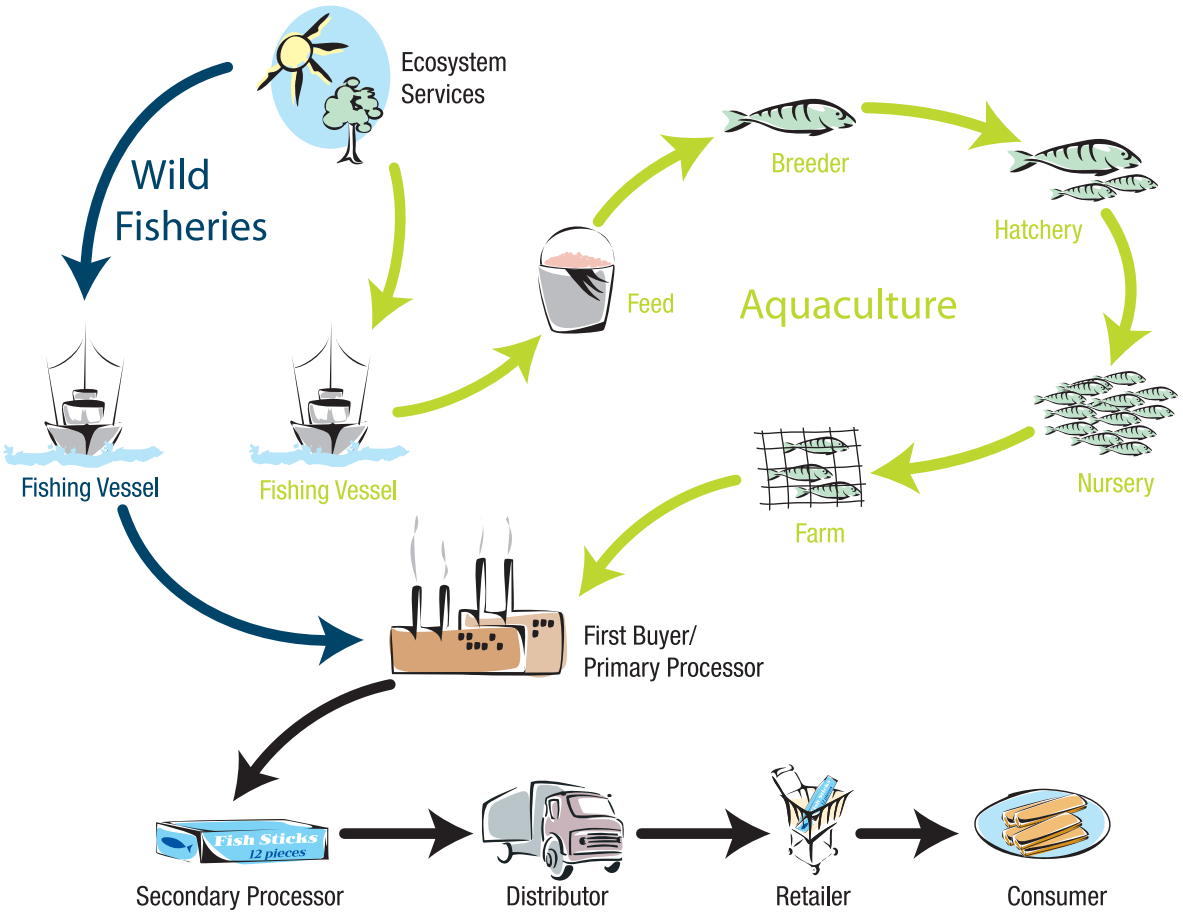

Figure 1 A few simplified seafood supply chains, exemplifying general differences between wild harvested fish and finfish aquaculture chains. It is important to note, however, that the supply chain pathways for various domestic and imported seafood products are incredibly diverse and complex, each presenting unique challenges for product tracing.

2.2 Commonly Used Terms

Before delving deeper into traceability systems, it may be helpful to clarify a few general terms, as adapted from Moe (1998):

product: a product can refer to any material at any stage of processing, whether it is a live fish or a processed seafood product

unit: a unit is the level at which a product is packaged (e.g. an eight-pack of fish sticks might constitute a **retail unit**, whereas a crate of fish sticks transported by pallet could be considered a **logistic unit** [see Figure 2]).

batch: a batch or **lot** is a quantity of product produced at a certain time, under similar circumstances (e.g. one run of fish sticks all produced on the same day at one plant).

step: a step is used to define a distinct operation or location where a process is performed on the product

chain: a chain describes the sequence of steps

trace: trace expresses the search for the history of a product origin

track: track is used when investigating a product's history after it has been delivered.

> ...traceability is "the ability to systematically identify a unit of production, track its location and describe any treatments or transformations at all stages of production, processing and distribution."
>
> (Archipelago, 2005)

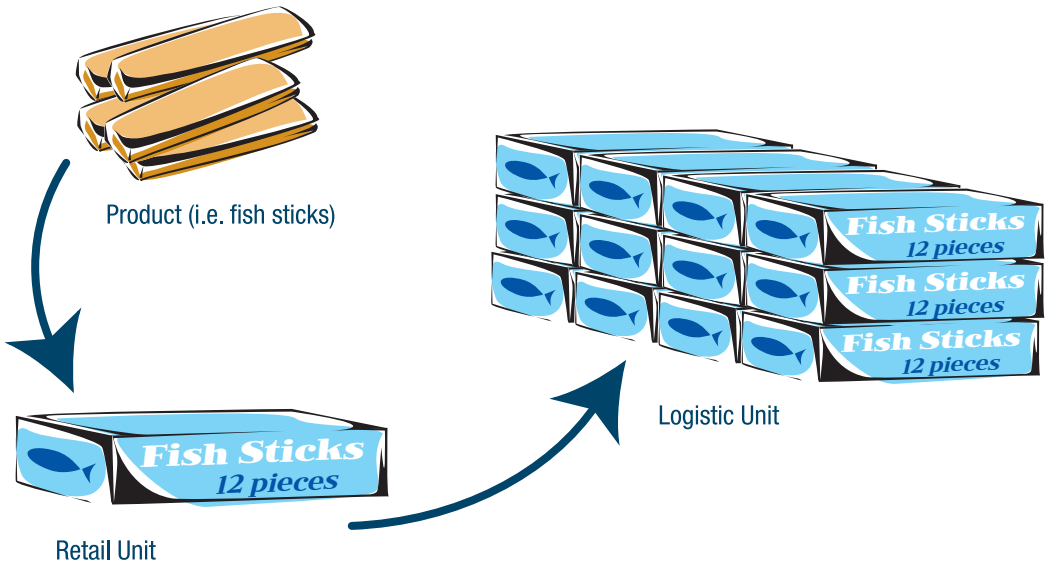

Figure 2 Common terms used to describe different unit levels along the supply chain.

2.3 Types of Traceability Systems

2.3.1 Categories

As briefly mentioned above, there are two main categories of traceability systems. **Internal traceability systems** allow one to trace what happens to a product within a business' operation (Petersen and Green, 2004). This type of recordkeeping is already legally required throughout the seafood industry, as it is essential for keeping track of inventory, purchasing and other in-house accounting.

External traceability systems enable one to trace what happens to a product through all parts of the supply chain, or part of the supply chain outside of one business entity (Petersen and Green, 2004). Tracing upstream means looking back along the supply chain towards the harvester/producer steps, while downstream looks forward towards distribution and consumption (Petersen and Green, 2004) (see Figure 3). This level of information keeping and sharing can pose a challenge for many businesses. However, with longer and more convoluted seafood supply chains and rising demand for data by both regulators and consumers, external traceability is increasingly important.

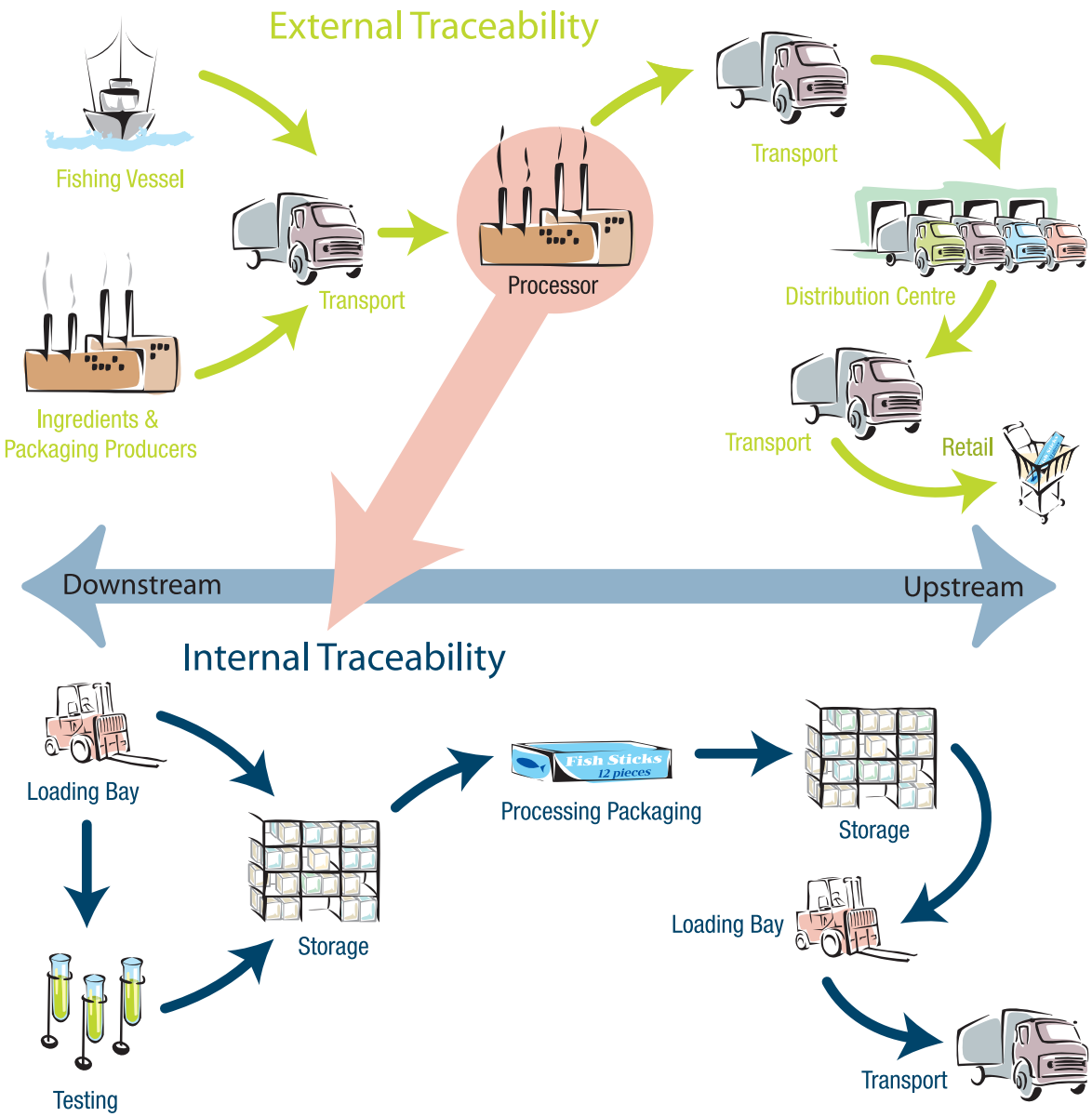

Figure 3 Internal and external traceability systems—scopes and relationships. While most seafood businesses have acceptable internal documentation, regulatory and market forces are pushing for increased external traceability.

