Seafood Traceability Glossary

A guide to terms, technologies, and topics

Introduction

This document provides definitions for common vocabulary associated with traceability, traceability technology products and systems, and seafood supply chains. Illustrations, diagrams, and photographs of select terms have also been included to provide additional clarification.

We have organized glossary terms into categories to help orient the reader. Within categories, terms are listed alphabetically. The first section of the glossary provides an overview of the categories for quick reference.

This glossary is a living document that will continue to be expanded as new technologies, systems, and initiatives evolve. The online version of this document will be the most up to date, with periodic revisions made to the downloadable PDF.

List of Categories

SUPPLY CHAIN ACTORS
Key trading partners and stakeholders involved in moving wild and farmed seafood from harvest to consumer.

SUPPLY CHAIN STRUCTURE
Terms related to the physical configuration of seafood supply chains and product flow.

TRACEABILITY SYSTEMS & PROCESSES
The various types of track and trace hardware and software combinations, the kinds of data they collect and share, internal processes associated with traceability, and the five core business functions of end-to-end traceability.

HARDWARE FOR DATA CAPTURE
Products, equipment and labels used for capturing and displaying data.

DATA
Types of information collected in seafood supply chains.

DATA PROCESSES
Terms associated with data management (capturing, storing, and sharing) relevant to movement of seafood product through the supply chain.

SUPPLY CHAIN PROCESSES
Terms associated with business transactions, product manipulation and transformation relevant to movement of seafood product through the supply chain.

LOGISTICS AND PRODUCT CHARACTERISTICS
Units of product, specific documents related to products, and other physical materials associated with seafood products.

ORGANIZATIONS
Key institutions that play a role in seafood supply chain function and traceability.

Some Common Abbreviations

ASN
advance shipping notice

CTE
critical tracking event

EDI
Electronic Data Interchange

EPC
Electronic Product Code

ERP
Enterprise Resource Planning

GTIN
Global Trade Item Number

IUU
illegal, unreported, and unregulated

KDE
key data element

RFID
radio frequency identification

SSCC
serial shipping container code

SKU
stock keeping unit

XML
Extensible Markup Language

Supply Chain Actors

AQUACULTURE FACILITY
The physical location at which marine or freshwater fish, shellfish, or plants are bred, reared, and harvested. Aquaculture (or fish farming) produces food fish, sport fish, bait fish, ornamental fish, crustaceans, mollusks, algae, sea vegetables, and fish eggs.

BROADLINE DISTRIBUTOR
Very large distributor of food products and other supplies that serves restaurant and foodservice establishments. Typically, broadline distributors purchase products from hundreds, if not thousands, of suppliers and food processing companies.

BROKER (ALSO, TRADER)
Person who buys, sells, arranges, and negotiates the sale of seafood between and among _producers, buyers_, and sellers. Brokers sometimes have access to markets that others cannot access. Brokers often do not handle the seafood physically, but make arrangements for the sale and transportation of that product.

BUYER
Person working for a wholesaler, retailer, or restaurant who is responsible for purchasing seafood products that meet pre-established requirements for price, quality, and consumer preference. Buyers maintain _inventory_ and identify and establish new, direct supplier relationships. Depending on the type of business and the location, buyers may buy direct from fishers, processors, or _wholesalers_.

CHEF
A trained professional cook who is skilled in recipe creation and food preparation. Chefs working in food service establishments are typically responsible for planning menus, purchasing food, managing kitchen staff, and communicating with front-of-house staff.

COLD STORAGE
Refrigerator or freezer warehouse that stores seafood product for later use by seafood processors or wholesalers. Commercial cold-storage operators charge a daily, weekly, or monthly fee for storage space and to ensure that proper temperatures are maintained.

CONSUMER
Person who ultimately buys (and potentially eats) a seafood product, and where the supply chain ends. Typically, the consumer purchases the product from a restaurant or retail location, though some will buy direct from producers.

CUSTOMER
A business or individual that receives product from a trading partner along the supply chain. Note that in this context, the term refers to a business-to-business (B2B) transaction and not the consumer.

DEALER
Person or business that participates in the sale and processing of seafood. In some countries, accurate dealer records of fish landings and sales data are

required by the government or by fishery managers.

DISTRIBUTOR
Person or business selling seafood to restaurants or retailers. Most distributors buy from _processors_ or _wholesalers_, though some distributors buy direct from fish auctions or _producers_. Others also dabble in processing.

END BUYER
Retail or restaurant business that sells seafood to the final consumer. This is often confused with the consumer—the person who purchases seafood from a retail store or restaurant.

ENUMERATOR
Person who meets boats at the dock to count, weigh, grade, and record landings for fishery management or tax purposes. Enumerators usually are employed by the local government or a local NGO.

EXPORTER
Person or business shipping seafood out of the country in which it was caught, landed, or processed. Most often, the export will be to a wholesaler who receives the product in the new country.

FIRST RECEIVER
Buyer (usually a processor or wholesaler) who purchases seafood directly from the producer. The first receiver can also be a fish auction.

FISHER
A person who catches wild fishery resources (e.g., fish, shellfish, crustaceans) for income or for sport.

