



Do You Know Where Your Seafood Comes From? *How Seafood Traceability Stacks Up Against Beef and Produce*

August 2012

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OVERVIEW

Many Americans enjoy eating seafood, and we eat a lot of it. In 2010, Americans spent a total of \$80 billion on seafood, with the average American consumer eating nearly 16 pounds of fish and shellfish, behind only China and Japan in global seafood consumption (Van Voorhees and Lowther, 2011). But how well do we know where our fish comes from? Your fishmonger may know it is wild; she may even know where it was caught. In most cases, however, there is little information about where, when and how the fish was caught, and where and when it was processed. For much of the seafood we consume, we simply don't know what path it has traveled to our plates.

The food we eat comes from a wide variety of places, and some of it can be traced back to the producer or even to where it was grown. While this information is often not available to the end consumer, meaning that most people know little about the origin – and the journey – of their food, some food companies have implemented traceability systems that help ensure the integrity of their products. If there is a foodborne illness outbreak, these companies, working with local, state and federal health agencies, can often pinpoint the source of contamination and recall products from that source. This is primarily accomplished through these companies' adoption of voluntary traceability standards that, in many cases, go above and beyond what the government requires.

For seafood, however, this traceability scheme largely does not exist. Fish and other seafood products often travel a complicated path from bait to plate, and the recordkeeping and traceability systems for seafood have historically lagged behind that of many produce and meat companies. As a result, consumers know very little about where, when and how their seafood was caught, and what stages of processing it underwent along the way. This makes it very difficult for people to make informed decisions about the conservation implications of their consumption, or to appreciate the health and safety effects of eating a particular fish or seafood product.

This report compares the traceability requirements and systems that exist in three big food sectors – beef, produce and seafood – and examines ways in which seafood traceability can be improved.

BEEF TRACEABILITY

The beef industry has been tracking many aspects of food production – mostly voluntarily – for decades. Producers know that traceability can be used to convey certain information, such as where and how the animal was grown, where it was slaughtered and where it may have been processed along the way. Having this information can help producers manage their product, receive accurate prices and protect their reputations. While government requires some traceability to control for animal diseases, much of the industry's efforts have been voluntary and market-driven. Consumers do not necessarily see detailed information about their beef, as it is largely kept private via barcode. Yet if an illness occurs,

industry and government officials can usually access this information and trace the product back to the rendering plant and often to the farm (Golan et al. 2004).

Legal Requirements

Amid public outcry over health and safety conditions of slaughterhouses and packing plants in the early twentieth century, Congress passed the Federal Meat Inspection Act (FMIA) in 1906 to ensure that all meat was processed sanitarily, and it remains the primary legal framework for beef production in the U.S. The FMIA requires thorough recordkeeping for all transactions in the supply chain and businesses must maintain records for the immediate previous sources and the immediate subsequent recipients (“one up, one down”). For imports, the product must be accompanied by a record of its country and plant of origin, along with certification that it has passed U.S. Department of Agriculture (USDA) and Customs requirements (Golan et al. 2004).

Beyond the FMIA requirements, for decades the beef industry has operated under additional, voluntary traceability. Shortly after passage of the FMIA, cattle producers began implementing their own recordkeeping requirements for their products in order to protect their property from theft, control the spread of disease and distinguish unobservable characteristics such as proper vaccinations and diet. Since many herds graze on the same land, many owners have long sought to identify their animals, often by branding or, increasingly, ear tags. Tags can include, either directly or via barcode, a lot of information about the animal, including its health history, vaccinations and breeding characteristics. According to the USDA Animal and Plant Health Inspection Service, in 1997, nearly 50 percent of all beef cattle operators used some form of individual animal identification, with 52 percent of calves and 65 percent of cows identified. An even larger number of animals, nearly 75 percent, were identified at the group level, where several animals are raised together. Animals also receive ear tattoos at the time of their vaccination, identifying the year the vaccination was given (Golan et al. 2004).

When cattle are transferred to feed lots and on to slaughter, identification and traceability becomes even more important. Most cattle today – two-thirds – are fed at large commercial feedlots where different animal groups mix. Nearly all animals at these large operations have individual or group identifiers. Even at small feedlots, most animals – roughly 80 percent – are also identified individually or by group. As most cattle are sold directly between owners and packing companies, documentation on each animal is crucial. Proper identification and recordkeeping also allows owners to distinguish their animals’ characteristics and receive accurate prices. After rendering, all USDA inspection numbers must remain on the meat’s label as it passes through the distribution system. These labels often contain the processor and lot information, again usually via barcode (Golan et al. 2004).