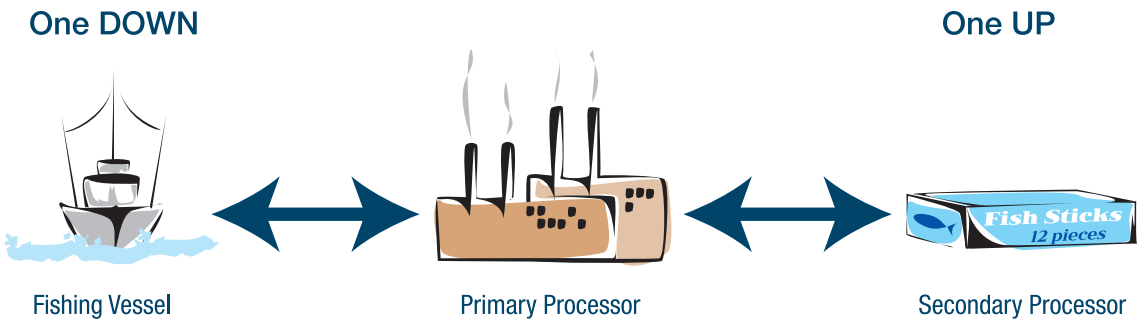

Figure 4 An example of "one-up, one down" traceability. Using the primary processor as a reference point, the secondary processor is one step up along the supply chain, while the fishing vessel is one down.

"**One up, one down**" is the simplest model of external traceability, and the minimum requirement of traceability regulations such as the U.S. Bioterrorism Act and the EU General Food Law. Under this system, each partner in the supply chain is held responsible for recording input and export data, but not for information which may be several steps ahead or behind in the supply chain (Can-Trace, 2007). While this system may be easiest for small businesses to realize, it does not allow for efficient recalls or trace-backs. As the Canadian Produce Marketing Association has noted with regards to "one up, one down" traceability, "the integrity of the system depends on all partners in the supply chain and is only as good as the weakest link" (Canadian Produce Marketing Association, 2008).

2.3.2 Systems

The simplest traceability system is what is traditionally known as a "paper trail." Using **paper traceability**, written data follows the product through the supply chain. These pieces of information are often stored on shipping receipts, import/export permits, or product invoices. Using paper traceability may be inexpensive and feasible for small businesses with a limited product line and a large amount of storage space. However, as businesses become larger, handle more products, and engage with trading partners along a longer supply chain, paper systems can become unwieldy and unreliable (Petersen and Green, 2004).

Electronic traceability systems allow product data to be managed using computers. Large amounts of information can be stored, managed, and even traded through an electronic network, often making use of multiple databases. Electronic recordkeeping is advantageous for many businesses; accounts are precise, quickly accessible, and require little space. Seafood companies that are interested in full external traceability will likely require the sophistication provided by computerized systems (Petersen and Green, 2004).

Electronic traceability can be achieved using a number of different tools. Most are either web-based or module-based. **Web-based systems** store information on databases that are accessed via the internet. In this way, information can be uploaded, downloaded and queried remotely by authorized partners along the supply chain. Web-based systems offer a practical and efficient method for recording and quickly accessing traceability information from all parts of the supply chain. Web-based traceability systems can be relatively cost-effective. Expenses usually include an installation fee, a subscription fee and/or a per-unit or per-record fee. Some business owners may have reservations about storing valuable product information online; however, these systems can control which information can be seen by different parties along the supply chain. Seafood companies should ask potential system providers about internet security options.

For **module-based systems**, specialized software must be installed in computer networks at various

points along the supply chain. Sometimes added hardware is also required. Oftentimes, module-based systems can either interact with or replace accounting or sales software already in use by a seafood business. Module-based systems can also often interact with web-based traceability systems. Modules may allow companies tight control over their traceability information, but installation and upkeep can be costly, especially if new software and/or hardware must be installed over a lengthy supply chain.

2.3.3 Other Tools

Whether module-based or web-based, electronic traceability systems typically make use of several other tools to track seafood products from their origin to the consumer's plate. Three crucial tools for full external traceability include identifiers, carriers and readers.

Identifiers are codes that can be scanned through a reading device. These codes allow data to be registered, encrypted and stored in a central location. GS1 standards are the most widely used product identifier standards for food products. While individual companies may also produce proprietary identifiers, these are usually useful only for internal traceability (Petersen and Green, 2004).

Carriers are the physical tags that hold the identifier data. These tags may take the form of a bar code or a radio frequency identification tag (RFID) (Petersen and Green, 2004).

- **Bar codes** have been widely used in the food industry since the 1970s, and are familiar to most people as a small digital image of lines and spaces affixed to retail items, identification cards and mail (Petersen and Green, 2004).
- **RFID**s, or radio frequency identification tags, are more sophisticated carriers. They are more rugged and reusable than a barcode, and capable of holding more identifier data. A microchip in the tag stores data and allows a reader to access it with an electromagnetic field. Because RFIDs can be read out of sight of a reader, many can be scanned simultaneously. Several large U.S. retail chains and government agencies have begun to require food suppliers to use RFID tags. Electronic Product Code (EPC) is the most commonly used identifier for RFIDs (Petersen and Green, 2004).

Finally, **readers** are either stationary (e.g. installed at a loading dock) or hand-held devices used to record and interpret the information stored on carriers and register products (Petersen and Green, 2004).

All About GS1—Managing Standards

EAN International-Uniform Code Council (EAN-UCC)

The EAN-UCC is a system used to standardize schemes for making businesses more efficient, such as bar codes. The EAN-UCC system is administered by GS1.

GS1

GS1 is an international non-profit that develops voluntary product identifier standards, most notably with bar-codes and mainly for foods. GS1 has regional groups, including GS1 Canada. GS1 is in charge of managing the EAN-UCC Systems and the Global Standard Management Process (GSMP). GS1 standards are used by everyone from multi-national companies to small independent businesses. More information on GS1 can be found at www.gs1.org. Emerging Canadian product standards can be found on GS1 Canada's website, www.gs1ca.org.

GSMP—Global Standards Management Process

GSMP is a collaborative user forum where GS1 standards are created and updated. It is a transparent industry driven initiative which started in 2002, where stakeholders can identify needs and best practices, then develop and implement standards accordingly.

Figure 5 Typical traceability data carriers include the barcode (left) and the RFID tags (right; photo attributable under creative commons license to Milo Grika, 2006).

3. Traceability and Doing Business

3.1 Background

Seafood is a major industry in Canada. In 2007, seafood exports were valued at $3.9 billion. It is estimated that over 80% of Canada's seafood, by value, is exported, with the United States as the largest export market (62-63 % of traded seafood). Canada also exports large quantities of seafood to Japan (8-11%), China (9%), and the European Union (9.9%) (Agriculture and Agri-Food Canada, 2007; DFO, April 2008). Recognizing the importance of maintaining Canada's seafood export market, the federal government is taking notice of seafood traceability initiatives and requirements abroad.

Current traceability regulations require that all Canadian businesses buying and selling seafood keep internal supply chain records. These records may be sufficient to comply with today's regulations, but there are a few key areas of concern:

- Many companies are not prepared to share the level of information required to satisfy future regulatory and market expectations, especially on key international markets. A 2007 Department of Fisheries and Oceans (DFO) market risk analysis assessed the vulnerability of Canadian seafood exports to eventual exclusion from European and other markets in the absence of eco-certifications. Such certifications require clearly verified chains of custody and traceability. Eleven percent (by value) of Canada's seafood exports went to "high risk" markets that are likely to initiate eco-certification requirements in coming years. The five provinces identified to be most at risk of losing export market share were Nova Scotia, Newfoundland, British Columbia, New Brunswick and Prince Edward Island (DFO, 2008).
- The information required from seafood harvesters is particularly inconsistent and often unclear– which may leave critically important questions unanswered (Gislason, 2004). For example, most existing and developing Quality Management Programs (QMPs) and product tracking processes in Canada only begin to trace product once it has arrived at a processing facility.

In short, the current traceability information required by the Canadian government may be insufficient to meet key export market standards in the near future.

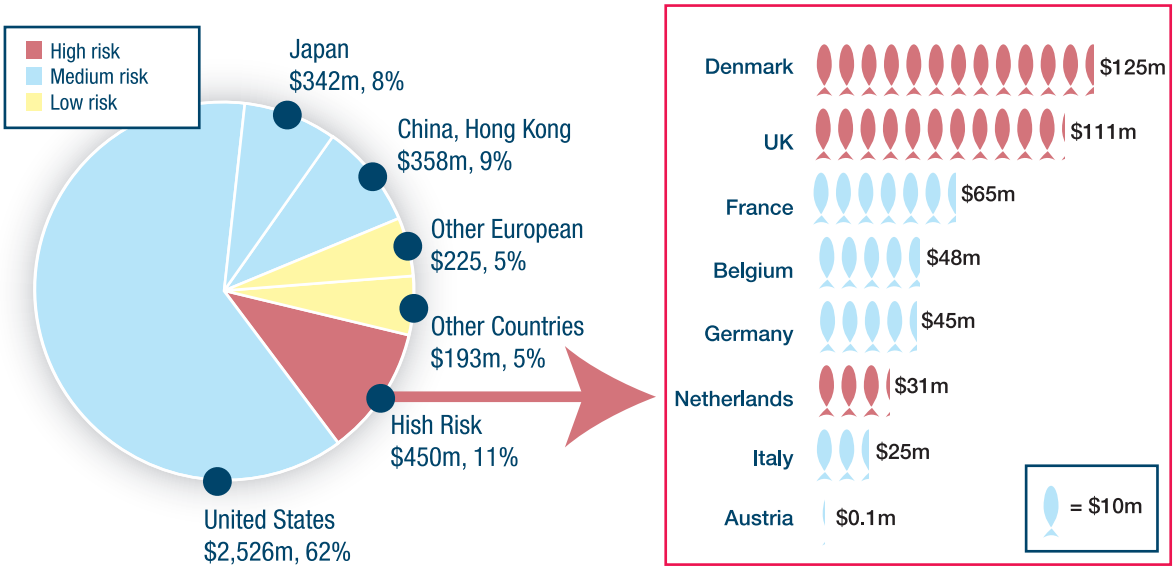

Figure 6 Export markets (by weight) identified by the Department of Fisheries and Oceans (DFO) where Canadian seafood businesses are most vulnerable to losing market share due to evolving traceability and eco-labeling requirements. Graphs from Eco-Certification: Draft Market Risk Analysis for Canadian Seafood Exports (DFO, April 2008).

3.2 Benefits

Beyond fulfilling legislative requirements, traceability can also provide businesses with a number of competitive advantages:

- Fast and efficient product recalls (and prevention of unnecessary recalls)
- Ability to offer safety reassurance by addressing concerns over product-tampering along the supply chain
- Access to lucrative markets for sustainable seafood, which depend on clear documentation throughout the chain of custody
- Safeguarding and assuring a trustworthy reputation of company and brand
- Valuable internal information in standardized form and central location, providing a potential feedback loop on product quality and service
- Enhancement of mutual trust and cooperation between consumers, business partners, government and auditors
- Direction of fewer resources to quality checks and storage (Frederiksen, 2002)

Different benefits from traceability are also apparent to businesses along different steps of the seafood supply chain, as depicted in Table 1.

3.3 Challenges

Accomplishing seafood traceability is no small task, and can present players along the supply chain with unique challenges. Traceability information can be difficult to collect along the often intricate chain of custody beginning in the water, and ending on a consumer's plate.

