FISHERIES DIVISION
THERE IS MORE TO SEA
GOVERNMENT OF THE COMMONWEALTH OF DOMINICA

basic fisherman training course BFTC

Training Manual

Second Edition

Sponsored by the Japan International Cooperation Agency (JICA)

JICA

Compiled by:

Norman J. Norris - Fisheries Officer
Derrick Theophille - Fisheries Liaison Officer

All comments and inquiries can be sent to:

Fisheries Division
Roseau Fisheries Complex Bldg.
Dame M.E. Charles Blvd.
Roseau,
Commonwealth of Dominica, W.I.

Email: fisheriesdivision@dominica.gov.dm
Fax/Phone: 1 (767) 448-0140
Phones: 1 (767) 266-5291, 266-5292

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Cover Photos by:

Mitsuhiro Ishida -
JICA Regional Fisheries Development Advisor

Dominica Fisheries Division

Preface

The Dominica Fisheries Division conducts group and individual training programs as part of the technical and general growth and development of the sector. This training is done at the local and national level to also contribute to the upgrading of knowledge in fisheries.

The focus of this Basic Fisherman Training Course (BFTC) Manual is to provide an overview of the subject areas presented at the course, and is to be supported with additional material during the presentations.

Included in the course is general information on world fisheries, but most of the manual is localized to our Small Vulnerable Economy (SVE) of Dominica. Easy adaptation can be done for other situations and conditions.

The Dominica Fisheries Division is indebted to the Japan International Cooperation Agency (JICA) for facilitating the production of this BFTC manual. We're grateful to the many facilitators and resource persons who contributed to this effort by providing articles. Reference materials have also been used from FAO, JICA and other agencies and individuals.

Foreword

By Mitsuhiro Ishida
JICA expert,
Fisheries Development Adviser

Japan International Cooperation Agency, JICA and I are really happy to publish the Basic Fisherman Training Course (BFTC) Manual II. In this version, we enforce the quality control of fish, from catch to consumption. This is basic but very important part of your business operations, because fisheries is not only the fisher but the vender as buyer, restaurant hotel and consumer. All of them are a team.

I also want to mention an appreciation to the Dominica Fisheries Division for allowing JICA to disseminate this knowledge to our neighboring countries through "the Regional BFTC to train the trainers' project by JICA-Dominica Fisheries Division." The beneficiary countries are St. Kitts and Nevis, Antigua and Barbuda, St. Lucia, St. Vincent and Grenadines and Grenada.

For you the fishers, I have never seen such a comprehensive and very practical guidebook, so I am really glad to introduce to you this BFTC manual. Please use it for upgrading your knowledge for your business and if you need any support please do not hesitate to contact your fisheries officer. They are pleased to support you and will improve the service. If necessary, JICA is also willing to work on it through the technical cooperation scheme.

Finally I wish that the fisheries resources will be well managed for a very long time and fishers enjoy working safely at sea.

Papa bordie, sakafet, bon jous, arigato, gracias.

About the BFTC

The fisheries sector is of significant social and economic importance to Dominica; it is a vital source of food, employment and revenue. Over two thousand fishers operate an artisanal fishery in which they have many challenges in addressing the emerging realities of the industry.

It is clear that the key to the successful development of our fishing industry is through education and training. Recognizing the need for change, the Fisheries Division initiated the Basic Fisherman Training Course (BFTC) in 2005 as the platform for nurturing a new generation of fishers.

Prior to the BFTC there was no formal entrants training and with the decline of the banana industry many persons were entering the fisheries sector with no knowledge of boating safety and survival skills, fish behavior, fishing gear and methods technology, the Fisheries Act and legislation and small fishing business development among others.

The goal of the BFTC is to develop the necessary competencies and skills in fisheries to enable fishers to optimize the potential of the fishing industry. The course has been designed to include all of the critical areas necessary for the survival of the industry.

It must be understood that in Dominica, the fisherman is also the captain, the mechanic and everything else on his boat. Hence the reason for basic training in those key areas which facilitate the success of his livelihood. With the many new entrants now "crossing the floor from fig to fish", without any qualification or experience, the request for training has intensified. It had become necessary to put a training program in place covering the critical modules.

The course as mentioned earlier is a basic one and is not meant to make an expert of participants. It is holistic in nature and further training is advised for persons requiring a higher level of skill or specialization.

The Division has worked with some key partners and resource persons in developing this course and some have been with us from inception. Many funding agencies and lending institutions now recommend the BFTC to clients wishing to invest in fishing, as a minimum requirement for assistance.

With the publication of this manual the BFTC is now established as the window to taking Dominica's fishery sector to the next level.

About The Fisheries Division

The Fisheries Division is the arm of Government mandated under the Fisheries Act # 11 of 1987 with the responsibility of managing the marine resources and its environment.

This is an act to make provision for the promotion and regulation of fishing in the fishery waters of Dominica and for matters incidental thereto and connected therewith.

Mission Statement

To create an enabling environment for employment, enhance food security, reduce poverty and to contribute to economic diversification in Dominica.

Vision Statement

To be recognized as an efficiently managed government agency by fishermen, related institutions and the public at large, delivering high quality support, research, development and regulatory services to the fisheries sector.

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MODULE 1

Overview of the Fisheries Industry

State of the Local Fisheries Industry

By Derrick Theophille

The Dominican fisheries industry comprises of small, open vessels operating on an artisanal basis within about 25% of its Exclusive Economic Zone (EEZ). Most persons work on a part-time basis, with peak activity occurring during the pelagic seasons. The industry is one which caters mainly to supplying fresh, unprocessed fish to the local population, starting at the port at which the fish is landed and usually culminating at the side streets in and around the capital of Roseau.

Aquaculture is practiced by few persons scattered around the island. Currently, aquaculture is for the most part practiced by persons who have established facilities over the course of many years. There are few new entrants. Production from fish farms are not very significant and are usually consumed by the farmers themselves and the local supermarkets and restaurants. One major fish farming operation at Portsmouth, though, has had successes in exports to neighboring islands.

Fishers and Other Industry Roles

The typical fisher can be described as an unmarried, 50-year-old male with a primary school level education. Over 66% of fishers are reported as being above the age of 40. The fishing population is shown to be aging in recent years as there have not been too many new young entrants to the industry.

The local fleet is manned by some 1500 fishers, many of whom are undocumented or unregistered. The majority of these persons fish only on a part-time basis. Many fishers hold a second job which takes priority over fishing. In fact, as a result of this lack of man power, the fishing effort data points out that a typical boat operates on average about 3.5 days each week.

Fishers make up at least 85% of all persons who work in the industry. Almost 50% of these fishers attest to be boat owners as well, making for a fleet that has multiple owners with sometimes complex ownership arrangements. With regard to crew, only about one quarter of the boats are shown to operate with only one person on board; about 50% of the fleet is manned by a two-man crew. The other boats can be manned by crews of four or more persons based on the boat size.

According to the 2008 Fishery Census, about 85% of all persons who operate in the industry are fishers; they catch the fish. Other roles performed by persons in the industry include boat owner, boat builder/repairer, outboard engine mechanic, gear builder/repairer, fish vendor and equipment supplier. Fishers tend to perform multiple roles. About 92% of all persons who sell fresh fish are also fishers. This means that for many fishers, the job extends beyond simply catching the fish. It is common to see fishers vending the day's catch from the back of rented pick-up trucks into the

night, blowing the conch shell to alert prospective buyers.

Over 2000 additional persons depend on the fishers and others operating in the industry. These persons are usually spouses, children or other close family members.

Fishing Operations and Fleet

Hook and line type gear is the most common utilized locally. About 69% of all gear recorded during the 2008 census were of this type. This is not surprising as this is the gear that is used to target pelagics, which are the more popular species caught. The local industry hinges on the pelagic fishery, with yellowfin tuna (*Thunnus albacores*) and the common dolphin fish (*Coryphaena hippurus*) being the top species caught.

The pot fishery is the second largest. Just over 23% of all gear documented are of the fish pot class. The net fishery (just 7% of gear reported) is in recession at the moment, affected by numerous environmental and anthropogenic factors impacting the viability of this traditional coastal fishing practice.