FOODSERVICE
Business or organization that prepares meals in large volumes. Foodservice includes independent restaurants, chain restaurants, universities, hotels, government and hospital cafeterias, and caterers.

IMPORTER
Person or business that brings in seafood from another country for the purpose of resale, usually to a _wholesaler_.

MIDDLEMAN
Person, especially in artisanal fisheries, that receives the product from the producer and passes along to the dealer or processor. Can also refer more generally to any node in the supply chain after producer and before the end buyer.

PRIMARY PROCESSOR
Person or business that performs the first steps in seafood processing, including heading, gutting, scaling, and deboning finfish, shucking shellfish, and holding crustaceans in live tanks.

PRODUCER
Fisher or aquaculture facility that harvests fish or shellfish.

PURCHASING MANAGER
The person in a company responsible for purchasing inputs for production (as in the case of secondary processors and distributors) or products for final sale (as in the case of restaurants and retail establishments). Purchasing managers may follow purchasing criteria related to certain product attributes, quality, or price.

RESTAURATEUR
A person who owns and operates a restaurant.

RETAILER
Person or business that sells seafood to the consumer, as opposed to another business or wholesaler.

SECONDARY PROCESSOR
Person or business that receives seafood from a primary processor (or other secondary processor) in order to process the seafood further before sale. Secondary processing could involve filleting, portioning, cooking, canning, smoking, adding other ingredients, or merely thawing, refreezing, then repackaging.

SPECIALTY DISTRIBUTOR
Person or business specializing in the sale of seafood items that command a premium price based on quality or other preferred attributes.

SUPPLIER
Person or business buying seafood from a wholesaler, or in the case of some artisanal fisheries, from a producer, with intent to sell to restaurants or retailers who serve consumers.

TRADING PARTNER
Any person or business that affects the flow of goods through a supply chain. Examples include producers, processors, third-party logistics providers, wholesalers, distributors, retailers, and foodservice operators.

TRANSPORTER
Person or business responsible for moving seafood from one point in the supply chain to another. Often a third party that specializes in seafood and other cold transport. Transporters do not transform the products they transport, but may provide cold storage services.

VESSEL OWNER
The person or entity (sometimes a company or group of investors) that owns a fishing vessel (and usually also one or more fishing licenses attached to the vessel). Vessel owners may also be captains, or they may hire a crew and captain to fish on their behalf.
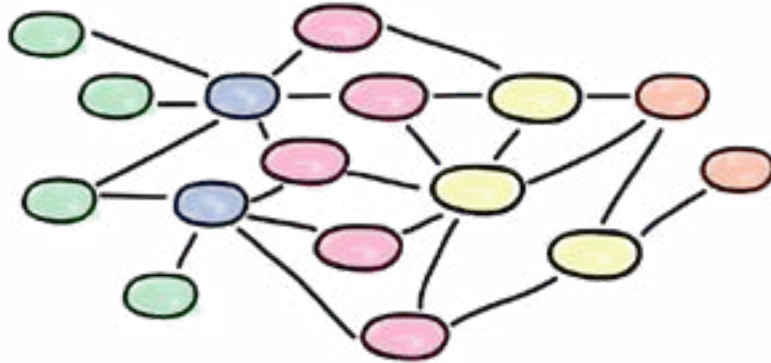
WHOLESALER
Person or business that purchases seafood for the purpose of resale to another business in the supply chain.

Supply Chain Structure

Supply "chain" diagram:

the reality:

COLD CHAIN
Supply chain that also serves to maintain products at or below a particular temperature through refrigerated storage and transport.

DOWNSTREAM
Any successive stage of the seafood production process that involves processing, packaging, and sale of a finished product that actually reaches the consumer. Downstream is the direction of the supply chain away from the _producer_ and toward the _consumer_. For example, packaging is a downstream stage from fish-cutting and processing.

FISHERY
A defined entity representing the human, biological, geographical, and physical agents and processes involved with raising or harvesting specific fish. That could include, but is not limited to, the people involved (e.g., fishers, processors, scientists, etc.), the species or type of fish, landing location, area of water or seabed, catch method or gear type, class of boats, and purpose of the activities (e.g., commercial, recreational, protected reserve).

FRAGMENTATION
Having different components of seafood processing located in different places or performed by different companies. Fragmentation makes it difficult to maintain accurate information flow between and among companies.

HORIZONTAL CONCENTRATION
Occurs when a few firms dominate a particular node in the supply chain and can control the flow and pricing of a product or products. In artisanal fisheries, this often is seen as a single _middleman_ aggregating catch from multiple fishers.

STAKEHOLDER ECOSYSTEM
The network of supply chain companies and other organizations (e.g., NGOs and government agencies) directly and indirectly involved with the production, processing, transporting, and final sale of a seafood product. The interaction of players within the network may be competitive or cooperative, antagonistic or synergistic. (See also _fishery_)

SUPPLY CHAIN
People and businesses involved with the production, processing, brokering, and distribution of seafood from fisher to consumer. Seafood may be transformed multiple times along the supply chain as it changes hands from one member of the supply chain to another.