Reliable information may be easier to obtain from aquaculture operations than many wild-caught fisheries, especially in the case of shellfish (oysters, clams, mussels, scallops) where strict records are required by law in case of contamination risk (Archipelago, 2005). As well, certain types of wild fisheries may have better access to data than others. One example is the British Columbian halibut fishery, which benefits from 100% dockside monitoring for catch validation, piece-by-piece tagging and traceability of fish, capable information storage systems, and an organized fishing association (Archipelago, 2005).

In addition to challenges with the availability of information, traceability systems, certifications and eco-labels often have associated expenses. For some small businesses, fisheries and aquaculture operations, especially those in developing nations, the costs can be prohibitive (FAO, 2001). The

expenses associated with adopting traceability systems and financing arrangements vary depending on the traceability program and the supply chain involved for a product. Various examples are given in subsequent sections.

Certain groups, particularly small-scale fishers, have expressed concern over potentially discriminatory elements inherent in various traceability schemes, namely the start-up cost and maintenance of these systems. In addition, some feel that emerging market requirements around traceability are actually designed to disguise underlying intentions to protect domestic industries, restrict market access, and erode national competitiveness for those less able to meet or afford foreign labeling and certification standards (FAO, 2001).

Given the potentially significant challenges of accomplishing seafood traceability, your businesses may find it practical to take a close look at its current marketing approaches and its capacity to implement new traceability systems.

Table 1 Sample traceability system benefits across the agri-food value chain (Source: Whole Chain Traceability in the Agri-Food Industry—The Time is Now (IBM, 2006)).

Farm Input†

- Increased productivity/ supply chain optimization
- Improved inventory
- Improved shipping/receiving accuracy
- Demand visibility and forecasting
- Refined client behaviour information
- More efficient marketing
- Risk mitigation and reduced liability

Producer/Grower††

- Increased farm efficiency
- Individual animal/product value-added information from processor
- Increased yields—business analytics from feed, pesticides, processor
- Increased and secure access to global markets
- Risk mitigation and reduced liability

Processor

- Increased service offerings to clients
- More detailed understanding of input and throughput by client
- Increased quality control
- Risk mitigation and reduced liability

Distributor

- Increased productivity
- Improved inventory
- Improved shipping/receiving accuracy
- Demand visibility and forecasting
- Decreased diversion expenses
- Risk mitigation and reduced liability
- International trade

Retailer

- Increased productivity/supply chain optimization
- Improved inventory
- Improved shipping/ receiving accuracy
- Demand visibility and forecasting
- Refined client behaviour information
- More efficient marketing
- Risk mitigation and reduced liability

Consumer

- Increased food supply confidence
- Greater availability of products and services

Government

- Improved public safety
- Increased competitiveness
- International trade
- Risk mitigation
- Reduced compensation

† Farm Input can apply to feed inputs in aquaculture operations. The Farm Input category would not apply to wild fisheries.

††The Producer/Grower category could apply to the Fisherman/Farmer.

4. Traceability in Sustainable Seafood Procurement

4.1 Sustainable Seafood—The Basics

Consumers are increasingly concerned about the ecological impacts associated with seafood, and demanding sustainable options.

Sustainable seafood is fish or shellfish that is caught or farmed with consideration for the long-term viability of harvested populations and for the health of marine ecosystems (www.seachoice.org). There are many factors to consider when choosing sustainable seafood. For example, when buying wild fish, it is important to consider whether the fish is coming from healthy, well-managed wild populations that are harvested in ways that minimize habitat effects, bycatch and discards, and do not promote over fishing. For farmed seafood, one must take into account the risk of escapes, disease transfer, pollution and habitat effects on the natural environment, as well as management effectiveness and fish feed impacts.

Fish Choice

Fish Choice is a directory for sustainable seafood. The aim is to connect seafood buyers with the most sustainable sources of seafood. Buyers can search the system for sustainable products according to various existing seafood assessment schemes (e.g. Canadian businesses would use SeaChoice). To learn more about Fish Choice visit www.fishchoice.com.

4.2 Conservation Groups

Environmentally sustainable seafood movements began in the late 1990s, mainly in the European Union and United States. Sustainable seafood efforts have gained considerable momentum over the years, and several groups provide useful information resources on sustainable seafood, both for business and consumers.

- Internationally, World Wildlife Fund (WWF) has a significant history of working on sustainable seafood issues. WWF has active consumer sustainable seafood consumer education campaigns in Europe, Hong Kong, Indonesia and South Africa. WWF's program focuses on encouraging businesses and consumers to support products certified by the Marine Stewardship Council (or MSC, which it helped to found along with Unilever in 1997), and helping fisheries to engage in the MSC certification process. For more information on WWF and their sustainable seafood work, visit www.panda.org.
- In North America, sustainable seafood has been gaining recognition over the past ten years. In 2008, 15 Canadian and U.S. conservation organizations joined together under the banner of the Conservation Alliance for Sustainable Seafood to put forward a Common Vision for Environmentally Sustainable Seafood. The Common Vision acts as a guide for businesses who are interested in committing to more sustainable seafood procurement. See the succeeding text box or www.solutionsforseafood.org for more information on the Common Vision.
- In Canada, five conservation organizations—Canadian Parks and Wilderness Society, David Suzuki Foundation, Ecology Action Centre, Living Oceans Society, and Sierra Club BC—joined together in 2006 to form the SeaChoice program. SeaChoice uses the best available science, communications and partnerships to mobilize sustainable seafood markets in Canada. For more information on SeaChoice or Canada's Business Guide to Sustainable Seafood visit www.seachoice.org.

4.3 Retailers and Food Service Providers in Canada

According to the Greenpeace Canada's 2008 "Out of Stock" report on sustainable seafood at Canadian grocery retailers, only a few players have publicly committed to sustainable seafood procurement (Hunter and King, 2008). While the steps toward seafood sustainability taken by a select few retailers are commendable, there remains much to do to transform the Canadian market.

Notably, Wal-Mart U.S. announced an ambitious goal to source all wild-caught seafood from sustainable sources by 2012, and has enlisted the help of MSC and WWF to accomplish this goal. It is unclear, however, if and when Wal-Mart Canada, among other

The Common Vision for Environmentally Sustainable Seafood

The Common Vision identifies six critical areas where companies can take action to ensure a sustainable seafood supply and protect ocean environments:

1. Making a commitment to develop and implement a comprehensive, corporate policy on sustainable seafood;
2. Collecting data to assess and monitor the environmental sustainability of their seafood products;
3. Buying environmentally responsible seafood;
4. Making information regarding their seafood products publicly available;
5. Educating their consumers, suppliers, employees and other key stakeholders about environmentally responsible seafood; and
6. Engaging in and supporting policy and management changes that lead to positive environmental outcomes in fisheries and aquaculture.

The groups involved in the Conservation Alliance for Seafood Solutions are:

- Blue Ocean Institute
- Canadian Parks and Wilderness Society
- David Suzuki Foundation
- Ecology Action Centre
- Environmental Defense Fund
- FishChoice
- FishWise
- Living Oceans Society
- Monterey Bay Aquarium
- Natural Resources Defense Council
- New England Aquarium
- Ocean Conservancy
- Shedd Aquarium
- Sierra Club British Columbia
- World Wildlife Fund – U.S.

For more information on the Common Vision or the groups involved in the Conservation Alliance for Seafood Solutions visit www.solutionsforseafood.org.

The Wal-Mart Effect

In 2006, the retail behemoth Wal-Mart made a pledge to source all of its wild-caught fresh and frozen fish for the North American market from fisheries meeting the Marine Stewardship Council (MSC) environmental standard for environmentally sustainable and well-managed fisheries. Wal-Mart is also requesting that product providers supplying farmed seafood obtain Aquaculture Certification Council (ACC) certification (Hunter and King, 2008).

It will take time for the sustainable seafood procurement program to be implemented across more than 3,700 Wal-Mart locations—however, the push has already begun to encourage fisheries and farms to pursue eco-certification and provide a powerful new route to raise awareness among the North American public about sustainable seafood (Hunter and King, 2008).

At the same time, however, several conservation organizations have expressed concerns about the potential pressure placed on MSC certifiers to approve high-volume fisheries for certification to stock Wal-Mart's shelves. Some also question the rigour of the ACC's industry-developed standards, as well as the extent to which conservation benefits are being achieved by MSC certifications.

businesses, will follow a similar path (Hunter and King, 2008).

The good news is that increasingly, opportunities are arising for businesses to engage with NGOs and certification schemes like MSC to develop labeling and seafood traceability for the Canadian market. Overall, with increased attention to the issue of sustainable seafood on North American and global markets, sustainable seafood is expected gain prominence in corporate social responsibility strategies and sustainability policies for the retail sector.

Businesses and NGOs working together towards sustainable seafood

Both the world of business and the world's oceans are tricky places to navigate. As a result, there can be many benefits to building partnerships between businesses that buy and sell seafood and the conservation community that specializes in researching sustainable seafood and fisheries issues. Developing sustainable procurement policies is one way for businesses to meet rising market expectations, support environmentally friendly practices on the water and to ensure our ocean resources last into the future.

Several active partnerships already operating in Europe and North America serve as exciting examples of what is possible when businesses and NGOs work together to help bring about change. For example, many of the Conservation Alliance for Sustainable Seafood groups mentioned previously are presently collaborating with retailers, food service providers and restaurants to market sustainable seafood. A few examples of these partnerships are listed below, with many more to be found on the Conservation Alliance website–www.solutionsforseafood.org.

- The Ahold group of companies has been working with the New England Aquarium to develop more sustainable seafood procurement practices since 2000.
- Wegman's has been working with Environmental Defense Fund in to develop standards and identify shrimp farms with best practices under their sustainable seafood procurement program.
- Aramark recently announced that their U.S. food service operations will source more sustainable seafood in coming years with the help of the Monterey Bay Aquarium Seafood Watch Program.

5. Current Traceability Requirements

Recordkeeping is a vital aspect of any successful seafood business. Seafood buyers and sellers need to be familiar with a wide range of rapidly evolving regulatory and market demands for traceability information. This is particularly important for Canada's seafood industry, as approximately 80% of Canadian fish and seafood products produced are exported internationally (Agriculture and Agri-Food Canada, 2007). This section of the document breaks down some of the information currently required

Product of Canada, eh?

At the time of printing, seafood products imported into Canada are subject to the labeling requirements of the Fish Inspection Regulations maintained by the CFIA. Country of origin must be declared on all imported fish products, but only on the container in which they are imported, not necessarily on the retail package.

To be labeled as "Made in Canada," most food products require at least 51 percent of the product to be made within the country." However, fish is an exception—any fish that undergoes "substantial transformation' in Canada at a federally registered establishment can be labeled "Product of Canada." These transformations may include any major processing step that changes the original nature of the fish or fish product, including salting, canning, battering, and breading. This is how, for example, basa farmed in Vietnam and seasoned with soya sauce in Nova Scotia can be marketed as a Canadian product.

However, the government is currently considering stricter regulations as part of a proposed Food and Consumer Food Labelling Initiative under the Canada's Food and Consumer Safety Action Plan. As Prime Minister Harper announced in May 2008, "If something in the grocery store is marked Product of Canada, it must mean all or virtually all the contents are Canadian, so that all the apples in the juice will come from Canadian farmers..., the cod in the fish sticks will come from Canadian waters, and all the milk and the ice cream will come from Canadian dairy cows."