In the wake of beef-borne illness outbreaks in the U.S. and abroad, states and the federal government have enacted stricter traceability requirements to better track and contain animal disease. For example, nearly every state requires a Certificate of Veterinary Inspection (CVI) for all livestock that cross its borders. The CVI is an official document, verified by a licensed veterinarian, certifying that the animal or group of animals is disease-free at the time of inspection. In 2009, Congress implemented a requirement (enacted under the 2002 and 2008 Farm Bills) that most grocery stores include country-of-origin labeling on all cuts of beef except for certain processed products. For beef with a U.S. country-of-origin label, the law requires that the animal be born, raised and slaughtered within the country. Thus, accurate recordkeeping is essential. Producers typically encode this recordkeeping paper trail in the barcode on each package, available for retailers who wish to verify the origins of the products they purchase or for the government to request in the case of a recall (Golan et al. 2004)¹.

Additionally, the growing demand for organically-raised beef has helped promote more robust recordkeeping and traceability. Under the Organic Foods Production Act of 1990 (amended in 2002), third party certifiers must work with organic food producers and handlers to establish individualized recordkeeping systems that can sufficiently prove that

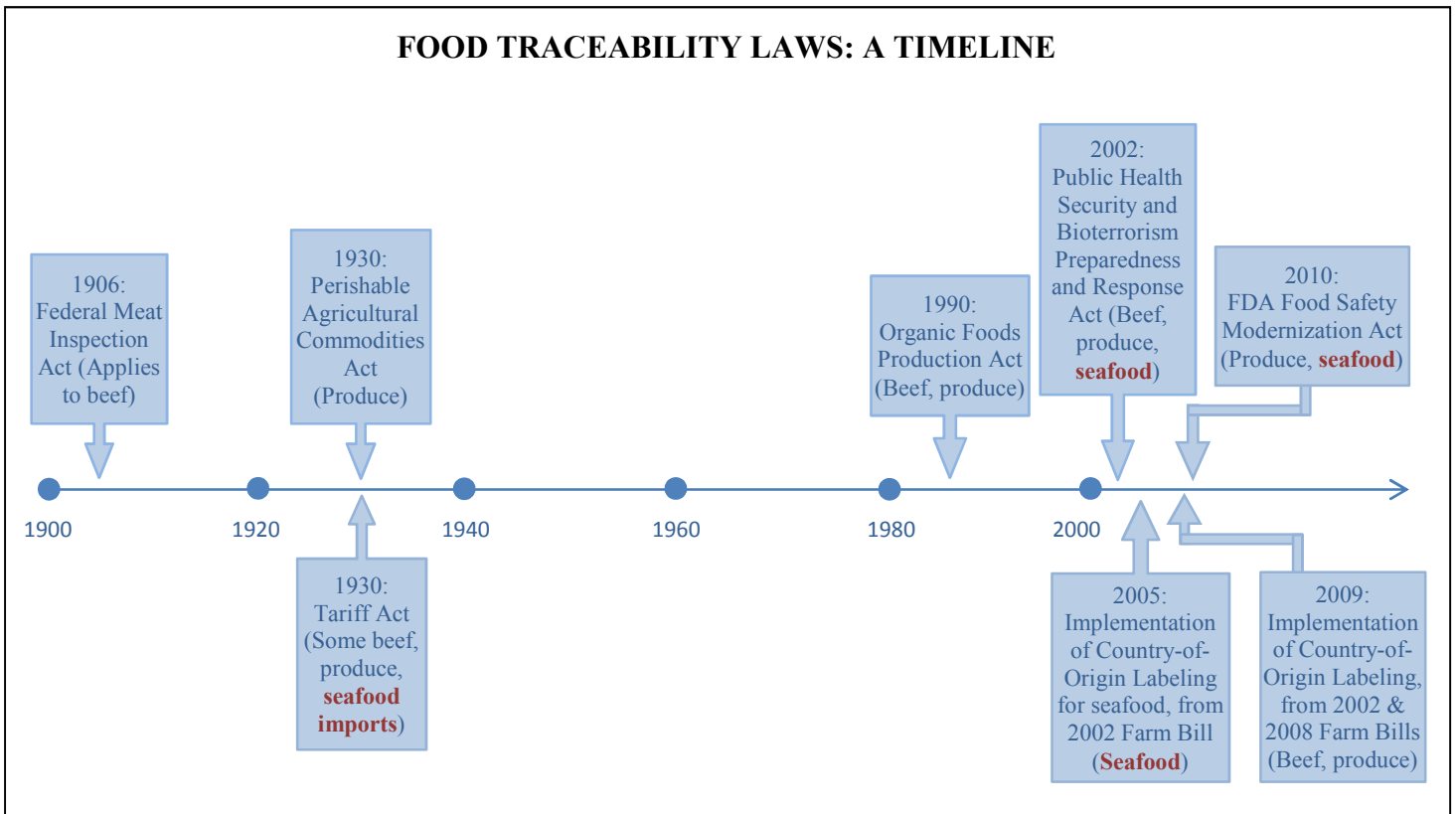
¹ On June 29, 2012, the World Trade Organization Appellate Body ruled that U.S. Country-of-Origin Labeling laws discriminate against beef and pork imports from Mexico and Canada. The U.S. must now comply with the decision, and it is unclear how this compliance will affect the labeling law.