UPSTREAM
Any stage of the seafood production process that occurs prior to another supply chain process. Upstream is the direction of the supply chain toward the producer and away from the consumer. As another example, _primary processors_ are upstream from _wholesalers_.

VERTICAL INTEGRATION
Consolidation of multiple points on the supply chain into a single company. In seafood, a vertically integrated company may own seafood vessels as well as processing facilities.

Traceability Systems & processes

BATCH TRACEABILITY
Ability to track information about a group of seafood products (referred to as a batch) that have a similar attributes such as harvest location, species name, harvest date, and processing location.

COMMERCIAL TRACEABILITY
The sharing of minimal data required to enable supply chain traceability without sharing proprietary or confidential data.

DATA VERIFICATION
The capacity to cross-check product or company-level information at any point in the supply chain with data supplied by other stakeholders or vetted by third parties. Data verification is critical for proving the legitimacy of the data and for preventing what might develop as traceability fraud. Verification can include mass-balance; data entry checks; restrictions on the ability to delete or modify data at a later date; verification of data accuracy via fish tickets or landing documents; verification of legal fishing through vessel monitoring systems (VMS) or AIS operations; and certificate status for health code or chain of custody compliance. Data Verification is one of the _five core business functions of traceability_ identified by Future of Fish.

ELECTRONIC TRACEABILITY
Seafood product information relevant to traceability is recorded, stored, shared, and accessed via electronic means as opposed to using a paper-based system. Elements of electronic traceability may include computerized or cloud-based databases, enterprise resource planning (ERP), Electronic Data Interchange (EDI), data standards, and barcodes or RFID systems (to name a few).

ENTERPRISE RESOURCE PLANNING (ERP)

Business management software used internally to collect and monitor information related to seafood business processes, such as purchasing, processing, marketing, sales, accounting, and inventory management.

EXTERNAL TRACEABILITY

The ability to track key data elements and other information about a seafood product as it moves between trading partners and through the supply chain. At a minimum, external traceability is one-up, one-down traceability. Increasingly, cloud-based data systems can also provide external traceability. Such cloud-based systems allow trading partners to capture, store, share and access product-level information across multiple nodes and potentially, the whole supply chain. The ability to perform external traceability depends on each trading partner having adequate internal traceability. External traceability also hinges on trading partners making commitments to share relevant information with other trading partners, either in one-up, one-down fashion or via a cloud-based system.

FISHERY INFORMATION SYSTEMS (FIS)

A general term used to describe an electronic data system to collect, manage, and share fisheries information for a wide variety of uses.

INTEGRATED HARDWARE TRACEABILITY

Includes _barcodes_, _readers_, _RFID tags_, and scanners to record information related to seafood products for traceability purposes. Integrated systems typically dovetail with a company's computer systems, such as financial, information technology, and inventory management systems.

INTERNAL TRACEABILITY

The ability of a company to both track and preserve information about individual batches or units as they move through its facility. The tracking and data preservation must exist throughout all internal processes, such as when a batch or unit is aggregated, disaggregated, transformed, transported or otherwise altered.

MOCK RECALL

A planned internal event practiced by processors, distributors, retailers and others in the supply chain on a routine basis to test the responsiveness and effectiveness of their individual recall plans, traceability systems, and recall procedures.

ONE-UP, ONE-DOWN

Record-keeping to track purchases (one up) and sales (one down) of all seafood products that move through a particular entity in the supply chain. This process is required by some countries for product recall purposes and is a form of traceability that is part of a larger whole chain traceability system.

PAPER-BASED TRACEABILITY

System using paper records, such as trip tickets, bills of lading, purchase orders, invoices, and handwritten labels to capture, store, and share information about seafood products for the purpose of traceability. Paper-based traceability is widespread in the seafood industry and may involve a combination of printed and scanned documents sent via email.

PRODUCT-DATA PAIRING

Product-data pairing is the physical attachment of product information to

the product itself. This can be achieved with a _barcode_, _RFID chip_, _QR code_, or alphanumeric (human-readable) code that journeys with the product as it moves through the supply chain. Under this approach, information about each product accumulates through each step, eliminating the problem of data attrition that occurs with internal traceability. Product-data pairing is one of the _five core business functions of traceability_ identified by Future of Fish.

SUPPLY CHAIN VISIBILITY

The ability to know information about the companies supplying products–specifically where they are located, what they do, how they do it, and whether their licenses and practices fall within legal limits. The focus of supply chain visibility is at the company or facility level, not at the product level. Its key value is proof of compliance with requirements such as sustainability certifications and _IUU_ regulations, as well as with risk management. Supply Chain Visibility is one of the _five core business functions of traceability_ identified by Future of Fish.

TECHNOLOGY ARCHITECTURE

A set of standards, protocols and processes designed to provide a blueprint of how various technology platforms can work together towards a common goal. For the purpose of traceability, a technology architecture is used to enable interoperability of systems to allow for seamless data flow and authorized access through the supply chain.