Under these proposed new labeling regulations, wild-caught seafood products may be labeled "Product of Canada" when caught in Canadian waters (or adjacent to Canada's waters as designated in Canadian regulatory fishing quotas), and the seafood is processed in Canadian establishments with Canadian ingredients. Farmed seafood from Canadian farms that is processed in Canadian establishments using Canadian ingredients may also bear a "Product of Canada" label.

Products made from imported ingredients, or partially from imported ingredients, but that are processed (i.e. that undergo their last substantial transformation) in Canada, may bear qualified labels such as "Made in Canada from imported ingredients" or "Made in Canada from domestic and imported ingredients."

For more information on these new Consumer Safety Action Plan regulations on product labeling in Canada, visit the Prime Minister's website at www.healthycanadians.ca/pr-rp/cfli-icepa_e.html

Canadian Prohibitions on providing false or misleading information:

Food and Drugs Act s. 5 (1) No person shall label, package, treat, process sell or advertise any food in a manner that is false, misleading or deceptive or is likely to create an erroneous impression regarding its character, value, quantity, composition, merit or safety.

Consumer Packaging and Labelling Act s.7 (1) No dealer shall apply to any pre-packaged product or sell, import into Canada or advertise any pre-packaged product that has applied to it a label containing any false or misleading representation that relates to or may reasonably be regarded as relating to that product.

domestically and by Canada's common seafood trading partners.

5.1 Canadian Traceability Requirements

So far, the demand for extended traceability systems has mainly focused on the beef industry in Canada. These pressures are the result of European regulations as well as growing public concern around animal health and food safety. Notably, for example, Quebec has legislated traceability documentation under the *Animal Health Protection Act* (Can-Trace, 2007).

While the development of traceability for seafood has been lagging, there are considerable movements underway to meet rising regulatory and market expectations.

Currently, Canada requires that the common name, country of origin, net quantity grade/size/class/count, moisture content and quality designation to be labeled on most seafood products (Canadian Food Inspection Agency, 2008).

In contrast to the United States and Europe, Canada does not currently require labels that define whether seafood is wild-caught or farmed. Seafood labels in Canada also do not need to include information about additives such as colourants and sulfites. Country of origin labeling in Canada is quite nuanced, as detailed in the "Product of Canada, eh?" box above. Packaging and labeling requirements for Canada's seafood is dictated by a hodgepodge of legislation, with rules found in the *Food and Drugs Act*, the *Consumer Packaging and Labeling Acts*, and the *Fish Inspection Act*.

In 1992, Canada was the first country to implement a mandatory food safety system based on Hazard Analysis Critical Control Point (HACCP) under the Canadian Food Inspection Agency's (CFIA) Quality Management Program (QMP) for fish and seafood processing operations (Gagnon et al., 2000). Some of the HACCP data collected under the QMP may be useful for developing increased seafood traceability in Canada. Currently, however, a minimum amount of traceability data is communicated along the supply chain, unless required by the export nation (Ron Bulmer Consulting, 2004).

Despite a lack of strong regulatory requirements, both government-sponsored traceability programs and non-governmental seafood sustainability programs strongly recommend that businesses that buy and sell seafood share additional information along the supply chain.

Can-Trace, a traceability initiative managed by Agriculture and Agri-Food Canada, recommends that wholesale, distributor and retail operations keep information on:

- lot numbers,
- product description,
- product identifiers,
- quantity,
- receipt date,
- receiver identifier,
- ship date,
- ship to and from location identifiers,

Hazard Analysis Critical Control (HACCP)

First employed by the Pillsbury Company in 1959 to produce safe food products for American astronauts, HACCP is a floor-level process that works to identify and prevent food hazards posing potential harm to consumers. The HACCP System consists of seven principles:

Principle 1: Conduct a hazard analysis.

Principle 2: Determine the Critical Control Points (CCPs).

Principle 3: Establish the critical limit(s).

Principle 4: Establish a system to monitor control of the CCP.

Principle 5: Establish the corrective action to be taken when monitoring indicates that a particular CCP is not under control.

Principle 6: Establish procedures for verification to confirm that the HACCP system is working effectively.

Principle 7: Establish documentation concerning all procedures and records appropriate to these principles and their application.

More information about HACCP for Canadian seafood products can be found at www.inspection.gc.ca/english/anima/fispoi/qmp/guide/elem5e.shtml

- shipment identifier, and
- unit of measure (www.cantrace.org).

SeaChoice recommends that labels include accurate information on:

- species name (preferably the scientific name),
- catch or farm method,
- catch or farm location,
- processing location, and
- feed ingredients (if farmed) (www.seachoice.org).

As Can-Trace (2007) points out, Canada's seafood industry will need to answer the following questions to achieve emerging traceability expectations:

- What information to collect, keep and share?
- How to store information to meet demands of customers and regulators?
- How to collect and store information in a cost-effective manner?

As this document goes to print, the Canadian government is exploring a number of options for promoting better traceability in the seafood industry. It is unclear at this point what direction federal agencies will take, if any, on implementing new traceability requirements for Canadian seafood products. See Section 5.2.2. of this document for more information on emerging European regulations, which are already influencing seafood export requirements, and may help shape future Canadian regulations.

5.2 International Traceability Requirements

Canadian seafood exporters are experiencing increased pressure to supply traceability information to many of their common trading partners, especially the United States and the European Union. In response to a series of high profile food safety and security scares, both jurisdictions have emerged as leaders in the creation of food labeling and traceability legislation. Japanese and Chinese markets also import large volumes of Canadian seafood, and are increasingly interested in traceability and more stringent labeling.

Can-Trace

www.cantrace.org

Can-Trace is a Canadian, industry-led initiative managed by Agriculture and Agri-Food Canada. The aim of Can-Trace is to establish a voluntary food traceability data standard for use by all commodity groups across the entire supply chain. The standard is known as the Canadian Food Traceability Data Standard Version 2.0 (CFTDS v2), and can be downloaded from the Can-Trace website. The undertaking is based on global standards and has identified a list of minimum data elements required to establish traceability in a "one up, one down" system.

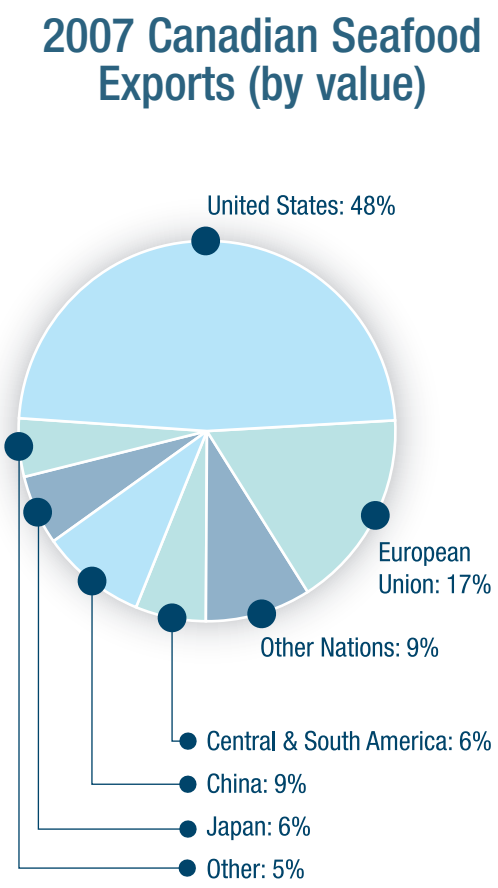

Figure 7 Canadian domestic exports of selected seafood commodities by quantity (product weight) in 2007. Data courtesy of DFO Statistical Services (DFO, 2007).

5.2.1 United States

Signed into law by President Bush in 2002, the Public Health Security and Bioterrorism Preparedness and Response Act (known more succinctly as the U.S. Bioterrorism Act) has generated regulations requiring the establishment and maintenance of chain of custody records by persons who manufacture, process, pack, transport, distribute, receive, hold or import food into the United States. Section 306 of the Act requires thatdocumentation identify both the last previous supplier and the next subsequent buyer of food and food packaging. This type of traceability information is known as "one-up, one-down" traceability.

Recordkeeping requirements are slightly different for "non-transporters" and "transporters." Non-transporters are defined by the Act as "persons who hold, produce, pack, import, receive or distribute food for purposes other than transportation" (Petersen and Green, 2004). This category includes fish processing plants and seafood importers, for example. Transporters are "persons who have possession, custody, or control of an article of food" for the sole purpose of shipping it (Petersen and Green, 2004).

There are a number of exemptions from the bioterrorism act, including fish farms and restaurants. Other entities, including fishing vessels, non-profit food organizations, and retail establishments with fewer than 10 full-time equivalent employees, are also excluded from the requirement to establish and maintain particular documentation, but remain subject to record accessibility requirements for existing information. The Act requires that these records be kept between six months and two years, depending on the type of food. (Petersen and Green, 2004).

Non-Transporters Record-Keeping Requirements

Receiving Food	Releasing Food
Name of firm, address, telephone number, and (if available) fax number and e-mail address	Name of firm, address, telephone number, and (if available) fax number and e-mail address
Type of food, including brand name and specific variety (e.g. brand X Atlantic Salmon, not just Salmon)	An adequate description of the type of food, including brand name and specific variety
Date the food was received	Date food was released
For persons who manufacture, process, or pack food: lot or code number or other identifier (to the extent such information exists)	For persons who manufacture, process, or package food: lot or code number or other identifier (to the extent such information exists)
Immediate previous transporter including: name of the firm, address, telephone number, and (if available) fax number and e-mail address	The name of the firm, address, telephone number, and (if available) fax number and e-mail address of the transporter's immediate subsequent recipient
Quantity and type of packaging (e.g. 25-lb cardboard box)	Information reasonably available to identify the specific source of each ingredient used in each lot of finished product

Table 2 A comparison of record keeping requirements under the US Bioterrorism Act for non-transporter seafood businesses receiving and releasing food product (FDA, 2005).

The US *Bioterrorism Act*'s final rule on "*Prior Notice of Imported Food Shipments*" requires that notice of food shipments destined for the U.S. be confirmed electronically with the FDA not more than five days or not fewer than two hours if imported by land, four hours by air or rail, or eight hours by water. Such a notice must include:

- Identification of the submitter and transmitter,
- Entry type and Custom Border Protection identifier,
- Identification of the article including brand name, quantity and lot code,
- Manufacturer,
- Grower if known,
- FDA country of production,
- Shipper,
- Anticipated arrival by port of entry, date and time
- Identification of the importer, owner or consignee, and
- Carrier (USDA, 2008).

The *U.S. Country of Origin Legislation* of 2002 (or COOL) also calls for seafood products to carry labels identifying both the country of origin and the method of production (for example, whether the fish was wild-caught or farmed). Starting on September 30th, 2008, COOL also requires that all suppliers be able to validate these claims through possession or legal access to one-up one-down documentation unique to each transaction. These records must also be kept for two years (USDA, 2008).

5.2.2. European Union Regulations

The European Union (EU) has required traceability records for seafood since 2005. The principles, requirements and procedures are laid out neatly in a series of regulations known as the General Food Law, or Regulation (EC) No. 178/2002. Like the US Bioterrorism Act, this law requires that all food and feed producers to record supply information on a "one up, one down" principle (Petersen and Green, 2004).

Presently, this regulation does not legally require Canadian companies exporting to EU countries to provide traceability information before entering Europe. However, this level of documentation may still be necessary to access these significant markets, as the importing body often requires the data from non-EU exporters to comply with the rules.