Fishing is done using one of the three main types of fishing vessels found on the island; canoes, keel or FRP. As previously mentioned, these boats are open, having no decks or shelter, and small, usually less than 40 feet in length. Such boats are powered by outboard motors attached to the stern. The outboards can be less than 10 horse power to over 200 horse power, but are usually within the 10-49 horse power (65% of all reported outboard motors) range.

State of the World Fisheries

Adapted from the FAO State of World Fisheries and Aquaculture (SOFIA)

The State of World Fisheries and Aquaculture (SOFIA) is the flagship publication of the FAO Fisheries and Aquaculture Department. This premier advocacy document is published every two years to provide policy-makers, civil society and those whose livelihoods depend on the sector a comprehensive, objective and global view of capture fisheries and aquaculture, including associated policy issues.

The latest installment of the Food and Agriculture Organization (FAO) publication, "State of the World Fisheries and Aquaculture 2010" or SOFIA 2010, was released at the end of 2010, covering topics such as climate change, Illegal Unregulated and Unreported (IUU) fisheries and also certification schemes in international fish trade.

This publication is released every two years and details statistics and also discussions on contemporary topical issues in the sectors of fisheries and aquaculture worldwide.

Production and Consumption

Worldwide, aquaculture seems to be growing at a rate that will soon place it as the primary source of fish consumed by the earth's population. Capture fisheries on the other hand, has shown a decline over the years. According to the FAO, capture fisheries and aquaculture has supplied about 110 million tons of fish as food in 2006. The average amount of fish consumed per person (per capita consumption) in that same year was at 16.7 kg or about 36 lbs, one of the highest on record. Aquaculture contributed about 47% of that.

About 25% of all fish produced goes towards non-food uses. This is because in many countries the production of fish meal and other products is significant.

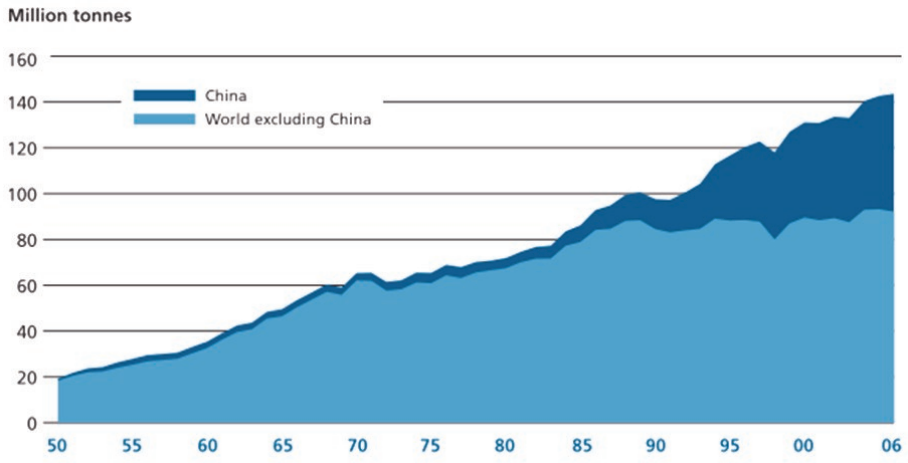
Fish production is increasing steadily worldwide. However, China seems to be the single greatest producer of fish. In 2006 China produced about 51.5 million tons of fish, providing 29.4 kg of food per capita. There are concerns however, that the production figures for China may be too high. Because of these concerns, production figures and other statistics for China, such statistics about the country is usually separated from those of the rest of the world.

Figure 1: World fisheries and aquaculture production and utilization (source FAO SOFIA)

	2002	2003	2004	2005	2006
Production *(million tons)*					
Total Aquaculture	40.4	42.7	45.9	48.5	51.7
Total Capture Fisheries	93.2	90.5	94.6	94.2	92.0
Total World Fisheries	133.6	133.2	140.5	142.7	143.6
Utilization					
Human consumption *(million tons)*	100.7	103.4	104.5	107.1	110.4
Non-food uses *(million tons)*	32.9	29.8	36.0	35.6	33.3
Human Population *(billions)*	6.3	6.4	6.4	6.5	6.6
Per Capita Food Fish Supply *(kg)*	16.0	16.3	16.2	16.4	16.7

World fisheries increased steadily until the late 1980s, and seem to have leveled off or stabilized since. China on the other hand seems to be still steadily increasing production. It is of note however, that the Pacific and Indian Ocean region seem to be increasing their fish production levels,

Figure 2: World capture and aquaculture production (source FAO SOFIA)



while the Western and Central Atlantic (our region) areas seem to be decreasing in fish production. Overall, the 2006 figures for global capture fisheries produced about 92 million tons, with an estimated value of US$ 91.2 billion. The top producers were China, Peru and the United States of America.

Livelihoods

Based on 2006 figures, it is estimated that 43.5 million people worldwide participate either part-time or full-time in the primary production of fish (capture fisheries and aquaculture). Some 4 million more work within the industry on an occasional basis (2.5 million in India). There was a 12% reduction in the number of persons operating in capture fisheries for the period 2001-2006. Most fishers are small scale and artisanal, much like here in Dominica. More persons are heading into aquaculture, with about 94% of all fish farmers (9 million people) coming from Asia.

With regard to the secondary sector (fish processing, marketing and other services), it is estimated that there are about four persons for every one person operating in the primary sector. If dependants (persons relying on those who work in the primary and secondary sector) are considered, it is estimated that there may be about 520 million total people working and dependent on the fisheries sector. That is nearly 8% of the world's population.

Fleets

Asia alone accounts for about 70% of all powered vessels, of which there are about 2.1 million (2006 figures). Most powered vessels used for fishing are less than 12 meters or40 feet long. This is particularly the case in Africa, Asia and the Near East. Vessels built to replace scrapped ones are usually smaller in size. Much of the world is moving towards smaller fishing vessels, although Europe and Americas are still known for their larger, industrialized fleets.

Marine Fishery Resources

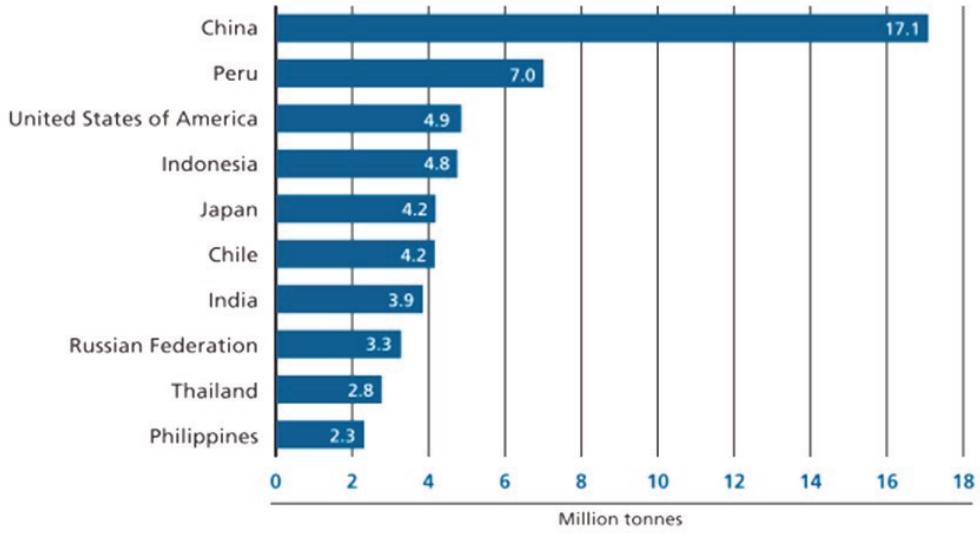
An overall review of the state of marine fishery resources confirms that the proportions of overexploited, depleted and recovering stocks have remained relatively stable in the last 10–15 years after the noticeable increasing trends observed in the 1970s and 1980s with the expansion of fishing effort.

In 2007, about 28 percent of stocks were overexploited (19 percent), depleted (8 percent) or recovering from depletion (1 percent) and thus yielding less than their maximum potential owing to excess fishing pressure. A further 52 percent of stocks were fully exploited and,

therefore, producing catches that were at or close to their maximum sustainable limits with no room for further expansion. Only about 20 percent of stocks were moderately exploited or underexploited with perhaps a possibility of producing more.