the products adhere to national organic standards. These records must be able to document all activities throughout each stage of the supply chain to verify the product’s integrity. No particular recordkeeping method is required; thus, each producer must work with the certifier to ensure that their system meets the minimum standards (Golan et al. 2004).

Additional Efforts

While virtually all beef sold in the U.S. is traceable back to the processor or rendering plant, the feedlot and sometimes to the original farm, efforts to expand traceability are ongoing. Beginning in 2002, the USDA proposed a National Animal Identification System (NAIS), which would have built on existing state and industry identification (ID) systems and created a new voluntary federal ID system in which every animal or group of animals could be tracked through the supply chain. Due to opposition from many different stakeholders, however, NAIS was never implemented, and in February 2010 the USDA announced plans to replace the NAIS proposal with a more flexible state-based Animal Disease Traceability (ADT) system. ADT is intended to allow states and tribes to implement whatever form of identification and traceability is best for them, which could mean full, mandatory farm-to-market traceability or no mandatory system at all. Only animals moving in interstate commerce will be required to have a form of ID that allows traceability back to the animals’ state of origin (Greene 2010).

Fast food restaurants and retailers are also becoming involved in traceability, helping to monitor the safety of products in the supply chain. By demanding that suppliers verify the origins of their products, these restaurants and retailers are creating a market for safe products and improving traceability (Golan et al. 2004). While consumers usually only see the country of origin or other basic identifying information on their beef, the far more detailed information accessible via the label ensures that government or industry traceback is possible in the case of an outbreak. This is largely a result of the industry’s market-driven efforts to go beyond what the government requires.



PRODUCE TRACEABILITY

The produce industry has long operated under a number of laws that require, at a minimum, a “one-up, one-down” level of traceability (Golan et al. 2004). For decades, growers have used various tracking systems to ensure that they receive accurate prices for their products, which are highly perishable and often ship long distances. Historically, without traceability, if a product’s quality diminished along the supply chain, it was difficult to establish liability between the grower, shipper or other suppliers. Growers knew that if they could not prove that they supplied a quality product, they could not support a claim against a supplier, and vice versa (Golan et al. 2004). Some producers have, at times, exceeded these legal obligations and voluntarily provided more robust traceability, even back to the product’s source. Particularly in the wake of a foodborne illness outbreak, these producers recognize that additional traceability requirements help ensure quality control and contain food safety problems. They know that if their products are involved in an illness outbreak, they must limit damage by quickly recalling the affected product. If they are not involved in the outbreak, firms can protect their reputation by proving the integrity of their products.

Despite these efforts, illness outbreaks over the past few years have highlighted the need for mandatory traceability and improved food safety controls. Recent outbreaks tied to spinach and peanut butter, for example, have highlighted weaknesses in the ability to accurately pinpoint the source of contamination, prompting calls for even stronger traceability that can facilitate better hazard control and enable quick recalls (Levinson 2009). This growing concern over the safety and traceability of our food helped spur the passage of the Food Safety Modernization Act (FSMA) in 2010, which created new safety standards and controls to improve the safety of all foods, like produce, that are regulated by the Food and Drug Administration (FDA).

Legal Requirements

During the Great Depression, producers demanded accurate recordkeeping to ensure quality control throughout the supply chain and to receive accurate prices for their goods. Congress answered in 1930 by passing the Perishable Agricultural Commodities Act (PACA) to require certain recordkeeping measures that would improve quality control. Today, all shippers, dealers and brokers buying or selling fresh or frozen produce must be licensed under PACA, and licensees must keep records of all transactions. Furthermore, shippers must assign lot numbers or other identification to all loads of produce they receive. If produce is packaged in a shed, the shipper typically segregates each incoming load and identifies it based on grower (or group of growers, if they pool their produce together for an average price), harvest location and date, and any other information they wish to include. The law does not require specific information to be included on the label, nor does it require labeling of each individual box, but many shippers provide detailed information on each box to adhere to various state requirements and to allow for an even greater level of traceback. Generally this recordkeeping facilitates traceback to the individual grower or group of growers (Golan et al. 2004).