TRACK-FORWARD AND TRACE-BACK EXERCISES

Activities undertaken as-needed by a company to test the ability of its traceability system to provide accurate information about product origin and destination. The exercises are often undertaken to ensure efficient process is in place for emergency recall purposes but are relevant for other risk mitigation. See overview here. **Track-forward exercises** involve the ability to accurately identify and report on information related to a target/recalled product including: quantity of units involving target product produced on a given day; names of customers that received target product and quantity received by each; target product still in inventory or in storage; products into which target product was an ingredient; write-offs or stock waste of target product; any other information related to destination of target product. **Trace-back exercises** involve the ability to accurately identify the origins of a target/recalled product, including: raw material suppliers; quantities of raw materials received on a particular date; manufacturing recipes or formulations; production records (including staff working a particular shift); and any other information related to the origins of raw materials.

TRANSPARENCY (ESP. VS TRACEABILITY)
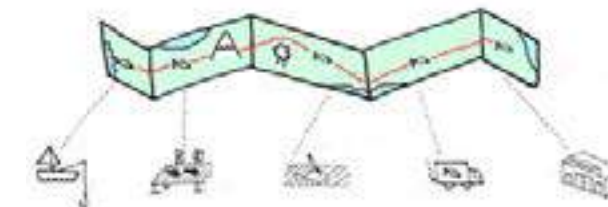
The availability of accurate information about the companies, facilities, or supply-chain players involved with a product. As opposed to traceability, which involves information at the lot-level, transparency is information related to business practices, manufacturing processes, locations, licenses, certifications, and other factors that may be used for compliance or risk

management purposes.

VERIFIABILITY (SEE ALSO DATA VERIFICATION)
Ability to validate and confirm information about seafood origins and other characteristics that may be on a label or otherwise associated with a product.

VESSEL-DOCK OR FARM LEVEL DATA CAPTURE
One of the five core business functions of traceability technology, the ability to create a supply chain with verifiable, accurate, and traceable data starts with the capture of information at the point of harvest or with the first receiver (e.g., at the dock). Once collected, this information can be paired with the product and uploaded to a database, where it can be pushed through or accessed by the supply chain via one or more traceability technology systems. Vessel-Dock or Farm Level Data Capture is one of the _five core business functions of traceability_ identified by Future of Fish.

HARDWARE FOR DATA CAPTURE

BARCODE

A series of thin and thick lines that carry machine-readable information about a product. The bar coding standards for consumer products are EAN-8 (8-digits) and EAN-13 (13 digits). The standard used for logistical units is ITF 14 (14 digits). GS1-128 (up to 129 alpha-numeric characters) is used within the _GS1_ Standard to allow barcodes to include specific product attributes such as harvest dates, harvest locations, lot numbers, quantities, weights, and packing dates. The hardware for barcode labeling includes labels, label printers, scanners and computer systems.

DATA CARRIERS
Labels or tags containing data that are physically attached to a unit in order to pair data with a product. Data carriers can be machine-readable, such as _barcodes_ and _RFID tags_, or may be human-readable, such as standard labels or both, such as hybrid labels.

IDENTIFIERS
The system of codes, including alphanumeric and symbolic codes, used in supply chains to record product data and differentiate specific units or batches. Identifiers may be embedded in _barcode labels_ or _RFID tags_, both of which may be scanned and recorded in databases. Companies may generate their own identifiers, or they may use standard identifiers, such as those created by _GS1_.

LABELS (ALSO CASE MARKINGS)
Informational tags, stickers, or printings on product packaging that provides details about the products.

PRODUCT IDENTIFICATION
The linking of a physical product throughout a firm's operations, including when product is disaggregated or transformed. Common practices include the use of _barcodes_, _QR codes_, physical stamps, and labels. _[1]_

QR CODE

Printed code that is readable by a smartphone camera and displays a specific webpage. QR codes on seafood labels usually are associated with information and photos about the seafood brand, fishery, fishers, or other information that tells the story of the fish.

READER
A device used to retrieve information from a barcode or _RFID_ tag. Readers can be hand-held scanners or stationary devices, such as RFID readers that are mounted in loading doorways to read RFID tags as product is moving from one area within a facility to the next.

RADIO-FREQUENCY IDENTIFICATION (RFID)

Technology that uses small tags attached to products to store and transmit _electronic product codes (EPC)_. Passive RFID tags require the use of stationary or handheld readers that electronically prompt the tags to transmit data. Unlike barcodes, RFID tags do not need to be in the line of sight of a reader. Active RFID tags use their own power supplies to send information to readers that can be up to a mile away. Implementation of RFID requires tags, labeling devices, _readers_, and information technology systems.

DATA

BATCH NUMBER (ALSO LOT NUMBER)
A unique alpha-numeric or _barcode_ identifier used to differentiate batches. Batch numbers are usually linked with production time and place, and are the cornerstones of traceability.

CATCH ORIGIN
Location where fish or shellfish are captured or harvested. This can be recorded precisely by vessels equipped with global positioning systems (GPS), or may refer broadly to a fishing region within the jurisdiction of a state or country or area of ocean if caught outside of jurisdictional waters.

COMMON NAME

The vernacular or colloquial name used for a biological species. In seafood, confusion can arise when the same common name is used for multiple different species of fish (e.g., "red snapper"), or when one species of fish is associated with multiple common names (e.g., mahimahi, dorado, and dolphinfish for one species: Coryphaena hippurus).