The areas showing the highest proportions of fully-exploited stocks are the Northeast Atlantic, the Western Indian Ocean and the Northwest Pacific. Overall, 80 percent of the world fish stocks for which assessment information is available are reported as fully exploited or overexploited and, thus, requiring effective and precautionary management. As stated before in The State of World Fisheries and Aquaculture, the maximum wild capture fisheries potential from the world's oceans has probably been reached, and a more closely controlled approach to fisheries management is required, particularly for some highly migratory, straddling and other fishery resources that are exploited solely or partially in the high seas.

Figure 3: Marine and inland capture fisheries: top ten producer countries in 2006



MODULE 2

The Characteristics of Fish

Fish Classification and Identification

Adapted from "Notes on Fish Identification", compiled by Suzette Soomai, Fisheries Division, Trinidad

A fish is a vertebrate (which means they are animals with backbones) with gills, usually covered with scales that live in the water. Some fish are capable of surviving out of the water for short periods, for example the flying fish is known for its ability to jump out of the sea and glide through the air before diving back into the sea. Fish can live in either fresh water, such as rivers or lakes, or salt water like the sea. Dominican Regulations define fish as anything living under the water. This can include living animals and plants as well as dead stones, shells or corals.

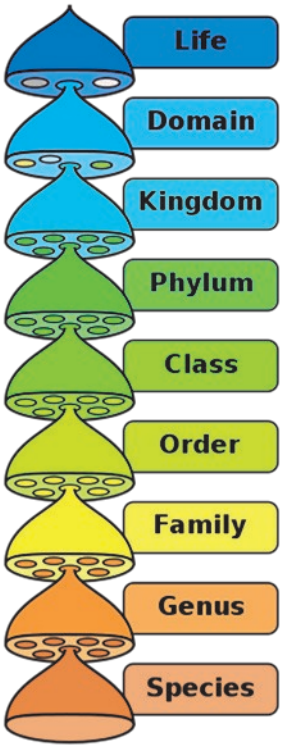
Classification and Taxonomy

Classification (as in biological classification) is the arrangement of organisms into structured groups to determine natural relationships between those organisms.

Natural classification is the usual form of classification used. This is based on the overall resemblances of creatures. The more closely related by descent (evolutionary relationships) organisms are the more features they have in common. According to the diagram, species belong to a larger group, called a genus. A genus fits into a family, which in turn fits into an order. Each sub group fits into a bigger group, with the highest rank or group being life itself. This means that all life can be categorized.

But why is all of this categorization important? The use of classification is for the purpose of facilitating the study of life, the similarities between species or the shared physical characteristics. Scientists use natural classification and similar tools as a means of understanding where various species of life came from.

Figure 4: How living things are classified



Taxonomy is the practice and science of classification. Basically it explains how classification is done. This module will touch on classical taxonomy, which is concerned with description, naming and classification based on morphological (relating to the form or structure, including outward appearance like colour and shape and internal parts like bones and organs) characteristics and sometimes biological data.

After animals are sorted and grouped they now need to be named, this is where nomenclature comes in. Nomenclature is the method by which labels or names are assigned to organisms so that biologists may communicate with each other, no matter what language they speak or where they come from. The name of a particular animal is written using two parts of the classification groupings: the genus (which is

written first) and the species. This is what is called the scientific name. For the example of the yellowfin tuna (common name), the scientific name would be: Thunnus (genus) alalunga (species). Scientific names are typically written in italics, as in Thunnus alalunga or underlined, as in Thunnus alalunga. It may also be written entirely in uppercase: THUNNUS ALALUNGA.

Identification of Fish

Fish come in many shapes, sizes and colours. Many look very similar, so similar that some species are often mistaken for others. Another concern is that the same fish may be called by one name in one village and by another name in a neighboring village. This can be very troublesome for scientists and resource managers who keep records of fish stocks (the amount of fish estimated to be available in an area of the sea) and attempt to manage the sustainable use of those stocks. Hence, it is important that fish be properly identified.

The following basic steps can be used to identify fish:

- Obtain background information on the species that would indicate the natural habitat and behavior of the fish. You should ask the following: what gear caught the species; where the fish was caught and at what depth was it caught.
- Examine the fish specimen closely and observe the general body shape, colouration, presence of any special marks, lines or spots.
- Decide whether it is a bony or cartilaginous fish.
- Identify the family to which the fish belongs by comparing it against drawings or photos found in a fish identification source (book or website). Select the picture that closest resembles your specimen. You may have to do this by the process of elimination; simply observe whether the feature listed for a particular drawing or photo is present on the fish you are trying to identify.
- When you have identified the family of your fish, it is now time to look even more closely at the body features to distinguish your fish from the others of the family. Species within a family group tend to have very similar features, perhaps differing in very subtle ways.
- When you are convinced that you are looking at a specimen of the same species described in the identification source as your fish, only then should you record the name.
- You should memorize the characteristics of the species so that you will be able to identify it on another occasion.

How to deal with problematic identification

There will be instances when you will be unable to identify a species whilst in the field due to unavailability of an identification source, time constraints or you require further assistance. In such cases you should take a sample of the fish and preserve it in the best way available at the moment and if possible take a colour photograph of it while it is still fresh in the field (fish tend to lose colour as they decompose after death). If you are unable to do this then make a

sketch or drawing of the fish and record the general description and body measurements and the local name used by fishermen.

Miss-identification of fish

Errors in fish identification or miss-identification of fish can lead to erroneous data collection. Common causes and types of miss-identification of fish are:

- Physical similarity to other species: Fish can be very close in physical appearance (for example sharks, kingfish and wahoo) and this can cause some confusion especially if you are inexperienced at biological data collection.
- Similar colouration: Using fish colour alone can lead to confusion as many fish carry similar colours and sometimes similar colour patterns as well.
- Similar distribution: Where species live in the same area or occupy the same ecological niche, they may even school together or form part of the same catch by a particular fishing method.
- Local name problem: The same fish may have two different local names or two different fish may have the same local name depending on the landing site, causing confusion in identification.

Figure 5: Identifiable features of a shark

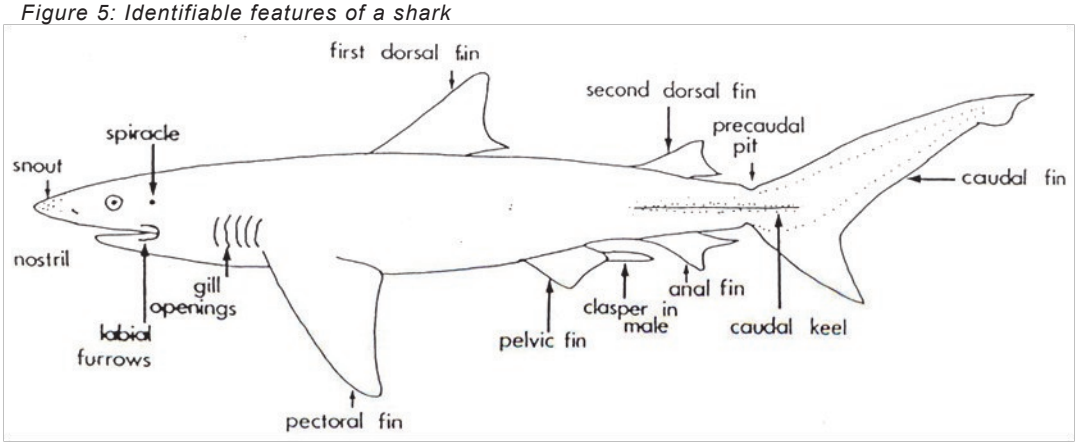
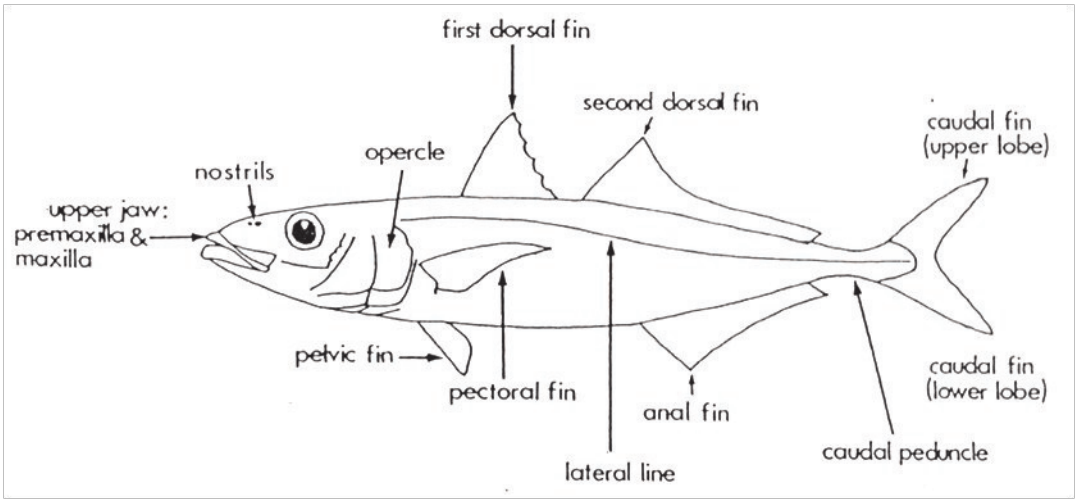