More recent laws, such as the Organic Foods Production Act (OFPA) and the country-of-origin labeling requirements added in the 2002 and 2008 Farm Bills, require other measures of recordkeeping for produce. Under the OFPA, the recordkeeping requirements are the same as for beef. Third party certifiers must work with organic producers and handlers to establish recordkeeping systems that can sufficiently prove that the products adhere to national organic standards, and these records must be able to document all activities throughout each stage of the supply chain to verify the product’s integrity (Golan et al. 2004).

With country-of-origin labeling, most grocery stores must include the country of origin on all fresh, unprocessed produce, either on the product itself, the package or the bin. Suppliers and retailers must maintain records that verify the country of origin and they must make these records available to their buyers (either on the product, shipping container or in a document that accompanies the product through final sale) and to the USDA if requested. Unless the product is pre-labeled, in which case that label is sufficient to establish the country of origin, all firms must keep these records for at least one year (7 C.F.R. 65.500(c)(4), 2009). While the more detailed information about the product (where it has traveled and when) is typically encoded and maintained for internal use only or for government review upon request,

some retailers require, and some firms voluntarily provide, labels that identify the firm's name and the state or region of growth within the country of origin (Golan et al. 2004).

Despite these different controls, a series of recent outbreaks of produce-borne illness has demonstrated a need for even stronger traceability in the industry. In the wake of these incidents, consumers and the government have started to demand more information about the supply chain for produce and other foods. The FSMA includes a number of provisions aimed at both improving safety and providing consumers with more detailed information about their food. The law sets new produce safety standards, creates new hazard prevention controls, gives the FDA mandatory recall authority and establishes a pilot project for formal traceability in the produce industry (21 U.S.C. 2223, 2010). This project aims to identify best practices in traceability that can inform government and industry on ways to improve traceback in the event of an outbreak. While the FSMA demonstrated that there is still a need for greater safety measures and traceability to facilitate quick traceback to contaminated produce, government – and, increasingly, the individual consumer – has a growing level of information about where our produce comes from and the path it travels through the supply chain.

Food Traceability Laws at a Glance: Beef, Produce and Seafood

Federal Meat Inspection Act (FMIA) of 1906: To ensure that meat products are slaughtered and processed sanitarily, the FMIA requires thorough recordkeeping for all transactions in the supply chain. Businesses must maintain records for the immediate previous sources and the immediate subsequent recipients. For imports, the product must be accompanied by a record of its country and plant of origin, along with certification that it has passed USDA and Customs requirements. **APPLIES TO BEEF**

Perishable Agricultural Commodities Act (PACA) of 1930: Recordkeeping law that is intended to ensure the prompt and fair payment to growers for their produce. Requires all shippers to assign lot numbers or other identifying information to all loads of produce they receive. Requires that all licensees under the PACA, including shippers, dealers and brokers, keep records of all transactions throughout the supply chain. Records must be kept for one year after final sale. **APPLIES TO PRODUCE**

Organic Foods Production Act of 1990 (amended in 2002): Requires that third party certifiers work with organic food producers and handlers to prove the food's organic integrity. Producers establish individualized recordkeeping systems, which must document all activities throughout the supply chain, to verify the product's organic claim. No specific records are required; thus, each system is developed individually with the help of the third party certifiers. **APPLIES TO BEEF, PRODUCE**

Country-of-Origin Labeling (COOL) (various laws): Requires that most large retailers clearly identify the country of origin on all cuts of beef, fresh, unprocessed produce, and some seafood – either on the package, display or bin. Ground beef labeling must contain the name of each country where the cattle (often multiple animals) originated or spent significant time. Records must be kept for at least one year after sale. Restaurants and certain retailers (e.g., fish markets, small establishments) are exempt. The laws pertaining to COOL are:

- *Tariff Act of 1930*: Required that imported products, or their containers, clearly display the country of origin for the “ultimate purchaser” (sometimes the consumer, sometimes the manufacturer or processor). Included many exemptions, including vegetables, fruits, and live or dead animals (including whole fish and shellfish, which could arrive at the ultimate purchaser with a label on the outermost container only).
- *2002 Farm Bill*: Amended the Agricultural Marketing Act (AMA) of 1946 to require COOL for most whole (unprocessed) foods, including seafood (but excluding processed products like fish sticks, canned tuna, chowder, etc.). Implementation of COOL for seafood began in 2005, but Congress delayed implementation for other products (including beef and produce) until 2009.
- *2008 Farm Bill*: Pushed forward implementation of COOL for non-seafood foods (including beef and produce). Also amended the AMA to cover additional foods, require labeling for products of multiple origins and stipulate whether fish or shellfish products are wild-caught or farm-raised.