As well, it is expected that elements of the EU General Food law will eventually be adopted by other countries, and that similar traceability requirements will soon be required to access other international markets as well (Archipelago, 2005).

Further, in response to rising customer demand for seafood traceability, several EU companies are starting to require information beyond the required "one up, one down" regulations. Some importers are even requesting that international companies adopt common electronic product identifiers such as GS1 (EAN-UCC) bar codes and/or radio frequency identification (RFID) tags (Peterson and Green, 2004).

With considerable attention in Europe over the past few years to illegal, unreported and unregulated fishing (i.e. IUU fishing or pirate fishing), additional traceability requirements aimed at combating IUU seafood imports are clearly visible on the horizon. The FAO estimates that IUU fishing makes up about one third or more of total catches in certain major fisheries. In 2007, the European Commission proposed a new initiative consisting of nine proposals aimed at combating IUU fishing, including a requirement that non-EU fishing and trans-shipping vessels that wish to export seafood to the EU must have their products documented and certified as legally caught fish by their flag state.This proposal, as well as the eight others that comprise the IUU initiative, will come into effect on January 1st, 2010 (European Commission, 2007).

As the largest importer of seafood in the world, and a major importer of Canadian seafood products, Europe's action will not go unnoticed. Exporters of seafood to the EU will likely see new catch verification requirements before the 2010 deadline. However, it is presently unclear how Fisheries and Oceans Canada (DFO) and Canadian businesses will ensure compliance with the EU's new stringent catch documentation and certification requirement. Some possibilities for meeting the new EU requirements include increased observer coverage, increased dockside monitoring, or mandatory independent third party certification.

For a more information on this proposed EU initiative full list of the nine proposals, visit ec.europa.eu/fisheries/cfp/external_relations/illegal_fishing/a_new_strategy_en.htm

The European Union has also been pursuing its own voluntary eco-label, and is expected to share

an outline with the public by the spring of 2009. The system promises to be less costly than prominent private eco-labels, and is expected to share common features with other emerging nationally and regionally developed certifications, such as that of Marine Eco-label Japan (Seafood.com News, December 11, 2007). Specifically, the EU scheme promises:

- clear, objective and verifiable technical criteria,
- certification procedure by an independent third party,
- open access,
- rigorous management, and
- transparency (Seafood.com News, December 31, 2007).

As Europe continues to develop new traceability regulations for seafood, a project that should be of interest to Canadian companies exporting—or thinking of exporting—to Europe is the PETER Project. PETER, or "Promoting European Traceability Excellence and Research," is an international forum for discussion and dissemination of the results of traceability research in Europe. With over 400 project partners, the purpose of the project is to harmonize global traceability standards to facilitate international trade. More information on the PETER Project can be found at www.eu-peter.org.

5.2.3. Japanese Regulations

Japan consumes more seafood per capita than any other nation—on average over 66 kilograms each year per individual (Halweil, 2007). Japan currently lacks specific traceability regulations for seafood. After an episode of Bovine Spongiform Encephalopathy (BSE) in 2001, stringent traceability requirements were enacted for beef imports, and there are strong indications that similar rules will be enacted for seafood (Peterson and Green, 2004).

A number of labeling laws require a sticker describing the country of origin and the method(s) of production to be attached to each lot of imported seafood. For example, the *Food Sanitation Law* (Law No. 55 of 2003) requires the following information:

- Name of the product
- Name and address of the processor
- Lot identification
- Date of import
- Ingredients and food additives used in its manufacture, and
- Any inspection records related to the lot (Japan External Trade Organization, 2006).

Seafood exported to Japan from Canada is usually shipped in bulk, with an importer or processor taking responsibility for the required Japanese-language documentation and labeling (CFIA, 2006).

In light of recent food scandals, government and consumer consciousness of proper seafood labeling is growing in Japan. For example, last year, the Ministry of Forestry and Fisheries consumer hotline received five times the number of consumer calls it did when it opened a few years ago. As well, a 2008 fraud scandal where low-grade Chinese eel contaminated with banned antibiotics, falsely labeled, and sold as high quality domestic eel on the Japanese market drew considerable media attention and public outcry (Seafood.com News, July 8, 2008). The Japanese government is currently evaluating a series of fish traceability pilot projects.

Along with a rise in food safety awareness, the Japanese public has also begun to express concern about seafood sustainability. The Japan Fisheries Association has responded by developing its own chain of custody eco-label known as "Marine Eco-Label Japan" (MEL Japan) (Seafood.com News, December 11, 2007). As consumer demands for chain of custody traceability rise, Marine Stewardship Council certified products are also increasingly prominent in Japan, from *Aeon* (the nation's largest supermarket chain) to the trading floors of the Tsukiji (Marine Stewardship Council, 2008).

5.2.4 Chinese Regulations

China is the world's largest producer and exporter of seafood worldwide (Glitner, 2007). This populous Asian nation also imports large volumes of seafood products every year. In fact, Canada is the fourth-largest supplier of seafood to China, exporting $203.6 million in 2006. Atlantic Canada accounts for about 85% of those sales (ACOA, 2007). These imports serve both domestic and re-export markets and for re-export after processing.

Recently, seafood products processed in and exported from China have received negative media attention due to contamination and other food safety scares. However, because China's economic engine depends on export markets, the Chinese government has responded aggressively, promising to eventually adopt U.S. and European Union

regulatory standards (Bay, 2007). Many of these regulations are administered by the *General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ)*.

Effective as of June, 2003, the *Chinese Regulations on Inspection and Quarantine of Import and Export Aquatic Products* apply to fish and fish products, with the exception of live fish, whether exported for direct consumption or for further processing in China. Under these regulations, seafood products must be clearly labelled both in Chinese and English, indicating the following:

- Product Identity: Including Common Name, Scientific Name and Product Specifications
- Production Identity: Including production date/code which must clearly identify the year, month and day of production, and batch code/lot number
- Preservation Requirements: For example, keep frozen'
- Processing Establishment: Including establishment name and CFIA registration number
- Country of Destination: Must state 'People's Republic of China'
- Production method and fishing region (CFIA, 2006).

It should be noted here that the country of destination labeling requirement does not apply to fish and fish products processed and packed at sea and, nor frozen fish destined for further processing. For a fuller picture of Chinese seafood import regulations, visit the Canadian Food Inspection Agency website: www.inspection.gc.ca/english/anima/fispoi/export/cert10/chnchne.shtml

On September 20th, 2008, the Shandong Institute of Standardization signed an agreement with TraceTracker to establish a joint venture company named China Trace (China Sourcing News, 2008, September 30). This collaboration aims to boost the reliability of the "Made in China" brand in both domestic and export markets. As the first on-line traceability system for Chinese products, it will provide quick, accurate, and reliable product information to authorities, businesses, and consumers (more information on Tracetracker can be found in Chapter 6).

6. Some Existing Traceability Systems

There are several electronic traceability systems that may be helpful for Canadian businesses that buy or sell seafood. These traceability systems are not required by the Canadian government, but they may help businesses comply with domestic and export government regulations, meet market demands and improve the efficiency of their operations. Many of the systems have been developed in partnership with governments or non-governmental organizations, but private industry has also responded to the growing demand for comprehensive traceability systems.

Tracking seafood along the supply chain can be costly. Associated expenses may include technical support, annual fees, software, hardware, or a combination of these elements. The price tag will vary from system to system, and may depend on the size of a particular business or the supply chain. However different options exist for businesses that wish to trace a full chain of custody for their products. For example, each individual element in the supply chain (e.g. fisherman, processor, distributor, and retailer) may purchase its own traceability system. Alternatively, one element in the supply chain (e.g. the processor or distributor) may sponsor all or the majority of the traceability system for the entire supply chain, ensuring it is affordable for all of the players.

The traceability systems currently available in the marketplace are diverse—in form, content and of course, price. Those profiled in Table 3 are by no means a complete list of available systems, but were included to illustrate some of the options presently available. Some of these systems may also be used in combination, depending on the needs of particular companies. It is hoped that by exploring this wide range of traceability services, it may be possible for seafood businesses to identify key elements that are potential good fits.

Young's Trace: From Boat to Plate

In 2005, major British seafood retailer Young's rolled out a pioneering 'boat to plate' traceability system called 'Young's Trace' in the Scottish langoustine fishery. The system works with linked land and boat-based technologies, developed in partnership with Der Haan Automotorizing and TraceTracker. In this system, module-based traceability technology on fishing vessels collects and transmits live data via satellite to allow the tracing of every batch of product—recording where and when langoustines are caught, and by which vessel.

Young's Trace was developed with Scottish fishermen and has generated considerable environmental, product quality and economic benefits. Significantly, fishermen found that by collecting and analyzing the traceability data, they were able to target more mature langoustines. This insight allowed them to deliver better quality product to Young's, while increasing their incomes and ensuring the sustainability of their fishery (Young's Seafood, 2005).

Table 3 Four electronic traceability systems

Traceability Program	TraceTracker	ScoringAg	De Haan Automatisering BV	Trace Register
Website	www.tracetracker.net	www.scoringag.com	www.dha-software.com/eng/ also: www.controllingthefoodchain.com	www.traceregister.com
Main Geographic Area	Europe, Asia, North America	USA	EU	USA
Basis	Web (Global Traceability Network (GTNet)	Web and hardware (ID and RFID tags and scanners)	Hardware ("Catch Registration") and software ("Poseidon")	SAAS ("Software as a Service" product) secure, product registration and data access and exchange online
Ocean to plate traceability?	Yes	Yes	Yes	Uncertain
Pricing	Price is based on a subscription fee, with a sliding scale depending on company size. There is no restriction on transaction volume or the number of concurrent users.	The initial cost is $10, and 55-cents per record or location.	Costs for installation and other support costs are not outlined for North America.	There is a nominal annual fee and incremental fee per traceability document line item registered.
Key Clients	Skretting, Coop Norway, Creative Salmon, EU Traceability Project	Alaska Quality Seafoods	Youngs Bluecrest, Yemeni Fish	Aquaculture Certification Council
Key Benefits	• Internet accessible • Can be used as a template, and can add on more sophisticated tracking applications • Diagrams of product flow through supply chain as well as database records are available • Already working on seafood	• Internet accessible • Records move with the product through its coded PIDC location and unique labeling system. • Data eventually designed to be accessible to retailers and consumers • Already working on seafood	• System is extendable and can add quality data and fishing data (e.g. water and air temperature) • Already working on seafood	• Internet accessible • Multi-lingual • Little or no systems infrastructure investment • Already working on seafood
Downsides (and remaining questions)	• Security of information on a web-based program • All trading partners in chain of custody have to subscribe (or one partner, e.g. processor, must be a sponsor) • Trading partners could hide data	• Security of information on a web-based program • Mostly focused on agri-business model	• Not yet used in North America. • Focused on generating sales orders • Designed around EU regulations. • Information not readily available to public.	• Security of information on a web-based program • All trading partners in chain of custody have to subscribe (or one partner, e.g. processor, must be a sponsor)

7. Verification, Certification and Eco-labeling

7.1 Verification and Certification

Once a suitable traceability system has been chosen, the next step to consider is an independent verification of chain of custody for selected products. Third party **verification**, by an auditor for example, assures the credibility of labeling and advertising claims, and is a necessary component of trustworthy eco-labeling.

Entities such as the U.S. Customs and Border Patrol plan to require third-party verification and certification of seafood product traceability systems in the near future. U.S. Customs will also be able to audit and verify product transactions and traceability systems. The EU is already using a similar system (Archipelago, 2005).