Figure 6: Identifiable features of a typical bony fish



Fish Behavior

By Norman J. Norris

Almost half of all species of animals with backbones (vertebrates) are fish. There are over 21,000 different known species of fish distributed in environments from higher mountain pools to the deepest parts of the ocean, and from the warm waters of coral reefs to the cold waters of Antarctica. Fish have two (2) sets of paired fins, the pectoral and pelvic fins, which are believed to be the evolutionary precursors of the four (4) limbs of terrestrial vertebrates. Single fins include the dorsal (back) fin, anal fin and the caudal (tail) fin. The shape and position of these fins, as well as the body, vary between species according to their habitats.

Much as humans depend on limbs to move, fish depend on fins to swim. Fish have a series of fins, each of which has a specific function in the movement of the fish. There is the dorsal fin on top of the back, the caudal (tail) fin, the anal fin on the underside towards the tail, a pair of pectoral fins on the sides of the fish just behind the gills, and the pelvic fish fin located in front of the anal fin on the belly of the fish. The body of a fish is streamlined. The snout is pointed in the front to penetrate through water and it has a broad tail that propels it through. The tail or caudal fin provides the forward thrust and is the main fin for swimming.

Fish also floats in water by use of a swim bladder. A swim bladder is an air-filled sack located near the stomach. Gas is released into the air bladder from the blood stream or through the fish's mouth or anus. The fish can float motionless without using extra energy. Sharks and tunas do not have air bladder and therefore must swim continuously. The internal organs of a fish include an S-shaped stomach leading to an intestine, which is longer in herbivores than in carnivores.

Where They Live

Fish are divided into two (2) major groups based on where they live in the ocean.

Pelagic Fish

Fish that live in the water column or at the surface. They depend on the element of surprise and speed to catch their prey and to avoid their own predators. They are all powerful swimmers and tend to be found in sometimes large schools. They are also migratory and tend to travel long distances to find food or to reproduce. Water is eight hundred (800) times heavier than air and any part of the fish's body, which creates friction, or turbulence causes a large amount of drag. Fast fish have bodies, which are fusiform, or spindle-shaped, as it is this shape, which offers the least resistance when moving through the water.

Demersal Fish

Fish that live on or near the sea floor. They may be solitary or schooling in nature and are not powerful swimmers. Demersal fish have developed a much greater variety of shapes. Some have large filmy pectoral fins to maneuver

around coral reefs and into caves, while others are adapted for burrowing into the substratum. Some bottom living fish have re-evolved a hard covering for protection, while others have developed poisonous spines. Demersal fish use colour to camouflage themselves against a red background, or coral reef, lobsters, snappers crabs are camouflaged by their environment.

Sunlight penetrates seawater to a maximum depth of 300ft. Below this there is no light. It is cold and frigid. As such, fish and other animal life are specialized to live in that area. These fish only know two colours, black and white. They have adjusted/adapted to that environment and can function.

Feeding Habits

Fish have adapted to many different forms of feeding, including sifting plankton from the water, scraping algae from rocks, eating coral and catching a wide range of mollusks, crustaceans and other fish. The mouth of a fish may be turned either upwards or downwards, or may be terminal, depending on whether the fish is a surface feeding, bottom-feeding or mid-water feeding species. The type of teeth and the spacing of gill rakers are related to the type of food taken. The gill rakers, comb-like structures attached to the inside curve of the gill arches, sift particles of food from the water, which enters the mouth and flows out through the gill slits.

Most fish feed by opening their mouth and biting off food or chewing it. Fish have teeth that line the edges of their mouth. Some have larger teeth than others do. Fish also feed by suction, which means they suck in water containing their prey into their mouth. Some fish eat plants and are called herbivores; others eat animals and are carnivores. Omnivores eat both plants and animals.

Very small plants and animals called plankton are found in the marine environment. These form the basis of all food chains on which all marine life depends. Plankton is made up of plants called phytoplankton and animals called zooplankton.

Senses

The development of senses in fish depends on their habitat. The eyes of many predatory fish, which live in clear water, are often large and presumably, sight in these species plays an important part in locating prey. The sense of touch is particularly well developed in some species with sense organs distributed over the entire body, and in the feelers or barbell of species such as catfish or goatfish.

Fish have senses like us humans. They can see, smell, taste, hear and feel. Humans cannot smell the taste and taste the smell. Because taste and smell is in the water fish can do them. In fish the barbs, lips and fins have taste buds. Fish also have two (2) nostrils, one on each side of the head.

How Fish Breathe

Most fish breathe through their gills. Gills are thin sheets located in the gill cavity. Water enters through the mouth, the gills extract oxygen from the water, which then passes through the gill membrane into the blood stream and carbon dioxide exits the membrane into the wa-

ter. A hard flap called the operculum protects the gill cavity.

Fish Reproduction

Fish reproduction occurs through fertilization of the eggs by the sperm. There are however, various methods of fertilization. In most species the female releases her eggs in the water while the male fertilize the eggs by releasing sperm alongside the female as she releases her eggs.

Some fish retain the eggs in their bodies and accept sperms from the males e.g. shark. The young ones are hatched within the body of the female and released in the water. Fish eggs can take from one day to several months to hatch depending on the environment.

Fisheries and Fishing

There are three (3) types of Fisheries:

- Coastal Fisheries (inside 12 miles)
- Offshore Fisheries (outside 12 miles - 200 miles)
- High Seas Fisheries (outside 200 miles EEZ and in international waters)

There are four (4) types of fishing:

- Surface fishing (less than 40 meters deep)
- Midwater fishing (50 m - 300m /400 m)
- Deep-water fishing (over 400 meters)
- Bottom or Benthic fishing (on or just under the bottom or sea floor)

MODULE 3

Fishing Technology

Classification of Fishing Gear and Methods

By Norman J. Norris

Methods to catch fish and other aquatic resources, with or without a gear, have always been practiced. Although the fundamental principles, i.e. filtering the water, luring and outwitting the prey and hunting, are the basis for most of the fishing gears and methods used even today, gears and methods have changed significantly over time and their capture efficiency is obviously hardly comparable to that of prehistoric times.