ELECTRONIC PRODUCT CODE (EPC)
A unique identifier used in *RFID* tags to differentiate products in the supply chain. EPC is managed by EPCglobal, a joint nonprofit venture between *GS1* and *GS1 US*.

GLOBAL TRADE ITEM NUMBER (GTIN)

The *GS1* standard for identifying items traded in a supply chain. GTINs are 14-digit identifiers to ensure uniqueness.

HUMAN READABLE INFORMATION

Information printed on a label that is easily read and understood without the need to decipher codes.

ILLEGAL, UNREPORTED, AND UNREGULATED (IUU)
Illegal fishing activities are those being conducted without permission or in violation of formal laws and regulations. Unreported fishing occurs when landings are not reported to the government or fishery management authority. Unregulated fishing is the harvesting of fish and shellfish stocks for which there are no conservation or management measures in place.

KEY DATA ELEMENTS
The different pieces of information that capture the who, what, where, and when of a seafood product as it moves through different *Critical Tracking Events* in the supply chain. Industry-wide agreement about what information needs to be captured continues to be a work-in-progress.

LANDING LOCATION
Location where fish or shellfish are off-loaded from a vessel. Note this data is different from the catch origin, which is where the product was harvested from the sea. Both landing location and catch origin are important data for verifying source information about a product and ensuring that products are

traveling through legal and documented supply chains.

LOT NUMBER (SEE BATCH NUMBER)

ONTOLOGY (ALSO VOCABULARY)
A complex and formally defined, classified, and characterized set of concepts and relationships (known together as terms) for use in information technology applications. Ontologies are useful for resolving ambiguities in datasets when performing data integration. Ontologies also can be called vocabularies, but vocabularies tend to be simpler and less formal sets of terms.

SERIAL NUMBER
An alphanumeric code used to identify a single unit for the lifetime of that unit. Most often, serial numbers are given sequential codes so that products within batches can be easily recalled if necessary.

DATA PROCESS

APHIA
The underlying platform of the World Register of Marine Species (WoRMS) and its more than 80 related global, regional, and thematic species databases. Aphia is designed to capture taxonomic and related data and information, and includes an online editing environment, which allows easy access to experts so they can update the content of the database in a timely fashion. *[10]*

AUTOMATIC IDENTIFICATION SYSTEMS (AIS)
An open and bidirectional (ship-to-ship, or ship-to-shore) satellite-based communication technology used at sea to automatically and continuously send data about a vessel and its whereabouts (e.g., name, flag, call-sign, size, type, lat-long position, course, speed, etc.). That information is accessible by other vessels equipped with AIS, as well as by land-based receivers (e.g., Vessel Traffic Services). Recently AIS information has been made available online for public viewing and vessel tracking (e.g., *Marine Traffic*).

BLOCKCHAIN (ALSO DISTRIBUTED LEDGER)
A public, permanent, unalterable, and constantly updated digital file of encrypted transactions that is stored in multiple copies across a network of devices. Distributed ledgers are distributed databases with decentralized data management systems. Because every storage device has an exact and updated copy of the ledger, data can be verified, audited, and protected from fraud and tampering—an important feature when transactions are occurring among actors that do not know or trust one another. Blockchain (originally invented for the digital currency, Bitcoin) is one system that uses a distributed ledger in which transactions are stored as chained blocks of data. *[2] [6]*

CATCH DOCUMENTATION AND TRACEABILITY (CDT)
Catch Documentation and Traceability (CDT) is a system designed to document and verify the legality of a seafood product at the point of catch or landing or anywhere along the supply chain by a member of the *a*. CDT was developed by USAID to help ensure that fishery resourcs from Southeast Asia are legally caught and properly labeled.

DATA ADDITION
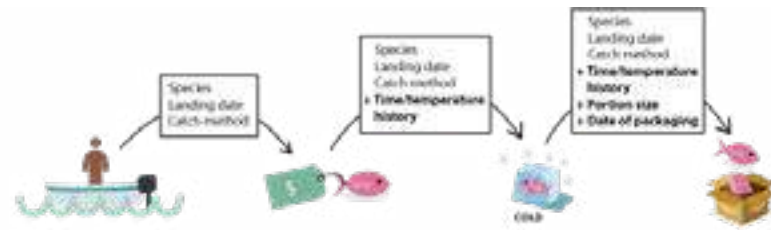
Refers to the successive linking of information as a product moves through the production process. At each step in production, additional data is created and can be added to the product's information history. This information may include addition of ingredients, time-temperature history, weight, portion size, and more. [1]

DATA COLLECTION

Refers to how data are created and entered into the data system. For example, scales used to weigh products may be connected to a data system electronically, or data may need to be transcribed manually. Barcode readers and QR scanners commonly are used to read product IDs. [1]

DATA PARTITION

Refers to determining which data need to be transmitted down the supply chain (external stream) and which data are kept within the firm (internal stream). Internal data may be partitioned further into data that need to be accessed readily (for example, in the case of a food safety recall), partitioned into a discrete "information silo," discarded at the firm level or archived data. [1]

DATA SECURITY

Refers to the mechanisms or processes that establish security of the data within a system. These processes operate at the firm level and also along the supply chain and include the process for setting permissions, as well as determining which staff or trading partners can access data under what circumstances and for what length of time.