APPLIES TO BEEF (imports since 1930, domestic products implemented in 2009 – each with exemptions), PRODUCE (imports since 1930, domestic products implemented in 2009 – each with exemptions) AND SEAFOOD (imports since 1930, domestic products implemented in 2005, with exemptions)

Public Health Security and Bioterrorism Preparedness and Response Act of 2002: Requires that domestic and foreign food facilities register with the FDA and maintain records of the immediate previous sources and immediate subsequent recipients of food. Imported foods require that more detailed information be provided before import, including name of manufacturer or shipper, and country of origin. Records must be kept for up to one year. Farms (including aquaculture facilities), restaurants, certain retail food establishments and fishing vessels are exempt from these requirements. **APPLIES TO BEEF, PRODUCE AND SEAFOOD**

FDA Food Safety Modernization Act (FSMA) of 2010: Creates a pilot project for high-risk foods, one of which must be produce. Also requires that FDA designate certain high-risk foods (based on incidence rate and severity of illness outbreaks) and establish recordkeeping requirements for these foods. Does not specifically require traceability for seafood, nor does it improve significantly on recordkeeping requirements for seafood products. The Act exempts certain portions of the seafood supply chain, such as fishing vessels, seafood farms and restaurants. Only facilities that are identified as handling specifically designated high-risk foods are subject to new recordkeeping requirements (and records must only demonstrate “one-up, one-down” chain of custody). **APPLIES TO PRODUCE AND SEAFOOD**

SEAFOOD TRACEABILITY

Unlike the meat and produce industries, which have had certain traceability systems in place for decades, the seafood industry has lagged in the traceability and recordkeeping that helps identify a food's origin. The fish you purchased for dinner may have been labeled as a product of the U.S., yet you likely do not know when, how or by whom it was caught. In some cases, you may even receive false information. Certain fish labeled "wild" may actually be farm-raised, presenting a whole host of health and conservation issues that you were hoping to avoid by buying wild fish. Because seafood takes a very complicated route from where it was caught or raised to your local grocery store or restaurant, there is ample opportunity for error – and fraud – in keeping and transferring records throughout the supply chain. Recent studies have found that seafood may be mislabeled as much as 25-70 percent of the time for commonly-swapped species such as red snapper, wild salmon and Atlantic cod, disguising species that are less desirable, cheaper or more readily available (Miller and Mariani 2010, Buck 2007, Jacquet and Pauly 2008). And because traceability systems are not widespread, consumers, government, and even many industry players are often left in the dark about the origins of seafood products.

Despite the health, safety and conservation implications of its consumption, seafood lags behind many meat and produce products when it comes to traceability.

Legal Requirements

Fish and seafood have historically been treated as different from other kinds of meat and are governed largely by separate standards. While seafood accounts for a disproportionate number of foodborne illness outbreaks (Upton 2010), the seafood industry has largely not adopted the traceability standards that meat and produce companies often employ. In addition, many food safety and labeling laws include exemptions for certain seafood suppliers, such as fishing vessels and fish markets, which have essentially given the industry a free pass from mandatory, full traceability (Johnson 2011).

While the FDA has primary authority to ensure that all seafood marketed and sold in the U.S. is safe and properly labeled, it does not fully utilize this authority, resulting in little traceability for seafood products. More than 80 percent of seafood consumed in the U.S. is imported, yet the FDA inspects only two percent of these shipments (GAO 2009). The majority of the inspections that are conducted focus on health and safety risks, through a series of visual inspections and, if necessary, further laboratory testing (Upton 2010). All seafood processors, both domestic and foreign, must prove that their products are in compliance with a series of hazard-reduction guidelines (Upton 2010), and in proving this, many seafood companies include traceability information (FAO 2011). But at no time do the records need to include detailed information on the seafood's origins, and much of the information that is recorded is lost along the supply chain (FAO 2011). Furthermore, fishing vessels are exempt from this hazard-reduction requirement unless they do a significant amount of processing onboard (Upton 2010).