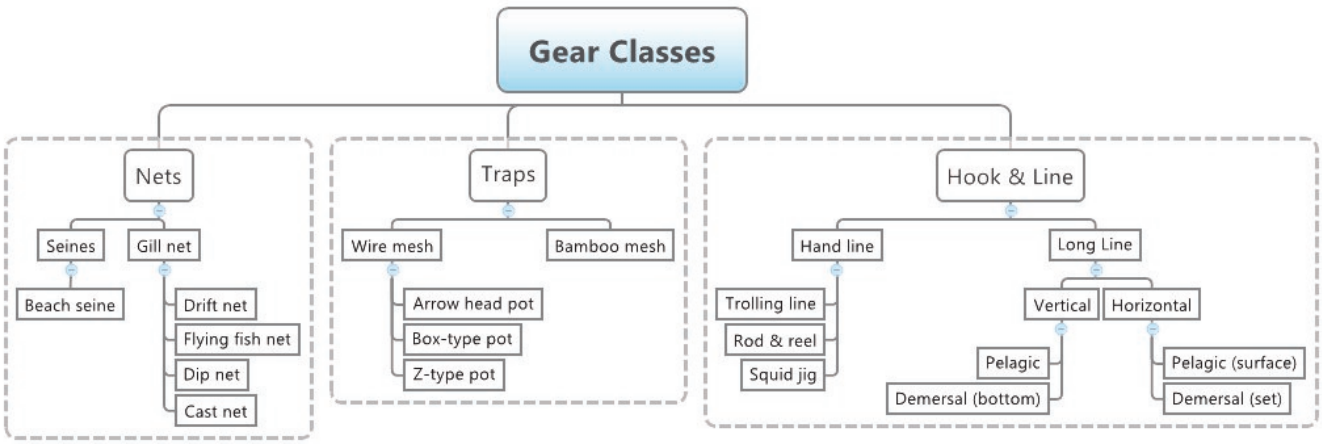
A fishing gear is the tool with which aquatic resources are captured, whereas the fishing method is how the gear is used. Gear also includes harvesting organisms when no particular gear (tool) is involved. As well, the same fishing gear can be used in different ways.

A common way to classify fishing gears and methods is based on the principles of how the fish or other prey is captured and, to a lesser extent, on the gear construction.

A classification of fishing methods will vary according to the purpose for which the classification is needed. For example, they may be classified according to their effectiveness for catching a particular species (e.g. Tuna long line, shrimp trawl, flying fish net and squid jigger). They may also be classified according to their use on certain types of fishing grounds (e.g. pelagic, demersal, benthic) or level of sophistication or popularity. However, fishing gears are generally classified according to the principle of how the fish are caught and the level of classification may be simple or complex. For example, a basic form of classification is to define fishing gears as either passive or active.

Passive fishing gears may be defined as fishing gears in which fish are captured directly as a result if actively entering the gear in search of bait or shelter or were unaware of the presence of the gear.

Figure 7: Classes of fishing gear



Active or mobile fishing gears may be defined as fishing gears which are towed for the purpose of intercepting individual fish or fish schools over a large area.

Some examples of passive gears would include:

- Nets: Gill nets
- Trammel nets
- Fish pots and traps
- Hook and line: Hand lining
- Vertical long line
- Bottom long line
- Surface long line

Examples of active or mobile gear would include:

- Trolling
- Seines or surrounding nets
- Trawls and dredges

Operation of Fishing Gears

Surrounding Nets

The manner of capture is to surround the fish from both sides as well as from underneath, thus enabling harvesting from deep water. This gear is particularly important for capturing schooling fish species such as tuna, Mackerel, jacks. This net developed into the ring net in which closing the net is achieved by shortening the wire which is threaded through a series of rings connected to the footrope. More recently these designs have been replaced by the purse seine.

Seine nets

Generally, these nets have very long wings which are connected to towing warps which have a dual function of both closing the wings of the net and herding fish towards the netting part of the seine. In the simplest types of design, the seine does not have a specific bag for collecting fish like the cod end of an otter trawl while in more elaborate designs; a bag net may be added either at one wing end or in the center of two wing ends. A seine operated from the shore is called a beach seine. Others operate from boats. Because of the herding action of the ropes, seine nets are particularly effective for catching fish on or very close to the sea bed such as flatfish, skates and rays. However, they are also effective for many other types of migrating and schooling fish.

Trawls

Trawls are conical shaped bag nets that are towed through the water and catch fish and other animals in the path of the net. They may be towed on the sea bed or in midwater by one or two vessels. Typically, one net is used during a fishing operation; however, two or more nets may be towed at one time in some specialized fisheries such as some types of shrimp trawling. Trawling in mid water is more complex than bottom trawling because of the requirements to maneuver the trawl vertically and horizontally to intercept schools of fish.

Figure 8: Nets at Colihaut

Dredges

Dredges are primarily used to take sedentary animals such as clams, oysters and mussels living on or are fully or partially buried in the sea bed.

Lift Lets

This type of net is set in the water horizontally and then hauled after a fish school has entered it. They are often used with light to attract and concentrate schools of fish to the net and may vary in size and complexity depending upon target species and quantity.

Falling Gear

These fishing gears work in almost the complete opposite way of the lift nets. Falling gear may be fixed to a frame as in the case of cover pots and nets or they may have no fixed frame as in the case of cast nets. Hand and boat cast nets are the most popular category used in marine fisheries.

Gillnets and Entangling Nets

Although many of the materials used in gill and entangling nets are very similar, the actual method of capture is quite different for these two gear categories. In gillnets, fish are captured as a result of becoming “meshed” as they accidentally or purposefully swim through the mesh of a net. If the body girth is greater than the mesh opening, there is a high probability that the fish will become stuck or meshed. On the other hand, fish and other animals are held in entangling nets as a result of becoming tangled in the loose netting without actually becoming meshed. However, in both types of gear there is a possibility that capture can result from a combination of gilling and entangling.

Gillnets may be set at the surface, in midwater or on the seabed, while entangling nets are generally set on the seabed and are used for catching crustaceans such as shrimp, lobsters and crabs.

Traps

These are fishing gears in which the fish or animal enters voluntarily but is hampered from

Figure 9: Bamboo fish pots at Scott's Head

coming out. Usually, there are one or more chambers which are closed as the animal enters or which has a retarding device such as a funnel. They are used to take a wide variety of fish and shellfish including shrimp and lobsters, pelagic and demersal fish. Traps vary in size and complexity. They may baited to entice animals or fish to enter, or may be considered as a preferred habitat offering protection from predators or as a site for spawning.

Hooks and Lines

In this category of fishing gear fish are offered real or supposed bait in a manner that makes it difficult for the fish to let it go once the fish has taken the bait. Hooks may be set individually to take single fish or they may be set in large numbers strung out vertically or horizontally on the sea surface, midwater or across the seabed. Hooks can be tended by hand with or without the use of a pole or set to drift in the current or anchored on or off the seabed.

Figure 10: Vertical long line gear

The Vertical Long Line Fishery

By Norman J. Norris

What is Vertical Long Line?

Vertical long line fishery (locally called Ducine) is a method, which utilizes numerous fishing hooks suspended vertically in the water by floats. This type of fishery was designed for the purpose of raising the fishing efficiency of the hand line fishery.

Types of Vertical Long line

Vertical long line may be divided into three main types.

a) Vertical long line for pelagic fish: A multiple hook long line suspended by a float and allowed to drift with the current. In this case the hooks may be fixed at any depth.

b) Vertical long line for demersal fish: A multiple hook long line is suspended in the water by a float, but the anchor attached at the bottom fixes the position of the line.

c) Vertical long line for squid: A multiple hook long line suspended vertically in the water and moving up and down by hand.

In Dominica there are only two types, a) and b).

Common to all three methods is the need to know or understand the depth at which the targeted species are migrating, a survey of the area is necessary if general knowledge is not available. Length of mainline is adjusted according to the depth.

Composition of Vertical Long Line Gear

- Flag
- bamboo (pole)
- buoy
- main line
- flag pole weight
- branch line
- swivel
- hook
- anchor
- PVC pole