DATA STORAGE

Describes manner in which data is stored by a firm for all stages of the production process. For example, initial data may be stored and then additional data linked to the older data, or perhaps data are only stored after the product has been shipped. Data storage can be on-site within a server housed at the facility or via a cloud-based database that can be accessed over the internet. Data storage is an ongoing process throughout a firm's operation. [1]

DATA TRANSMISSION

The mechanisms and processes used to transmit data and information along the supply chain. For example, data may be physically attached to the product, or transmitted electronically after the product has been shipped. [1]

DECENTRALIZED DATA MANAGEMENT

A distributed database that is managed by a network of devices adhering to a set of rules (computer code) regarding data structure, storage, sharing, encryption, and transactions.

DISTRIBUTED DATABASE

CENTRALIZED   DECENTRALIZED   DISTRIBUTED

Data that is stored across a network of devices as opposed to being stored in a central database on a single computer, or attached to a common (centralized) processing unit. A distributed database can have centralized management system (e.g., a single company that owns the data and can run queries or analytics) or a _decentralized data management system_ (as is the case with _distributed ledgers_).

ELECTRONIC DATA INTERCHANGE (EDI)

The electronic transfer of data among computer systems using standardized data formats. EDI allows different software applications at different trading partners to communicate with each other and send and receive transactional data such as purchase orders, invoices, and notices of receipt without the need for human intervention.

INTEROPERABILITY

The ability of different information technology systems or software programs to communicate seamlessly for the purpose of exchanging and using data. For systems to be truly interoperable, they must have both _semantic_ (common meaning) and _syntactic_ (common format) interoperability.

NODE

node
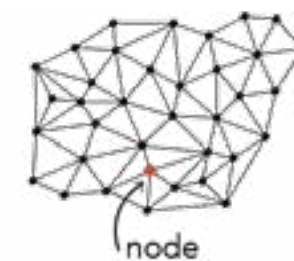
A distinct entity in a supply chain (e.g., fisher, receiver, processor, cold storage, distributor, retailer) that may be responsible for capturing, inputting, storing, or sharing data.

ON-BOARD MONITORING SYSTEMS

Systems on board marine vessels that automatically monitor, capture, and

record vessel activity and systems status data using measurements and sensors. That data may be displayed in real time for the captain, transmitted to an on-shore receiver, or recorded and stored in the vessel's "black box".

PERMISSION-BASED SHARING

Within the context of cloud-based traceability systems, permission-based sharing allows a seafood company to specify which pieces of information it can share with certain trading partners in the supply chain, and which data it prefers to conceal. This information usually pertains to prices and quantities, but also may include more specific product-level data such as harvest location, vessel name, and harvest date (to name a few).

SEMANTIC INTEROPERABILITY

The ability to communicate accurate and useful information automatically among two or more software programs or computer systems. Semantic interoperability requires an agreed-upon set of standardized vocabulary so that there is no ambiguity; the meaning of the information sent is identical to how the receiver interprets and understands it.

SYNTACTIC INTEROPERABILITY

The ability of computer systems or software programs to communicate with one another. Syntactic interoperability involves agreed upon standards related to data formatting and communication protocols, such as XML or SQL. The presence of syntactic interoperability does not ensure that the data transmitted from a sender will be interpreted accurately by a receiver; that requires semantic interoperability.

VESSEL MONITORING SYSTEMS (VMS)

The general term for on-board surveillance systems that enable environmental and fishery regulatory agencies to track the location and activities of commercial fishing vessels operating within a country's territorial waters, EEZ (exclusive economic zone), or treaty areas. The primary purposes of VMS relate to sustainable fishery management and preventing illegal fishing. Different countries use different communication technologies for VMS and impose different criteria around which registered vessels are required to carry the systems. *[7]*

WORMS

The World Register of Marine Species (WoRMS) is a global species database that aims to be an authoritative and comprehensive list of names of marine organisms. Controlled by taxonomic and thematic experts, WoRMS combines information from Aphia with other authoritative marine species lists maintained by others (e.g. *AlgaeBase*, *FishBase*).

Supply Chain Processes

AGGREGATION

The process of combining discrete units or batches.

CAPTURE

To catch wild fish using any form of gear, including nets, hooks, traps, pots, rod-and-reel, spears, and so on.

CHAIN OF CUSTODY

Documentation showing the transfer of ownership of seafood product every time that product changes ownership and/or is altered or repacked. Certifiers often require partners to adhere to a specific chain of custody protocol in order to move labeled, certified product through the supply chain.

COMMUNICATION PROTOCOL

Formal rules or instructions for exchanging information between computer systems. Communication protocols can include authentication, error detection and correction, syntax, and semantics.

CRITICAL CONTROL POINT (CCP)

A point or step within the food-production process (from raw material to finished product) at which control can be applied in order to prevent, eliminate, or reduce (to an acceptable level) a food safety hazard.