Under the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, specific recordkeeping requirements were implemented for all foods regulated by the FDA, including seafood. Facilities that manufacture, process, pack, transport, or handle these foods must register with the FDA and maintain detailed records about the

The U.S. seafood industry is starting to experiment with traceability systems that provide full information about a fish's journey from bait to plate. While laudable, these systems are neither consistent nor widespread.

supply chain of their food. As is the case for beef and produce, the records must include a "one up, one down" traceability system (Golan et al. 2004). However, farms, restaurants and fishing vessels are exempted from this requirement. Of the facilities not exempted, a 2009 report from the Department of

Health and Human Services Office of Inspector General found that the majority did not meet the recordkeeping requirement and 25 percent did not even know about the law (Levinson 2009). While the seafood industry, through the National Fisheries Institute, has issued guidance on implementing voluntary traceability methods that go beyond what the law requires (NFI 2011), it is difficult to know how widespread these efforts are and will be in the future.

Country-of-origin labeling has been required for seafood since 2005 (under the 2002 Farm Bill), yet the law includes some significant loopholes that make traceability difficult (Food and Water Watch 2011). Seafood often takes a complicated path from bait to plate (or tank to plate, in the case of farm-raised). A fish may be caught in one location and undergo multiple processing stages, often in different countries, before being sold at market. And under current law, the requirements for labeling seafood with its country of origin are complex and often misleading. A fish is labeled a “product of the U.S.” only if it was caught or harvested in U.S. waters or caught by a U.S. vessel and has not undergone a “substantial transformation” (such as filleting) outside the U.S. (7 C.F.R. 60.128(d), 2005). For fish caught or raised abroad but processed in the U.S., it is considered a product of both (or more) countries, yet the label could read “product of country X and the U.S.” and it would be unclear where the fish was actually caught or raised (7 C.F.R. 60.200(g)(2), 2005). In some cases, a fish could be caught in the U.S. and sent to country X for filleting, then imported to the U.S. for sale in U.S. markets, and it could be labeled only “product of country X” since that is where the processing occurred (*Koru North American*, 701 F. Supp. 229, 1988). Furthermore, country-of-origin labeling is not required for seafood in more substantially processed products, such as fish sticks or canned tuna, nor is it required in restaurants or certain specialty retailers like fish markets. With confusing laws that contain significant exemptions, consumers often have limited information about the origins of the seafood they buy.

**Traceability Works:
Rhode Island Trace & Trust and Darden**

While seafood traceability has historically lagged behind that in other food sectors, some seafood companies are implementing bait-to-plate traceability systems that show great promise.

Rhode Island Trace & Trust in New England is a network of fishermen, distributors, processors and restaurants committed to providing full traceability and transparency about the seafood they sell. Consumers can visit their website (www.traceandtrust.com) to find participating stores and chefs, and they can even input ID information from a fish’s tag to trace it back to the boat or fishermen who caught it (Nathan 2011).

Darden Restaurants, which owns such popular restaurants as Red Lobster and Olive Garden, is working with GS1, an organization that promotes supply chain traceability, to develop a barcoding system that allows fish to be labeled and traced from the supplier and/or fisherman to the processor, distributor and on to the restaurants. By adopting GS1 traceability standards, Darden restaurants and buyers can share detailed information about the source of their products with both suppliers and consumers alike (Business Wire 2009).

Programs like these demonstrate that not only is full traceability possible, but there is significant demand among consumers and producers alike, and more effort should be made to expand traceability nationwide.

Finally, the 2010 FDA Food Safety Modernization Act (FSMA), which significantly expands FDA’s authority to address food safety concerns, exempts seafood from many of the law’s requirements and does little to enable seafood traceability. New recordkeeping requirements are limited to specifically designated high-risk foods, and many portions of the seafood supply chain – most fishing vessels, seafood farms, some grocery stores and restaurants – are exempted (21 U.S.C. 350(d), 2010). The law also cannot require full traceability back to the point of origin or beyond immediate subsequent recipients.

While the law does require traceability pilot projects that will help identify and explore best practices for tracing food, these pilots are limited to the as-yet unspecified category of high-risk foods. The pilots must include at least one project for processed foods, one project for fruits and vegetables, and all projects must involve foods that have been the subject of significant outbreaks between 2006 and 2010. FDA has announced three projects to date: one for tomatoes, one for frozen Kung Pao-style products that contain a mixture of ingredients that have been the subject of outbreaks and one for peanuts. Despite the

documented risk and the high proportion of seafood-borne illnesses, the FDA has not made any indication that seafood will be designated as a high-risk food and be the subject of a traceability pilot project.