Figure 11: Multiple methods utilizing vertical long line technology

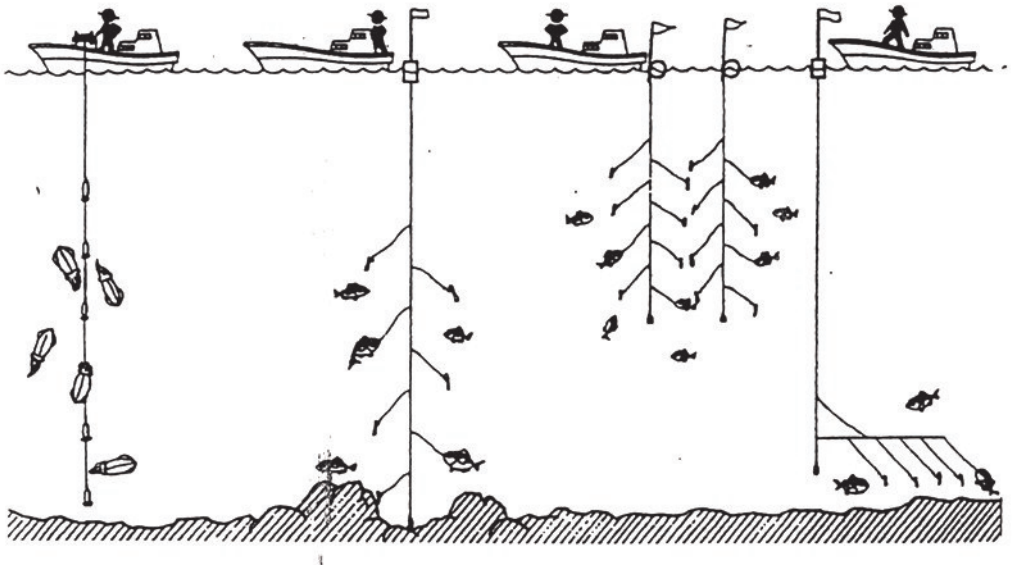
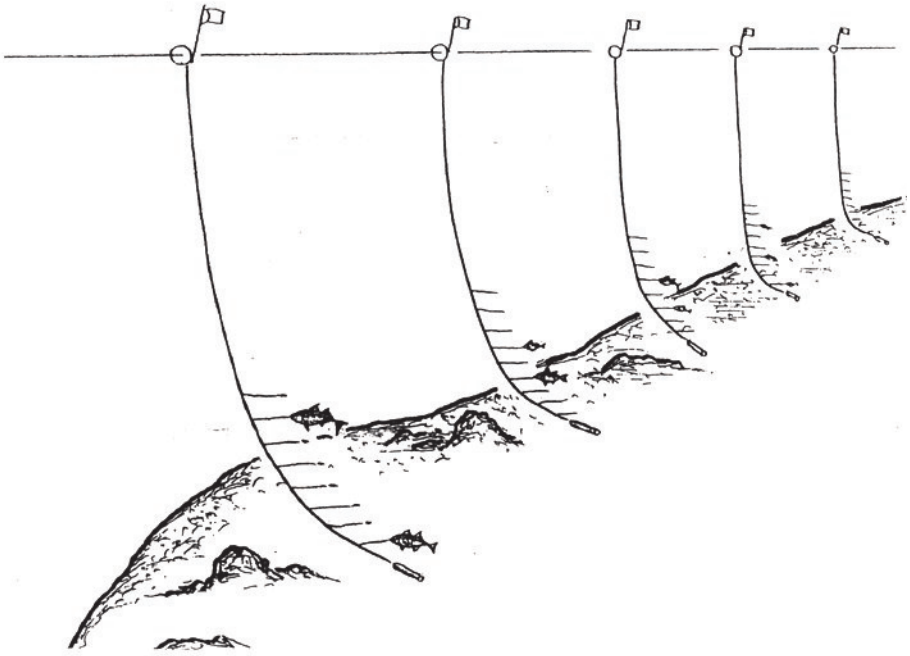


Figure 12: Utilizing vertical long lines at varying depths



Advantages and Disadvantages of Vertical Long Line Gear

Advantages

- It is operated with many lines and hooks
- It can be used in combination with other fishing methods. It is very popular to fish near fads or artificial reefs.
- Because of its small size and space, many hooks can be transported inside a basket or tray, and used in a small canoe or boat.
- No special machine or skill is needed to operate.
- Purchasing cost of gear is much cheaper compared to other fishing gears, it is also relatively easy to construct.
- This fishing gear is applicable for use in fishing areas that have steep rocks and coral reefs.

Disadvantages

- Fishing operation is limited to good weather conditions only.
- It takes much care and attention to prepare for the next fishing operation.
- If the buoy gets lost, the whole fishing line may also get lost.

Fishing Methods

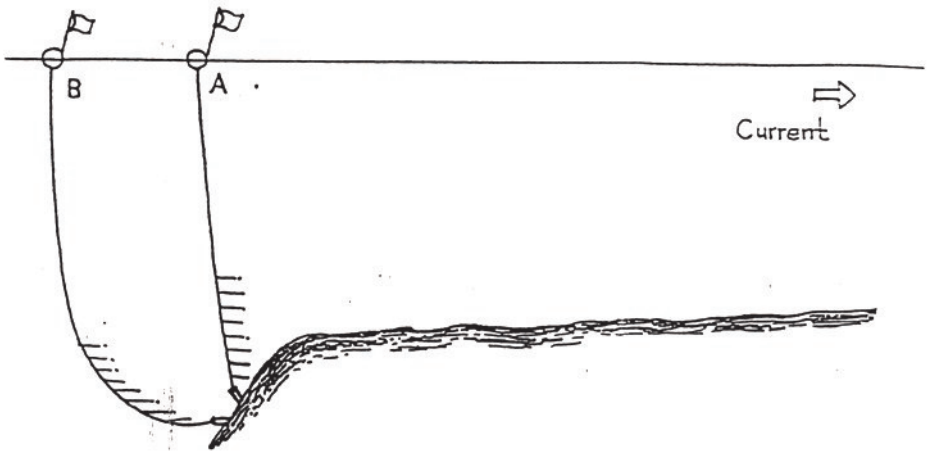
Attach the sinker to the end of the line. Bait the hook closest to the sinker and lay it on the side of the boat. Continue baiting each hook up the line, laying each one carefully on the side of the boat to prevent tangling.

When all the hooks are baited, drop the sinker into the water. The hooks will be pulled one after the other by the weight. Reel out the line until the sinker makes contact with the bottom. Tie the reel onto the bamboo marker attached to the buoy. Release the gear so that it may drift with the current.

For smaller fishing boats with not enough space on the sides, the hook can be baited separately and dropped in the water before baiting the next hook. Care and attention must be taken, as large fish may seize the bait already in the water and drag the line creating injury.

Always set the line with the current running away from it. The line should always be longer

Figure 13: Setting the gear with currents running towards the shore



than the water depth.

The vertical long line can be used with as little as five hooks or as many as twenty on the main line. For small fishing boats with one or two fishermen, five lines (or gears) are quite sufficient at one time. Once the fifth line has been set the boat can return to the first and begin to haul. If the boat has five or more persons, ten lines can be deployed. If a line comes up with several fish, the bait should be replaced and the line set again in that exact position.

With the pelagic vertical long line, fish such as dolphin, kingfish and tuna can be caught.

The demersal vertical long line can catch species like snapper and grouper.

Bait

The behavior of a fish towards bait is influenced by the bait: the presence, smell, type, size and feeding time. Some bait work for some species and not for others. Unless it's artificial never use the same bait more than once. It is important that good strong bait be used in order to provide a longer and more effective fishing time.

Bait size is to be the most important size selection factor, and bait type the most important factor for species selection

The catch rate is greatest when the gear is set just before the active feeding period.