Certification of a fishery or aquaculture operation goes one step further than verification. This is a voluntary process that involves assessment of a fishery or aquaculture operation to determine whether it meets a given standard. If successful, products from the fishery are usually entitled to use an eco-label in the marketplace after a traceability audit (see next section for more information on eco-labels). Certification is more rigorous than verification, and typically requires entire chain of custody auditing and certification.

7.2 Eco-labels and Certification

The ability to verify how and where a seafood product was caught or farmed is also crucial with the rise in prominence of seafood eco-labeling. Eco-labels can also help convey the assured quality of a product to consumers. An **eco-label** is "a seal or logo indicating that a product has met a set of environmental or social standards" (Consumer Reports, 2008). A third party certifying organization usually (but not always) assesses and certifies the product and the process is a voluntary one; it does not entail direct government involvement.

The UN FAO notes that eco-labeling schemes typically fall into three categories:

1. **First party labeling:** Individual companies label their own products according to their own predetermined standards (i.e. a self-declaration).
2. **Second party labeling:** Industry associations set labels for their members' products, verified through internal procedures or third party certifiers.
3. **Third party labeling:** Labels and certification are established by an independent third party, and companies that buy and sell these products are typically expected to provide traceability information (FAO, 2001).

Therefore, it is important to note that not all eco-labeled products are audited and certified by an independent third party. In addition, the eco-labeling body may either be (i) the same body conducting the auditing or certification, or (ii) the eco-labeling body may provide applicants with lists of acceptable certifiers.

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www.msc.org

Figure 8 Examples of prominent eco-labels. LEFT: the seal of the Forest Stewardship Council. RIGHT: the Marine Stewardship Council label.

Eco-labels are common in natural resource sectors. For example, in the wood products sector, the Forest Stewardship Council (FSC) pioneered standards for sustainable forestry practices in 1992, and has been a model for the subsequent Marine Stewardship Council (MSC). In textiles, chocolate and coffee, we have seen the rise of fair trade eco-labels, such the TransFair certified mark. Fruit and vegetable products also bear many eco-labels, such as the United States Department of Agriculture Organic certificate or Quality Assurance International organic certification.

The international, independent eco-label resource website, Ecolabelling.org, lists 84 eco-labels for all kinds of Canadian products, and 107 eco-labels for food worldwide (www.ecolabeling.org). The EcoLogo Program, an eco-labeling program initiated by the Canadian government in 1988, claims to have over 7500 certified eco-labeled products and services in its database, located at www.ecologo.org.

When considering an eco-label, the following information may be useful:

1. FAO Guidelines for Eco-labeling
   www.fao.org/newsroom/en/news/2005/100302/index.html
   - The Food and Agriculture Organization of the United Nations has developed voluntary guidelines for eco-labeling of seafood products from sustainable marine fisheries. The guidelines are a minimum standard for eco-labeling of wild marine fisheries products, and include principles such as transparency, non-discrimination in trade, auditing and verification, and conformity with international standards.
   - It may be useful to check whether a potentially appropriate eco-label meets these guidelines and whether it is required for access to target markets.

2. Global Eco-labeling Network
   www.gen.gr.jp/index.html
   - The Global Eco-labeling Network is an association of eco-labeling organizations established to improve and promote eco-labels.

7.2.1 Certification Bodies and Eco-labels for Wild Fisheries

Eco-labels and certification bodies for wild-caught seafood exist with varying degrees of rigour. A few examples are provided below.

Independent Certifiers:

- *Marine Stewardship Council (MSC)*
  www.msc.org

  Currently, the seafood certification body and eco-label with the strongest presence on the international seafood market is the Marine Stewardship Council (MSC). MSC started as a partnership between the World Wildlife Fund (WWF) and Unilever in 1997, and now functions as an independent, non-governmental standard setting and accreditation organization. MSC approves independent third party certifiers to assess, audit and certify fisheries and seafood product chains of custody using the MSC's internal fishery standard for a well-managed and sustainable fishery. The MSC fishery standard is based on the FAO code of conduct for responsible fisheries along with other international fishing agreements. The certification period lasts 5 years. Products that come from these fisheries and chains of custody can be labeled with a blue and white MSC label. However, conditions are also often levied on the approved fisheries to encourage practice and management improvements. As a result, MSC should not be seen as a final approval of sustainability, but rather a mark of fisheries that are striving towards more sustainable practices.

  According to the MSC website, MSC has certified 30 fisheries worldwide, representing approximately seven percent of world's edible wild seafood catch. MSC's eco-label can now be found on over 1,200 products worldwide, at fish counters, as well as on private-label and branded seafood products (Marine Stewardship Council, 2008b).

- *Friend of the Sea (FoS)*
  www.friendofthesea.org

  Friend of the Sea (FoS) is a relatively new NGO that certifies both wild and farmed products according to FAO guidelines. Like MSC, FoS

contracts third-party certifiers to assess and audit fisheries and products according to FoS sustainability criteria. FoS advertises itself as a low-cost, accessible alternative compared to expensive certification processes such as the MSC, but there are questions from the conservation community about the comprehensiveness and integrity of the Friend of the Sea certification and eco-label in a number of areas, including for environmental impact indicators, and standard development and verification procedures (WWF, 2007).

Industry-driven Eco-labeling:

- *Alaskan Seafood*
  www.alaskaseafood.org

In some cases, place-based logos may be considered an eco-label. Take for example the case of Alaska seafood. The Alaska Seafood Marketing Institute (www.alaskaseafood.org) advertises Alaska fisheries management as being among the best in the world, and has developed a distinct logo for Alaskan fishery products. The "Alaska" brand is rooted in emphasizing the purity of Alaskan environment and the sustainability of Alaskan fisheries management, thus creating a place-based eco-label. These claims are made by an industry-based organization, however, and do not have third party verification.

7.2.2. Certification Bodies and Eco-labels for Aquaculture

At this time eco-labeling or certification schemes for aquaculture products lag behind those for wild fisheries in terms of global scope, independent third-party auditing, and certification of products. However a number of aquaculture accreditation or certification schemes either exist or are being developed.

Collaborative stakeholder processes

- *WWF Aquaculture Dialogues*
  www.worldwildlife.org/what/globalmarkets/aquaculture/index.html

Since 1999, WWF has been working with stakeholder groups from around the world, including farmers, retailers, NGOs, scientists and aquaculture industry groups, to develop standards for commonly farmed aquatic species. The collaborative process to develop global standards for aquaculture product certification, with consideration of environmental and social sustainability, is called the WWF Aquaculture Dialogues. With input from such a broad swath of stakeholder groups, the Aquaculture Dialogue process aims to produce credible standards. Starting with shrimp, the Aquaculture Dialogues have now expanded to include dialogues on salmon, mollusks, tilapia, pangasius, abalone and trout. Standards from these processes are not yet complete or available for use. Although the WWF is working to organize the standard development process, the standards, when complete will not be administered by WWF. The intention is that the Aquaculture Dialogues standards will be adopted by various groups. Many conservation groups are also pushing for the development of a new aquaculture certification body to administer the forthcoming Aquaculture Dialogues standards. (WWF, 2008).

Although the standards for most common aquaculture species are not yet ready for use, standards will be released in the next one to four years. As a pro-active measure, companies may be interested in becoming involved in the Aquaculture Dialogues for certain species that they sell, and familiarizing themselves with the dialogues recommendations and processes, as they will likely affect even current industry and retailer-based aquaculture standards.

Science-based advisory processes

- *Global Aquaculture Performance Index (GAPI)*

The Seafood Ecology Research Group at the University of Victoria has developed a Global Aquaculture Performance Index (GAPI). GAPI is a standardized analytical framework that can be applied to directly compare sustainability of diverse marine fin-fish products. The default unit of analysis is species produced in particular countries but can modified to be applied across scales—from individual farms to global standards. The standards look at five classes of key environmental indicators—water consumption, wild fish inputs, habitat impacts, ecosystem impacts, and appropriation of eco-region services—to assess the sustainability of aquaculture with respect to objective targets

(Volpe and Gee, 2008). The GAPI standards are still in development with the first practical evaluation (salmon) due in early spring 2009.

Industry-based

- *Global Aquaculture Alliance (GAA)*
  www.gaalliance.org
  and
- *Aquaculture Certification Council (ACC)*
  www.aquaculturecertification.org

  The Aquaculture Certification Council (ACC) certifies aquaculture operations based on best practice codes for social, economic and environmental sustainability developed by the Global Aquaculture Alliance (GAA), a non-profit industry-based association. Currently, the ACC only has certification schemes for shrimp and tilapia, but catfish and other species standards are still under development (Global Aquaculture Alliance, 2008). Because the ACC is an industry-based organization that sets standards for industry, some conservation organizations have concerns about potential conflicts of interest in establishing standards, lack of stakeholder involvement, insufficient independency of inspection and certification, and inadequate environmental standards (WWF, 2007).

- *International Organization for Standardization (ISO)*
  www.iso.org

  ISO is the world's largest developer of international standards, with membership from 157 nations and strong links to industry and government (ISO, 2008a). The development of new standards by this NGO is typically spurred by demand from industry, and appropriate technical experts are consulted to develop the standards (ISO, 2008b). In 2007, ISO began development of standards for fisheries and aquaculture, addressing topics such as "terminology, technical specifications for aquaculture farms and equipment, characterization and monitoring of aquaculture sites, environmental monitoring, resource monitoring, data reporting, traceability and waste disposal" (California Environmental Associates and Monterey Bay Aquarium, 2007). There is concern over the quality of the environmental standards that will be produced by the ISO for two reasons: first because ISO standards are typically process-based as opposed to performance-based, and second because the fisheries and aquaculture committee is led by Norway, a prominent salmon and cod farming nation. There is opportunity, however, for the ISO to adopt the emerging WWF Aquaculture Dialogue standards and for conservation and industry groups to push for the development of strong environmental standards (California Environmental Associates and Monterey Bay Aquarium, 2007).

Retailer-based

- *Safe Quality Food (SQF)*
  www.sqfi.com

  The Food Marketing Institute (FMI) acquired the SQF program as a way to provide a common food safety and quality protocol for its 26,000 retail food stores. SQF standards are recognized by the major international retailer organization Global Food Safety Initiative (GFSI), which holds over two thirds of global food retail revenue (California Environmental Associates and Monterey Bay Aquarium, 2007). Approved auditors and certifiers assess companies for compliance to SQF program standards (SQF, 2004). While common SQF standards would allow for easy recognition of food certifications between GFSI members, development of SQF aquaculture standards is still in the initial exploratory stages (California Environmental Associates and Monterey Bay Aquarium, 2007).

- *GLOBALGAP*
  www.globalgap.org

  GLOBALGAP is a European private sector organization that develops "good agricultural practice" standards and provides eco-labels for pre-farm gate activities, with certification by approved certifiers. Its primary focus is on food quality and safety, with environmental standards as secondary. GLOBALGAP is not intended to be a consumer eco-label, but instead a business-to-business eco-label (GLOBALGAP, undated). GLOBALGAP has developed an Integrated Aquaculture Assurance standard, as well as a farmed salmon specific standard. Both of these standards are weak on environmental issues, and the geographic scope of the program is focused on

Europe (California Environmental Associates and Monterey Bay Aquarium, 2007).

Small, independent NGO efforts

- *Friend of the Sea*
  www.friendofthesea.org

  See previous section on Wild Fisheries.