More Action Needed

Despite the health, safety and conservation implications of its consumption, seafood lags behind many meat and produce products when it comes to traceability. Very little of our imported seafood is inspected for health and safety, and virtually none is inspected for mislabeling or fraud (GAO 2009). With increased competition from abroad, however, domestic fishermen are seeing more efforts to market cheaper and often illegally-caught fish. As consumers become more aware of this problem and start to demand more information about the origins of their fish, and as fishermen

recognize consumers' desire for local, sustainable seafood, the U.S. seafood industry is starting to experiment with traceability systems that provide full information about a fish's journey from bait to plate. While laudable, these systems are neither consistent nor widespread. Without uniform and mandatory traceability, industry and government cannot appropriately conduct a recall and consumers cannot make informed choices about the fish they buy.

HOW TO ENSURE SEAFOOD INTEGRITY

There are a number of steps governments and industry can take to prevent seafood fraud and ensure that consumers have full, accurate information about their seafood.

Track and Trace Seafood

Fish and seafood information needs to be tracked through every step of the process from the water to our plates. Each seafood meal should be entirely traceable through distribution and processing back to its original capture or aquaculture facility. This traceability must include:

- Transfer of basic catch documentation throughout each step in the supply chain, including scientific common name of the species; gear type used and whether the fish was wild-caught or farmed; and geographic catch area or aquaculture production area;
- Inspections and enforcement efforts vigorous enough to deter fraud, including improved border inspections and DNA testing for species identification;
- Review of tracking and inspection data for systemic problems and false documentation;
- Refusing entry to known violators in order to reduce the market for illegal fishing and mislabeled seafood; and,
- Transparency in labeling and full public disclosure to allow informed purchases and decision making.

Prevent Mislabeled and Provide Information to Consumers

Recent studies have shown that mislabeling is widespread (Abelson and Daley 2011; Carpenter 2012), causing economic fraud, increased health risks, conservation harm, and facilitating illegal fishing. Mislabeled fish must be prevented at all steps in the distribution chain. Consumers need full and accurate information about the origins of their fish so they can be assured that what they are buying is safe and legal.

Increase Inspections to Ensure Safety of Seafood and Keep Illegal Fish Out of the U.S. Market

Seafood is a high-risk food and must be handled safely with increased accountability to prevent illness. Bacterial contamination and naturally-occurring toxins, which are more present in some species than others, become added risks when fish are mislabeled. The FDA only inspects two percent of seafood imports, and even less of that is inspected for fraud. The National Oceanic and Atmospheric Administration's (NOAA) inspections of domestically-caught fish are done on a voluntary, fee-for-service basis, meaning that the worst offenders are likely not participating. The FDA and NOAA should increase their inspections of seafood to ensure that the products are properly labeled and consumers have full information about what they are eating.

Increased inspections will also help combat illegal fishing, which hurts honest fishermen and consumers alike. Law-abiding fishermen deserve to compete on a level playing field, not face unfair competition by those skirting the law. If a fishing boat is not adhering to domestic or international fishing laws, it is likely violating other requirements as well, including health and safety regulations. Inspecting more seafood at ports and at the border will help deter illegal fishing and protect consumers by keeping illegal products out of the U.S. market.

Coordinate Federal Agencies

A wide range of federal agencies share responsibility for seafood safety and inspections, yet instead of adding capacity, this fragmented system currently leads to confusion and inefficiency. Coordination is needed to effectively protect consumers and unite the government against fraud.