Figure 14: Setting the gear with the current running away from the shore

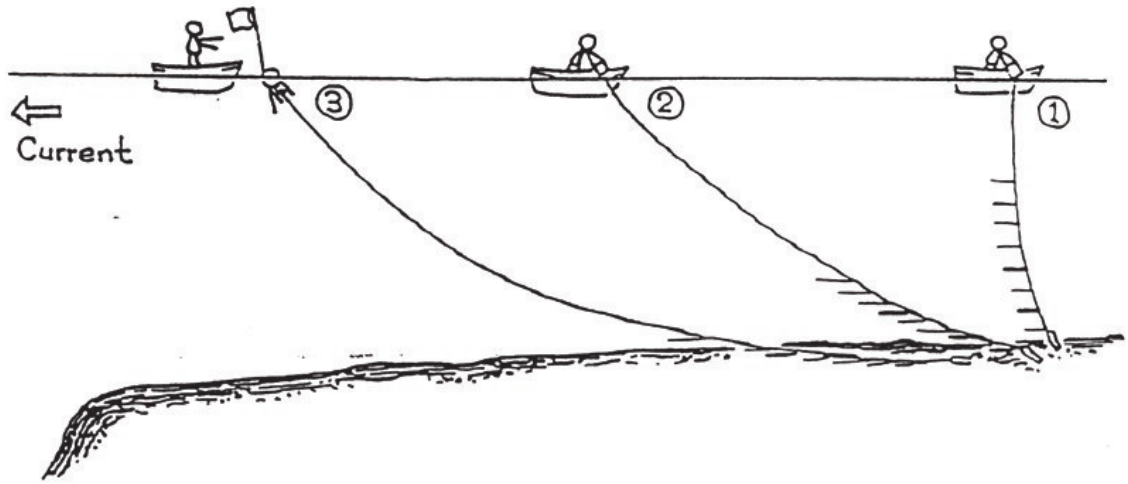
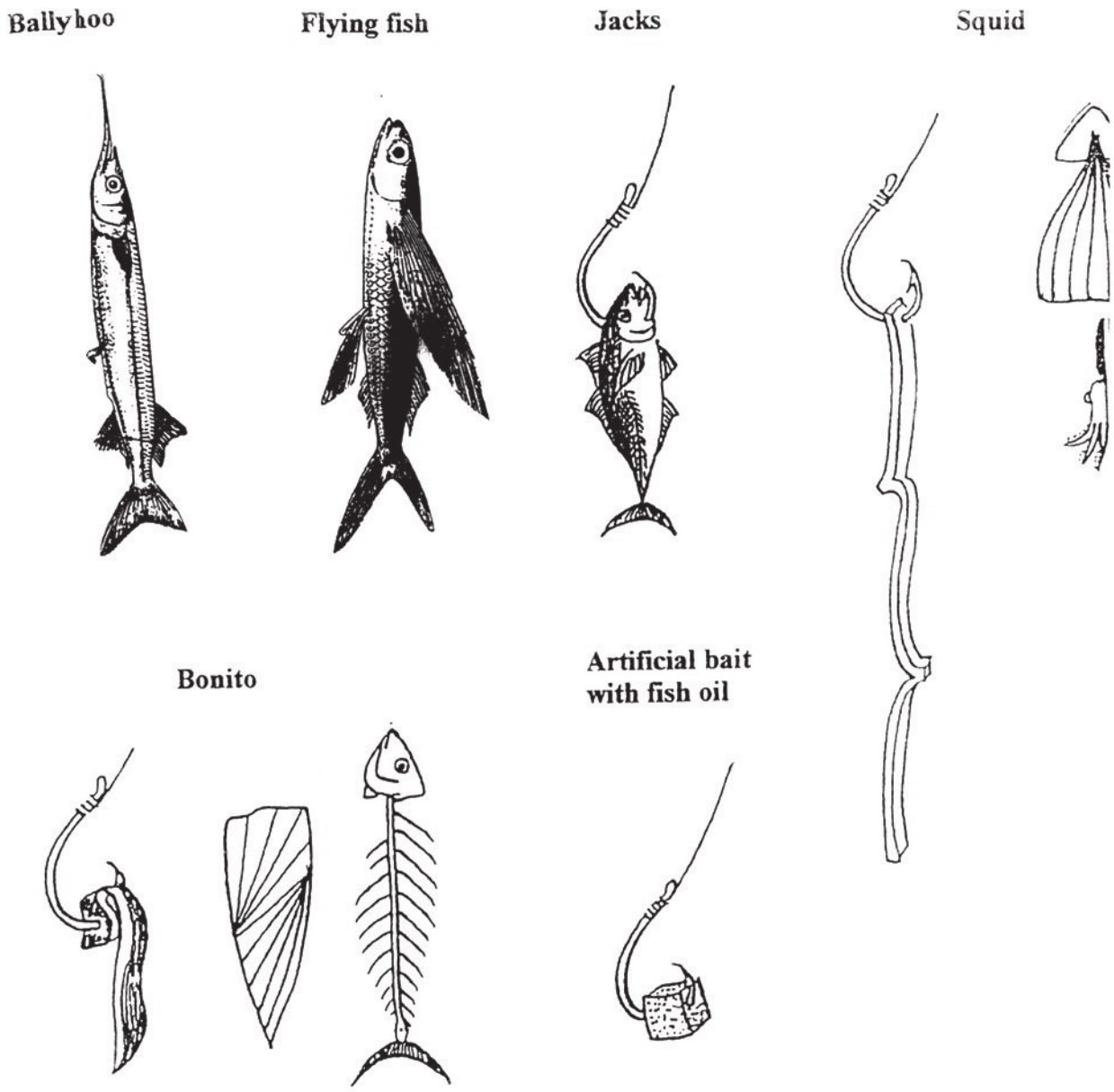


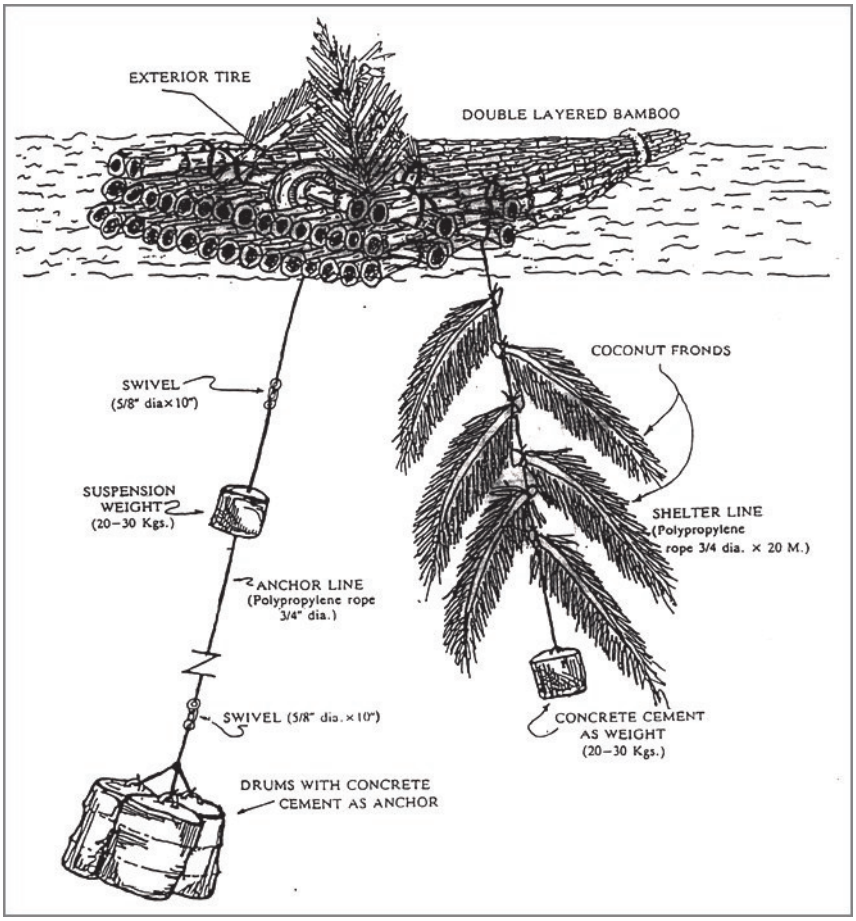
Figure 15: Bait used in the vertical long line fishery



Fish Aggregating Devices (FADs)

What is a FAD?

Figure 16: A calm water FAD



A FAD is any method, object or construction used for the purpose of facilitating the harvesting of fish by attracting and thus aggregating them.

From ancient times, it was known that fish gather around floating objects like branches, palm leaves, logs and shipwrecks. These traditional FADs have been used in many coastal areas, lagoons and bays, catching pelagic fish such as dolphin, bonito, tuna, kingfish, jacks, mackerel etc.

FADs can be classified as traditional and modern. Depending on the area of location these FADs can further be classified as:

- Bottom FADs or Artificial Reefs (AR)
- Mid-water FADs
- Surface or floating FADs

While some are made of simple, less expensive materials, others are complex, intensive construction and expensive. A FAD is an additional fishing gear to utilize fish behavior.

Objectives of FADs

The main objectives of establishing FADs are:

- To increase the catch rate with reduction in the cost of production.
- To reduce the time scouting for fish, therefore decreasing operational costs of fishing boat.
- To improve fishing efficiency as a result of increased time available for fishing.
- To facilitate catching due to concentration of fish around FADs.
- To catch fish from under exploited species, by gathering them.