- *Food Alliance*
  www.foodalliance.org

  A non-profit based in the U.S., Food Alliance certifies farms and food handlers, focusing on socially and environmentally responsible agriculture and business practices (Food Alliance, undated). Food Alliance has strong relationships with certain major retail and food service buyers, but its geographic scope is mainly limited to the U.S. Although it does not currently have aquaculture standards, Food Alliance has been working with the Pacific Coast Shellfish Growers Association to develop standards. They are currently seeking to collaborate with the WWF Molluscs Aquaculture Dialogue standards, which are now available in draft form (Sustainable Food News, 2008; WWF, 2008).

Organics

With consumer interest in organic food, especially at the premium end of the market, organic aquaculture standards are under development in the United States and certified product will likely appear within two to three years. The United States National Organic Standards Board has been working since 1999 to develop organic standards for seafood, while in the EU, independent organic certifiers, including the Soil Association (UK), Naturland (Germany), BioSuisse (Switzerland) and Debio (Norway) are currently using organic standards for aquaculture. The EU also is drafting continental organic standards, but they are expected to outline rules rather than rigorous environmental quality standards (California Environmental Associates and Monterey Bay Aquarium, 2007). European organic aquaculture standards allow the use of antibiotics and chemical treatments for parasites which are not compatible with organic livestock standards currently in place in North America.

7.2.3. General Certifiers and Auditors

Below are listed examples of internationally recognized third-party certifiers that typically do not provide eco-labels themselves, but that do audit and certify seafood products. Many additional certifiers exist, and companies should explore other options as well.

- ECAAS Pty Ltd.
  www.ecaas.com
  This Australian company specializes in environmental, quality and safety (including HACCP food safety) certification and assessment.

- Food Certification Scotland
  www.foodcertificationinternational.co.uk
  Starting with farmed salmon and specializing in European market standards, this company certifies aquaculture and other food products, through various approved schemes.

- Institute for Marketecology (IMO)
  www.imo.ch
  Based in Switzerland, but with offices around the world, IMO specializes in organic certification for farmed seafood and feed inputs, as well as wild fisheries products. IMO works with a number of organic certification standards and ecolabels, including Naturland and BoiSuisse.

- MacAlister Elliott and Partners Ltd
  www.macalister-elliott.com
  This UK-based company specializes in fisheries management and development consulting and assessments.

- Moody Marine
  www.moodyint.com/NewsPages/MoodyMarineQuickLink.php
  Based in the UK as a division of Moody International, Moody Marine certifies fisheries under MSC or Responsible Fishing Scheme (RFS) standards.

- Quality Assurance International (QAI)
  www.qai-inc.com/0_0_0_0.php
  QAI is a private corporation that specializes in certifying food and fiber products. QAI has developed programs for national organic standards (e.g. USDA organic), restaurants, retailers, fiber, and food safety (i.e. bioterrorism prevention).

- Scientific Certification Systems (SCS)
  www.scscertified.com
  SCS provides certification, auditing, testing services and standards. They focus on safety and quality, conservation and social responsibility for food and agriculture, eco-products, forestry and fisheries (MSC).

- SGS Product and Process Certification
  www.sgs.com
  SGS is a Dutch company that offers food safety, quality and environmental certification and auditing services.

- Surefish
  www.surefish.com
  Surefish is a Seattle-based company that specializes only in seafood—quality, food safety, chain of custody (MSC), and regulatory consultation, auditing, inspection, certification and training services.

- Tavel Certification Inc.
  www.tavelcertify.com
  Based in Halifax, NS, Tavel handles MSC certification for wild fisheries.

7.3 Other Organizations Providing Services Related to Traceability, Certification and Verification

- ISEAL (International Social and Environmental Accreditation and Labeling)
  www.isealalliance.org
  ISEAL is essentially a standard setter for standards. ISEAL approved standards must have both environmental and social components, and meet a suite of specific conditions listed on the ISEAL website.

- MRAG Ltd.
  www.mrag.co.uk/index.html
  MRAG is an international consulting firm that focuses on sustainable natural resources use, management and practices. MRAG has worked with a wide range of clients, from government agencies in over 60 countries, to UN agencies, NGOs and private companies. They specialize in numerous policy, planning, development, management and assessment programs related to natural resources.

- BlueYou
  www.blueyou.com
  BlueYou is an independent Swiss consulting company and resource centre for sustainable development in the food production sector. They offer worldwide professional services for the promotion and implementation of market driven sustainable production models in aquaculture, agriculture and fisheries. BlueYou provides services for full range traceability, focusing on specific solutions for small holder producers—ensuring that future market access for sustainable seafood is not only for big players.

- Borealis Centre for Environment and Trade Research
  www.borealiscentre.org
  The Borealis Centre is a leading international research organisation for the non-profit sector focusing on environmental impacts through the chain of production, as well as financial and political mechanisms. The centre provides research and related services to NGOs, with emphasis on unique trade flow and chain of custody research, environmental impact research, markets analysis and many other areas of information gathering and dissemination.

Whole Foods—Setting a New Standard

In July, 2008, U.S. based grocery chain Whole Foods announced it would implement enhanced environmental and health and safety standards for all of the farmed seafood products sold in each of its 270 stores across the U.S., UK and Canada. Developed in conjunction with input from fish farmers, government and academic scientists, and conservation groups, Whole Foods set out standards for antibiotics and hormone use, feed content, genetically modified organisms (GMOs) and cloned fish, best environmental farming practices for producers, traceability and preservative use. Whole Foods will also require its farmed seafood suppliers to undergo third party audits to ensure the standards are being met. (Seafood.com News, July 16, 2008)

A detailed list of the standards is available at www.wholefoodsmarket.com/products/seafood/aquaculture.html.

8. Setting Up a Traceability System—A Checklist

It is easy to feel overwhelmed with all of the different pieces that go into building a traceability system for a business. We have included a checklist that summarizes the main steps to keep in mind when selecting a traceability system.

Step 1 Determine the needs of your business and your current capacity for traceability

Your Seafood Business

Important questions

The following is a list of some helpful questions, developed by IBM Business Strategies, to assist seafood businesses in providing focus and assessing current capacity for traceability.

- ☐ Do you understand what drives your target consumer's purchasing behavior?
- ☐ How do you communicate information about your brands? How do you assess the effectiveness of these communications?
- ☐ What is your strategy for protecting your brands in the marketplace?
- ☐ How are traceability and transparency integrated with your brand strategy?
- ☐ What does the supply chain look like for the products you buy and sell?
- ☐ How do you engage with your supply chain partners to deliver transparency and traceability? (IBM Institute for Business Value, 2007).

Important actors to consider

- ☐ All the links in your supply chain (e.g. fishery/farm – processor – distributor – retail store)
- ☐ Business or fisheries/aquaculture consultants
- ☐ Non-governmental organization or scientific input (e.g. SeaChoice or Conservation Alliance for Sustainable Seafood member groups)

Step 2 Choose a Traceability System

Traceability System

Important questions

- ☐ What kind of traceability do you want—external, internal or both?
- ☐ What medium do you want to store your traceability on—paper or electronic? If electronic, will it be web-based, module based, or a combination?
- ☐ What are the current traceability requirements of your trading partners—both according to individual company policies and national regulations?
- ☐ Does the traceability system comply with Canadian regulations?
- ☐ Will you consider Can-Trace recommendations?

Important Actors to Consider

- ☐ All the links in your supply chain (e.g. fishery/farm – processor – distributor – retail store)
- ☐ Government regulatory bodies (e.g. CFIA, DFO, international trading partners, PETER decisions for European trading partners) and their seafood regulations
- ☐ Business trading partners and their seafood regulations
- ☐ Business or fisheries/aquaculture consultants
- ☐ Non-governmental organization or scientific input (e.g. SeaChoice or Conservation Alliance for Sustainable Seafood member groups)

Step 3 Verification, Certification and Auditors

Important questions

- ☐ How would verification of my traceability system benefit my business?
- ☐ Is certification of the traceability system and the supply chain beneficial?
- ☐ Do I want my certification system to be ISEAL compliant?
- ☐ How will the traceability system be audited?

Important actors to consider

- ☐ All the links in your supply chain (e.g. fishery/farm – processor – distributor – retail store)
- ☐ Government regulatory bodies (CFIA, DFO, international trading partners, PETER decisions for European trading partners) and their seafood regulations
- ☐ Business trading partners and their seafood regulations
- ☐ Business or fisheries/aquaculture consultants
- ☐ Non-governmental organization or scientific input (e.g. SeaChoice or Conservation Alliance for Sustainable Seafood member groups)

Step 4 Communicate your traceability efforts

Important questions

- ☐ How will I communicate my business' traceability system to trading partners and consumers?
- ☐ Is an eco-label beneficial to my business?
- ☐ Would I like my eco-label to be compliant with FAO guidelines for eco-labeling seafood?
- ☐ Are there other resources on eco-labels I can explore, such as the Global Eco-labeling Network?
- ☐ Would a consultant help me to decide on an appropriate eco-label?

Important actors to consider

- ☐ All the links in your supply chain (e.g. fishery/farm – processor – distributor – retail store)
- ☐ Business trading partners and their desire for eco-labels
- ☐ Business or fisheries/aquaculture consultants
- ☐ Non-governmental organization or scientific input (e.g. SeaChoice or Conservation Alliance for Sustainable Seafood member groups)

9. Conclusion

Canada's seafood industry is facing significant sustainability challenges. Seafood supplies are in decline, the oceans are in poor health, and consumer confidence around the safety and environmental impacts of seafood products is increasingly threatened.

As the world changes, seafood companies need to adapt or risk being left behind. Governments around the world are beginning to enact legislation requiring comprehensive chain of custody information regarding exported seafood. As well, important players on the international seafood market, especially supermarkets in the U.S. and EU, are leveraging demands for extended traceability information.

SeaChoice has recognized that external traceability will be crucial to achieving a sustainable seafood future. External traceability allows a transparent response to rising consumer concerns while improving the quality, safety and reputation of their product. Internal traceability is already a standard business practice for many Canadian seafood companies, and may be attained using simple paper or software systems. External traceability is more complex however, often requiring significant investments to track and share critical information across the entire supply chain.

Despite the current challenges associated with implementing detailed, verified traceability systems for seafood, the potential benefits are hard to ignore. Comprehensive seafood traceability systems and labeling are already becoming critical components to accessing both domestic and international markets, building consumer confidence, and ensuring the stewardship of our oceans and natural resources. We hope this guide has provided some helpful information and first steps for developing seafood traceability in your own business.

10. Glossary

auditor - An evaluator and assessor of the validity, accuracy and reliability of an organization, system, process, project, product, etc. The auditor is typically from an independent third party and provides an assessment of the system being evaluated.

batch (also **lot**) - A quantity of product produced at a certain time, under similar circumstances (e.g. one batch of fish sticks all produced on the same day at one plant) (Moe, 1998).

Bioterrorism Act - A 2002 U.S. Act, officially titled "Public Health Security and Bioterrorism Preparedness and Response Act of 2002" (Petersen and Green, 2004).

bycatch - Animals caught by accident in fishing gear; species that fishers do not intend to catch. Bycatch is usually thrown back dead or injured (SeaChoice, 2008).

Canadian Food Inspection Agency (CFIA) - A federal agency that regulates Canada's food supply and the safety of food products (CFIA, 2007).

carrier - A physical entity that is attached directly to a product, and carries information about that product. In this document, two examples are mentioned - bar codes, and RFID tags (Petersen and Green, 2004).

chain - A sequence of steps (Moe, 1998).

certification - A voluntary process that involves an assessment of a fishery or aquaculture operation to determine whether it meets a given standard. If successful, products from the fishery are usually entitled to use an eco-label in the marketplace after a traceability audit. Certification is more rigorous than verification, and typically requires entire chain of custody auditing and certification.

corporate social responsibility - Corporate social responsibility (CSR, corporate responsibility, corporate citizenship, or responsible business) is a notion that businesses should consider broad societal interests and develop strategies for creating positive impacts on their customers, employees, business partners, communities, and society at large, including the environment. CSR is

seen to be voluntary and to extend beyond the regulated responsibilities of a business.