CRITICAL TRACKING EVENT (CTE)

A specific point along a supply chain where certain key data elements need to be captured for the purpose of enabling traceability of a product. CTEs for seafood include harvest, landing, primary processing, aggregation, packaging, shipping, receiving, and sale. For a longer list of CTEs, see Tables 1 through 4 of *GFTC Seafood Traceability Technology Architecture Brief*.

FORWARD CONTRACT

Agreement between a fisher and a *buyer* that commits the buyer to purchase the boat's catch before the fisher returns to port. Sometimes the forward contract is made before to the fisher leaves on a fishing trip; other times the contract is made as early as the start of the season. In cases where the contract is between a fisher and an *end buyer* (retail or restaurant), processors and distributors work on a fee-for-service basis and do not take ownership of the product.

GRADING

Process of separating product based on a particular feature, such as size or quality, in order to send higher-value products into more premium markets.

HARVEST

A term referring to the capture of wild fishery resources, as well as to the harvest of farmed fish and plants within an aquaculture facility.

HAZARD ANALYSIS AND CRITICAL CONTROL POINTS (HACCP)

A management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution, and consumption of the finished product. *[9]*

LOGISTICS

A management process that coordinates the movement of seafood within processing or storage facilities and among sellers and buyers in a supply chain.

MASS BALANCE

Accounting method typically used by auditors that ensures the total weight sold for a product does not exceed the total weight purchased. Often used for verifying certified product, mass balance does not always require physical separation of certified product from non-certified product.

PROCESSED

A seafood product that has been changed from its original form through cutting (e.g., heading & gutting, filleting, portioning), cooking/smoking, canning, packaging, freezing, etc.

SHARE

To exchange information related to traceability with another entity, usually a trading partner.

SHRINK

This term has two common definitions: 1) Loss in weight of seafood due to dehydration; 2) Revenue loss from seafood that has not sold or has spoiled and must be discarded.

TRACEABILITY

Ability to track information about the origin and journey of seafood products as they pass through a supply chain. Traceability requires that the people and businesses in the supply chain have (a) systems to capture, manage, and share data; (b) mechanisms for physically linking products and data (such as tags or barcodes); (c) internal processes for tracking products and information about products as they undergo transformation, *aggregation*, disaggregation, and packaging within a facility; (d) supply chain visibility, and (e) the ability to verify that data are accurate and remain intact from origin to consumer.

TRACE

To use traceability information or records to identify the origin, attributes, or history of a product within the supply chain.

TRACK

To follow a product or batch as it moves down the supply chain, toward the end user.

TRANSFORMATION

Any change made to a traceable item (such as a batch or single product) that affects its identity or characteristics. Transformation includes *aggregation*, disaggregation, processing, value-added activities, packing, and repacking traceable items.

VALUE-ADDED

Amount by which the value of a seafood product is increased at a certain node in the supply chain due to specific production methods (e.g., fishing,

handling, processing), added ingredients, packaging, or branding.

LOGISTICS AND PRODUCT CHARACTERISTICS

BATCH (ALSO LOT)

A defined quantity of seafood product that has undergone production or transformation at the same time and place, and under the same conditions. There is no standard for what can be considered a batch. A batch can be a single fish or tote, or facility's production from a single hour, a day, or even an entire year. In general, the smaller the batch size, the lower the amount of product at risk for food safety or security issues, and the less money and inventory a company would lose in the case of a recall.

BILL OF LADING

A document detailing the type, quantity, and destination of a seafood shipment. The bill of lading serves as a contract between the shipping party and the *transporter*. It also serves as a receipt of shipment when the shipment is delivered to the receiving party.

CATCH CERTIFICATE

A certificate required by individual countries or international groups of countries, such as Regional Fisheries Management Organizations (RFMOs), for validating origin of seafood product. Information required typically includes fishing vessel name, vessel registration number, species, catch area, landing date, total weight, and importer/exporter information. The EU catch certificates require the competent authority of the flag state (the country in which the fishing vessel is registered) to validate the catch, confirming it was caught in compliance with applicable laws and conservation measures. Catch certificates are one way the EU is attempting to combat *IUU* fishing. The certificates also represent how the EU is trying to ensure traceability of fishery products.

COMMODITY

High-volume product aggregated from many sources and for which all the individual units are considered identical, regardless of how, where, when, or by whom they were produced or harvested. Units can be whole fish, filets, or value-add products.

CONSUMER ITEM (SEE RETAIL TRADE UNIT)

COUNTRY OF ORIGIN LABELING (COOL)

A U.S. labeling law that requires retailers to include information to consumers about the source of certain foods including wild and farmed fish, and fresh and frozen shellfish. An imported product must be labeled with the country of origin as declared to U.S. Customs and Border Protection at the time the product entered the United States; products that undergo substantial transformation must be labeled with the country where that processing took place according to CPB _rulings_. This means seafood transformed in the U.S. may be labeled "From country X, processed within the United States." In addition to origin, method of production must also be included, distinguishing wild vs. farm-raised product. Seafood products exempt from COOL include any cooked, cured, or smoked products; seafood combined with other foods or sauces, or seafood that otherwise has been "restructured." Examples of this last distinction include fish sticks, canned tuna, and clam chowder. _[4]_

FISH TICKET (ALSO LANDING RECEIPT)

An official State-issued form used to document details about individual commercial seafood landings occurring in that State. Most States issue booklets of uniquely numbered paper fish tickets (with 2-3 carbon copies each), which typically are filled out by the first receiver (e.g., processor or wholesaler). One copy of the fish ticket is given to the seller (e.g., fisher or vessel captain), one is sent to the State department responsible for fisheries, and one is kept by the first receiver. Each State creates its own forms.