REFERENCES

- Abelson, J. and B. Daley. 2011. On the menu but not on your plate. Boston Globe. Accessed Jul 6, 2012: http://articles.boston.com/2011-10-23/business/30313749_1_fish-plate-menu.
- Carpenter, S. 2012. Seafood in L.A. frequently mislabeled, group says. Los Angeles Times. Accessed Jul 6, 2012: <http://www.latimes.com/news/local/la-me-seafood-fraud-report-20120417.0,7409070.story>.
- Code of Federal Regulations. 2009. Country of Origin Labeling of Beef, Pork, Lamb, Chicken, Goat Meat, Perishable Agricultural Commodities, Macadamia Nuts, Pecans, Peanuts, and Ginseng. Title 7, Pt. 65.500. Accessed Jul 5, 2012: <http://ecfr.gpoaccess.gov>.
- Code of Federal Regulations. 2005. Country of Origin Labeling for Fish and Shellfish. Title 7, Pt. 60. Accessed Jul 5, 2012: <http://ecfr.gpoaccess.gov>.
- Food and Agriculture Organization (FAO). 2011. Assessment and Management of Seafood Safety and Quality. Accessed Dec 6, 2011: www.fao.org/docrep/006/y4743e/y4743e0p.htm.
- Buck, E.H. 2007. Seafood Marketing: Combating Fraud and Deception. U.S. Library of Congress. Congressional Research Service. Accessed Mar 1, 2011: <http://www.nationalaglawcenter.org/assets/crs/RL34124.pdf>.
- Business Wire. 2009. GS1 US Announces Launch of Groundbreaking Foodservice Initiative with Leading Foodservice Manufacturers, Distributors and Operators. Accessed Jan 9, 2012: <http://www.reuters.com/article/2009/10/05/idUS111097+05-Oct-2009+BW20091005>.
- Food and Water Watch. 2011. Country of Origin Labeling. Accessed Dec 2, 2011: <http://www.foodandwaterwatch.org/food/consumer-labels/country-of-origin-labeling/>.
- Fresh Express. 2012. Your Salad Story. Accessed Jan 6, 2012: <http://www.freshexpress.com/YourSaladStory#/your-salad-story>.
- Huffstutter, P.J. 2010. Amid mounting safety concerns, technology helps track food from farm to table. Los Angeles Times. Accessed Jan 6, 2012: <http://articles.latimes.com/2010/oct/03/business/la-fi-food-safety-tracking-20101003>.
- Golan, E., B. Krissoff, F. Kuchler, L. Calvin, K. Nelson, and G. Price. 2004. Traceability in the U.S. Food Supply: Economic Theory and Industry Studies. USDA ERS. Agricultural Economic Report Number 830.
- Government Accountability Office (GAO). 2009. SEAFOOD FRAUD: FDA Program Changes and Better Collaboration Among Key Federal Agencies Could Improve Detection and Prevention. Accessed Nov 18, 2011: <http://www.gao.gov/new.items/d09258.pdf>.
- Greene, J. 2010. Animal Identification and Traceability: Overview and Issues. Congressional Research Service.

- Jacquet, J.L. and D. Pauly. 2008. Trade secrets: Renaming and mislabeling of seafood. *Marine Policy* 32: 309-318.
- Johnson, R. 2011. Food Safety on the Farm. U.S. Library of Congress. Congressional Research Service. Accessed Nov 18, 2011: <http://openocrs.com/document/RL34612/2008-12-19/>.
- Koru North America v. U.S.* 701 F. Supp. 229. 1988. U.S. Customs and Border Protection. Accessed Jul 5, 2012: <http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5057319>.
- Levinson, D. 2009. Traceability in the Food Supply Chain. Department of Health and Human Services. Office of Inspector General. Accessed Jan 9, 2012: <http://oig.hhs.gov/oei/reports/oei-02-06-00210.pdf>.
- Miller, D.D. and S. Mariani. 2010. Smoke, Mirrors, and Misabeled Cod: Poor Transparency in the European Seafood Industry. *Frontiers in Ecology and the Environment* 8: 517-521.
- Nathan, J. 2011. A Boat-to-Table Initiative Brings Fish to Chefs. *New York Times*. Accessed Jul 6, 2012: <http://www.nytimes.com/2011/08/10/dining/a-boat-to-table-initiative-brings-fish-to-chefs.html>.
- National Fisheries Institute (NFI). 2011. Traceability for Seafood, U.S. Implementation Guide. Accessed Jan 9, 2012: http://www.aboutseafood.com/sites/all/files/FINAL%20Seafood%20Trace%20Guide_v1.1.pdf.
- Upton, H. 2010. Seafood Safety: Background and Issues. U.S. Library of Congress. Congressional Research Service. Accessed Nov 14, 2011: <http://openocrs.com/document/RS22797/2010-12-02/>.
- U.S. Code. 2010. Food Safety Modernization: Registration of food facilities. Title 21, Pt. 350(d). Accessed Jul 6, 2012: <http://www.gpo.gov/fdsys/pkg/USCODE-2010-title21/html/USCODE-2010-title21-chap9.htm>.
- Van Voorhees, D. and A. Lowther. 2011. Fisheries of the United States 2010. National Marine Fisheries Service. Accessed Jul 11, 2012: http://www.st.nmfs.noaa.gov/st1/fus/fus10/FUS_2010.pdf.