Country of Origin Labeling (COOL) - A provision of the United States Farm Security and Rural Investment Act of 2002 (or "Farm Bill"), which stipulates country of origin labeling (COOL) for meat, fish, perishable agricultural commodities, and peanuts (USDA, 2008).

downstream - Looking forward towards distribution and consumption (Petersen and Green, 2004).

EAN-UCC - European Article Numbering-International-Uniform Code Council. The specifications, standards, and guidelines co-administered by GS1.This system standardizes bar codes, EDI transactions sets, XML schemas, and other supply chain solutions (Can-Trace, 2007).

eco-label - A seal or logo indicating that a product has met a set of environmental or social standards (Consumers Union, 2008).

ecosystem services - Processes and resources supplied to humans by the natural environment (e.g. sunlight).

electronic traceability system - A traceability system that records and stores all data and records electronically, for example by bar codes or radio frequency identifiers (RFIDs) (Petersen and Green, 2004).

external traceability - The ability to keep track of what happens to a product, its ingredients and packaging in the entire or in part of a supply chain (Petersen and Green, 2004).

FAO - Food and Agriculture Organization of the United Nations.

FDA - Federal agency under U.S. Department of Health and Human Services responsible for all food products and ingredients, with the exception of meat, poultry and egg products.The agency also regulates the labeling of food and related items such as medicine and cosmetics (Petersen and Green, 2004).

FID - Canadian Food Inspection Agency's Fish Inspection Directorate - the official agency enforcing the legislation on seafood imports to Canada (Can-Trace, 2007).

Fisheries and Oceans Canada (DFO) - On behalf of the Government of Canada, DFO is responsible for developing and implementing policies and programs in support of Canada's scientific, ecological, social and economic interests in oceans and fresh waters.

GS1 - GS1 is a voluntary standards organization that manages the EAN-UCC System, administering companies with prefixes and coordinating the accompanying standards under the Global Standard Management Process (GSMP) (Petersen and Green, 2004).

GS1 Canada - GS1 Canada (formerly the Electronic Commerce Council of Canada [ECCC]) is a non-profit, industry-led organization that promotes and maintains global standard for the identification of goods, locations and related e-commerce communication such as bar code issuance and maintenance (GS1 Canada, 2008).

HACCP - Hazard Analysis and Critical Control Point.

identifier - The system of codes used to identify batches (e.g. UPC or UCC-EAN 128 code are identifiers) (Petersen and Green, 2004).

internal traceability - The ability to track what happens to a product and packaging within a company or production facility (Petersen and Green, 2004).

ISO - International Standardization Organization.

lot - (see *batch*)

Marine Stewardship Council (MSC) - An international, independent, non-profit certification system for sustainable wild fisheries product, started in 1997 through collaboration between Unilever and World Wildlife Fund (www.msc.org).

module-based traceability system - A traceability system where specialized software must be installed in computer networks at various points along the supply chain. Sometimes added hardware is also required.

NGO - Non-governmental organization.

non-transporters - "Persons who hold, produce, pack, import, receive or distribute food for purposes other than transportation" (Petersen and Green, 2004). This category includes fish processing plants and seafood importers, for example. Transporters are "persons who have possession, custody, or control of an article of

food" for the sole purpose of shipping it (Petersen and Green, 2004).

"one up, one down" traceability - A traceability system where each participant in a supply chain must keep records of traceability information about the products they receive and where the products are shipped to or sold (Can-Trace, 2007).

paper traceability system - A traceability system that stores all records and data on paper (Petersen and Green, 2004).

product - Any material at any stage of processing, whether it is a live fish or a processed seafood product (Moe, 1998).

reader - A device used for reading barcodes or RFID tags (Petersen and Green, 2004).

RFID - Radio frequency identification, consisting of carriers (small tags) and readers used to transmit information from the tags to a database (Petersen and Green, 2004).

step - A distinct operation or location where a process is performed on a product (Moe, 1998).

supply chain - A series of linked stages that provide goods or services; the layers of processes involved in the manufacture of goods and the provision of services (Can-Trace, 2007).

sustainable seafood - Sustainable seafood is fish or shellfish that is caught or farmed with consideration for the long-term viability of harvested populations and for the oceans' ecological balance as a whole (SeaChoice, 2008).

traceability

1 "A simple, working definition of traceability is the ability to follow and identify a product unit or batch through all stages of production, processing and distribution, both forward and backward.

This requires an independent "trail" that identifies:

- where a product or item is,
- where it has been, and
- what was done to it along the way" (Archipelago, 2005).

Or

2 The ability to track and/or trace product flows in a production and distribution chain (Agri-Food Canada, 2007).

Or

3 European Union: 'Traceability' means the ability to trace and follow a food, feed, food-producing animal or substance intended to be, or expected to be incorporated into a food or feed, through all stages of production, processing and distribution." (Petersen and Green, 2004)

4 International Organization of Standardization (ISO): "The ability to trace the history, applications, or location of that which is under consideration. When considering a product, traceability can relate to the:

- origin of material and parts;
- processing history; and
- distribution and location of the product after delivery" (Petersen and Green, 2004).

tracing - The ability to identify the origin of a particular unit in a supply chain by reference to records held upstream in the supply chain (Petersen and Green, 2004).

tracking - The ability to follow the path of a particular unit or batch downstream through the supply chain as it moves between trading partners (Petersen and Green, 2004).

transporters - "Persons who have possession, custody, or control of an article of food" for the sole purpose of shipping it (Petersen and Green, 2004).

unit - The level at which a product is packaged. For example, an eight-pack of fish sticks might constitute a "retail unit", whereas a crate of fish sticks transported by pallet could be considered a "logistic unit" (Moe, 1998).

upstream - Looking back along the supply chain towards the harvester/producer steps (Petersen and Green, 2004).

USDA - Federal agency under the U.S. Department of Agriculture responsible for food products such as meat, poultry and egg products. USDA is also responsible for overseeing farm and foreign agricultural services, as well as food nutrition and consumer services, food safety, marketing and regulatory programs, natural resources, and environment and rural development (Agri-Food Canada, 2007).

verification - A voluntary process that involves an assessment of a fishery or aquaculture operation, or an entire traceability system,

usually by an auditor, to determine whether it meets a given standard.

web-based traceability system - A traceability system where information is inputted stored and accessed on an internet website database.

11. Acknowledgements

Thank you kindly to the Ecology Action Centre, its Marine Issues Committee, and the other SeaChoice member organizations (Canadian Parks and Wilderness Society, David Suzuki Foundation, Living Ocean Society and Sierra Club BC) for providing support and encouragement in producing this document. The David and Lucile Packard Foundation generously funds SeaChoice program work in Canada and we greatly appreciate its support.

Thank you as well to Arni Petersen, David Green, the National Fisheries Institute and North Carolina Sea Grant for their very useful guide, Seafood Traceability: A Practical Guide for the U.S. Industry (2004), after which this document was modeled. Their encouragement and help in producing this Canadian document was much appreciated. Taina Uitto of Sustainable Seafood Canada, Shauna MacKinnon of Living Oceans Society, Lana Gunnlaugson and Corey Peet of David Suzuki Foundation, Susanna Fuller, Jennifer Ford, and Marla MacLeod of Ecology Action Centre, Beth Hunter of Greenpeace Canada, and Marc Allain of MA Consultants also kindly helped to edit this document. Rachel Moffat of Beyond Expectations Communications & Design Solutions provided patient and skillful graphic design of this document.

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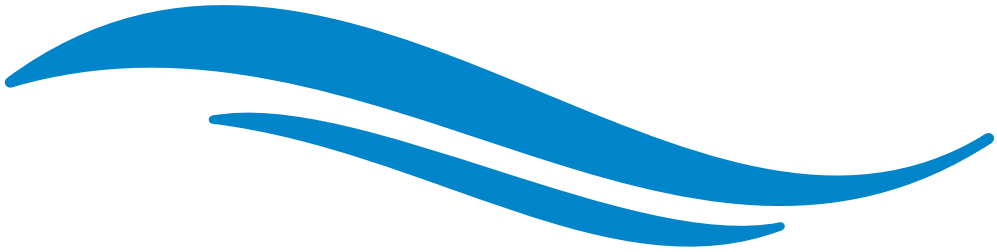
13. Appendix

Existing Aquaculture Standard and Certification Efforts

From a California Environmental Associates and Monterey Bay Aquarium document—Promoting the Adoption of Sustainable Aquaculture Standards (2007). Updates from 2008 added from research done by SeaChoice. Original table modified from research done by the Marine Stewardship Council.

Key Programs	Scope	Species	Status
WWF	Global	Shrimp, salmon, tilapia, basa, catfish, shellfish, trout, seaweed	Draft standards for tilapia and molluscs available. Developing standards for remainder.
USDA organics	U.S.	Draft standards for all	Draft Standards in development
EU	Europe	Possibly all (TBD)	Under development
MSC	Global	No farmed fish to date	Idea of aquaculture certification rejected in 2008.
GAA and ACC	Global	Shrimp, tilpia expanding to basa, catfish, marine finfish	Shrimp certified. Remaining fisheries under consideration/development
ISO	Worldwide	Not limited	Technical committee formed to develop standards for aquaculture
EuropGAP	Europe	Salmon	Quality and environmental standards
SQF and FMI	International	Many products including aquaculture	In place
Friend of the Sea	International	All	Certifying wild and farmed product
Species programs	**Scope**	**Species**	**Status**
Alter-trade Japan	Japan	Shrimp	Product certified
Carrefour Quality Line	International	Shrimp	Products certified
Shrimp Seal of Quality	Bangladesh	Shrimp and prawns	Product certified
Thai Quality Shrimp	Thailand	Shrimp	Products certified
Fundación Chile	Chile	Salmon	Unknown
Tartan Quality Mark	Scotland	Salmon	In place
Label Rouge	France	Salmon	In place

Species programs (cont'd)	Scope	Species	Status
Safe Quality Food	Canada	Salmon	Products certified
Responsible Aquaculture	Canada	Salmon	Products certified
Brand Canada	Americas	Salmon	In place
Milieukeur	Holland	Eels, sheath-fish and tilapia	Products certified
SPLAM	Malaysia	Shrimp, freshwater and marine finfish, mollusks, ornamental fish	Pilot project stage
Organic	**Scope**	**Species**	**Status**
USDA	U.S.	All	Under development
EU	Europe	All	Under development
Soil Association	UK	Salmonids, brown trout, rainbow trout, arctic char, shrimp, mussels	Products certified
Naturland	Globa;	Trout, salmonids, mussels, shrimp, carp, tench	Products certified
Debio	Norway	Salmon, trout, rainbow trout, char, perch, pikeperch, cod	2500 farms and 350+ operators registers
KRAV	Sweden	Salmonids, perch, mussels	Products certified
IFOAM	International	Range of aquaculture species	Under development
NASAA	Australia and South Pacific	Finfish	Products certified
BIO-GRO	New Zealand	General standards	No certifications to date
BIO-Suisse	Switzerland	Variety of farmed fish	Products certified
ICEA	Italy	Range of farmed fish	Starting



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