INVENTORY

Physical amount of seafood product on hand and available for sale.

LOGISTIC UNIT

An aggregation of items (usually _nonretail trade units_ such as cases or crates) packed specifically for transport or storage. Common logistic units are pallets and containers.

LOT (SEE BATCH)

MANIFEST

A document listing the cargo, passengers, and crew on board a ship at the point of departure, which is delivered to customs or other officials upon landing at the destination. The manifest may be used to verify consistency in the vessel's cargo and occupants between departure and arrival.

NONRETAIL TRADE UNIT

Cases or crates that are not labeled for individual sale, but instead contain individual retail units.

QUOTAS

Catch limits issued by a governing or regulatory body on the wild-catch or harvest of a fish stock or fishery resource. Quotas may be set for an entire fishery (total allowable catch) and/or divided into individual fishing quotas (IFQ) for fishers. Quotas are typically set at the start of a fishing season and may be adjusted as fishing ensues and stocks are monitored.

RETAIL TRADE UNIT (ALSO CONSUMER ITEM)

Any item intended for sale to the end consumer. Retail trade units tend to be labeled with _barcodes_ that are scanned at the point of sale.

STORIED FISH

Seafood sold with accurate information about its journey from water to plate. This information explains where, when, and how the seafood was caught, who caught it, and often may include other compelling facts about the people or communities involved in the fishery.

Types of Organizations

FISHING CO-OPS

A seafood business that is owned and governed by the fishermen supplying fish to the business. Fishing co-ops can give fishermen higher prices for their fish than they might get otherwise, and may also provide dividends based on profits. Some fishing co-ops agree to rules around fishery management, product handling standards, or sell under a common brand.

STANDARD-SETTING

Often these are non-profit organizations that establish requirements or specifications to ensure processes and products meet criteria for safety, efficiency, quality, etc. Examples involved in the seafood arena include entities establishing guidelines around data identification and exchange and eco-label and certification organizations, such as:

AQUACULTURE STEWARDSHIP COUNCIL (ASC):

Founded in 2012 by WWF and the Dutch Sustainable Trade Initiative, this not for profit organization sets standards for a certification and labeling program that aims to promote responsible aquaculture production.

EPCGLOBAL
A neutral, consensus-based, nonprofit standards organization formed as a joint venture between _GS1_ and GS1 US. EPCglobal issues Electronic Product Codes (ECP), which are unique numbers to be used in RFID tags for identifying products in the supply chain.

FAIR TRADE USA
The leading third-party certifier of Fair Trade product in the USA, Fair Trade USA sets standards based on its core mission of empowerment, economic development, social development and environmental stewardship. Fair Trade USA launched its Capture Fisheries program in 2014.

GLOBAL AQUACULTURE ALLIANCE'S BEST AQUACULTURE PRACTICES (BAP)
The GAA is a non-profit, non-governmental trade organization that sets standards to advance environmentally and socially responsible aquaculture through its BAP program. Standards cover the following steps in the supply chain: farms, feed mills, hatcheries and processing facilities that support the production of farmed raised fish and shellfish.

GS1
An international nonprofit organization that has created standardized identifiers and identifier formats for use in supply chains to facilitate external traceability. The GS1 Global Traceability Standard defines industry-best practices for traceability, including the essential information that must be collected, recorded, and shared.

INTERNATIONAL STANDARDS ORGANIZATION (ISO)
The world's largest standards-setter, this international body is made up of standards organizations that work together to develop and promote industry-wide standards.

ISEAL
The International Social and Environmental Accreditation and Labeling (ISEAL) organization is a non-governmental association with members comprised of sustainability standards and accreditation bodies. The association works to promote credibility and uptake of sustainability standards around the globe.

MARINE STEWARDSHIP COUNCIL
An independent nonprofit organization that sets standards for sustainable fishing and relies on a chain-of-custody certification.

TECHNOLOGY CLUSTERS
Geographic concentrations of interconnected companies, universities, and other organizations with a specific industry focus and with the goal of leveraging a region's assets to spur innovation, accelerate the development of new technologies, and create economic opportunity. Clusters are often led by cluster organizations that connect stakeholders and facilitate collaboration within the cluster. _[3]_

TRACEABILITY PROVIDER
A businesses or organization that offers software or hardware designed to fulfill one or more of the _five core business functions of traceability_ (i.e., vessel-dock capture, product-data pairing, internal traceability, supply chain visibility).

THIRD-PARTY CERTIFIER
Independent party or organization that specializes in the certification of fisheries, production process, or businesses using an established standard.

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