Composition of FADs

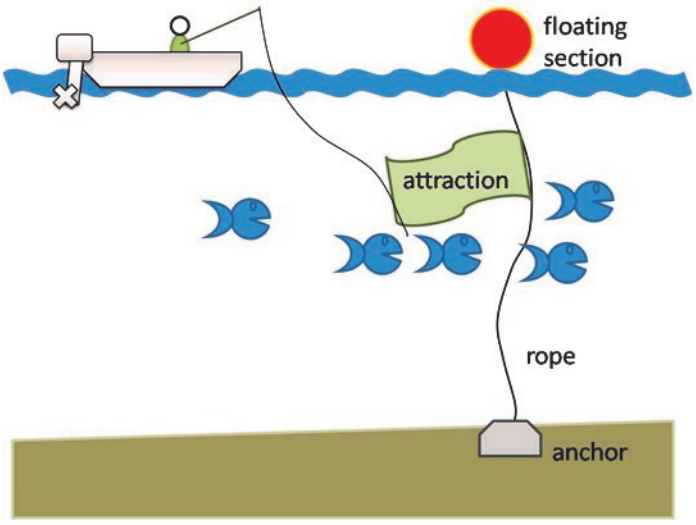
FADs consist of three sections, a floating section, anchoring section and attraction section.

- Floating section

- Marker
- Raft

- Anchoring section
  - Rope
  - Joint
  - Anchor
- Attraction section
  - Attachment (branches)

Figure 17: Parts of a FAD



Why Do Fish Gather Around FADs?

Fish once attached to a FAD gather near it at night and move independently in the daytime. Suggested explanation for this behavior is as follows:

Protection: Small fish gather to protect themselves by hiding among floating objects.

Food: Small fish gather in order to eat plankton attached to floating objects. Large fish gather to prey on the concentration of smaller fish.

Shade: Fish seek the shade under floating objects.

Smell: The smell from floating objects attract fish.

Spawn: Spawning fish gather to lay eggs on floating objects.

To eliminate parasites: Floating objects serve as cleaning stations where pelagic fish have parasites removed by other fish. Other fish species rub their bodies against objects to get rid of parasites.

Sounds: The floating objects produce sounds when moving in current, waves and swells. These sounds encourage fish to gather around the floating objects.

Fish become member of schools: Some fish gather around floating objects in order to form schools and consider floating objects as member of their school.

Categories of Fish Aggregation

Fish are grouped in three categories based on their reaction to the FAD and the length of time spent in the vicinity of the FAD:

Transient: Usually visible only for a short time as they pass by.

Visitor: Do not gather but appear to react to the presence of the FAD, staying for a while.

Resident: Gather off the FAD, staying within sight permanently and others staying out of sight for some time but eventually returning.

FAD Construction Materials

Materials used for FAD construction differ according to the type of FAD being made, the availability, locality and the cost of materials.

Items that should be considered include:

- Bamboo / Drums
- Coconut palms, nets, flag
- Tires, tubes,
- Nylon monofilament
- Shackles, swivels
- Cable wire
- Poly-ethylene (PE)/ Poly-propylene (PP) rope
- Tin can /chain
- Cement, tarish, chains, anchor

Ropes that are usually used should be three or eight strands and at least 18~20 mm polypropylene, because it has the necessary strength at the lowest cost. Its buoyancy is also important for the lower section of the anchor line, preventing the rope from chafing on corals or rocks.

Chains or tins filled with concrete are usually used for counter weight, preventing excess buoyancy so the main line would not float to the surface during low current. Swivels are very important for preventing the rope from twisting and breaking. Shackles are for connecting mooring lines, chains, anchors and buoys.

Figure 18: FAD anchors at Dublanc

Any heavy weight can be used as an anchor. Concrete filled drums are very common, cheap, and easy to make. Engine blocks or heavy iron can also be used.

The idea is to have a FAD with as little maintenance, long life, minimum corrosion and high water resistance at reasonable cost.

Site Selection For Setting FADs

Choosing an ideal area for setting a FAD is very important in terms of economy, safety of the gear, and ease of operation.

The most important factors determining site selection are as follows:

Migratory area / Fishing area: The area must be known to be frequented by migrating fishes. In areas where the upper current mixes with the bottom current has rich nutrition and becomes a good fishing ground.

Current: In areas with slow or moderate current are preferable. Strong currents result in higher rope tension and stronger pressure on the FAD anchor structure.

Bottom: The ideal bottom condition should be of a sandy or muddy type, or a gently sloping sea floor. Steep areas can result in loss of the entire gear if the anchor rolls or descends into deeper areas.

Depths: This will depend on the species targeted. For small coastal pelagics, shallow water. Deeper water is better for targeting bigger species.

Setting of FADs

Preliminary survey is necessary before setting the FAD. Fishing area, current, bottom type, height of waves is considered to determine the length of rope and the number of anchors. Setting is done during fine weather and calm sea. Observing the current and wind direction, the boat should be moving upstream and positioned at a suitable distance from the setting area. The marker and raft with appendages are dropped first from the upper stream of the setting area. While the anchor is slowly paid out, the boat maneuvers at slow speed and approaches the setting area with the current. Finally the anchor is dropped into the water.

Fishing Gears Benefiting from the Use of FADs

Fishing operation should be conducted according to the fish targeted and its behavior. A FAD is a subsidiary fishing gear to utilize this behavior, and should be used in conjunction with a variety of primary fishing gears.

- Trolling: Trolling for pelagic fish is well known. However, trolling in connection with FADs saves a great deal of time and fuel that is normally spent looking for fish.
- Hand line: Hand line fishing around FADs has been proven to be more productive than elsewhere. Fishing can be carried out from small boats or even sailing canoes.
- Nets: Fishing nets have very good potential around FADs. From flying fish to bigger species. This could cut down on searching time and increase the likelihood of improving the catch.

Advantages and Problems of FADs

Advantages:

- Simple structure, easy to construct with local materials
- Low cost
- Wide range of setting area (50~1500m)
- Possibility of setting using small fishing craft instead of large ones
- Easy to locate, so it reduces time spent searching for fish and fuel consumption
- Possibilities of prolonged fishing by transient stay of fish school around FAD
- Small boats can catch big expensive fish such as tunas, marlin and swordfish

Problems:

- The principal problem with FADs is that rafts can be washed away
- Current flow and wave action can damage, destroy and sink FADs
- Iron materials such as shackles or swivels can deteriorate and corroded by the salt water
- Short weight of anchors

To ensure longevity of FAD some problems can be avoided by doing a vigorous inspection before deploying.

Important Points for Success of FADs

- Publicity (information) activities
- Selection of appropriate type of FAD
- Construction of FAD
- Site selection
- Setting of FAD
- Management of FAD
- Fishing operation
- Clear understanding of the principles of operations of a FAD

The Fishing Fleet

By Derrick Theophille

There are at least 440 fishing boats in the industry. The boats are generally small, open vessels. About 57% of the boats are between 11 and 20 feet in length, and 33% ranging from 21 to 30 feet. The majority of the fleet (about 65%) consists of open wooden vessels called keel boats. Some of these boats are reinforced with fiber-glass on the outside or fitted with an FRP ice box or console. The wooden skeleton of the keel boat differentiates it from the pure FRP or pirogue-types, which make up only 11% of the vessels. Another 21% of the fleet is comprised of dug-out boats called canoes which are traditionally constructed of gommier wood by the local Carib Indians. Previously, all three types of boats have been used within the coastal, reef/demersal and offshore fisheries. However, as safety-at-sea becomes more of a concern, this has changed to some degree.

Figure 19: A typical canoe boat

Canoes

Canoes are found mainly on the west coast communities (in the calmer Caribbean Sea) and used to target coastal pelagics, reef/demersals and in some cases small migratory pelagics. Typically, the canoes are used un-powered, but in some cases a small outboard engine (sometimes 15HP or smaller) is utilized when the fish is farther away from the landing site or if the boat is manned by one fisher. Oars are the propulsion method of choice for such small boats. Most canoes measure no more than 20 ft in length. These boats utilize the majority of the net-type gear (such as, beach seines) for the harvesting of small coastal pelagics such as sardines, ballyhoo and jacks. Canoes tend to work within one mile from the shore, but in most cases operate less than a mile out as the west coast shelf is extremely narrow. Various fish pots (the main types being box-type and Z-type) are used for the capture of snappers, groupers and parrot fish among others. Some fishers also utilize hook and line gear from their canoes for targeting coastal, small migratory pelagic and reef/demersal species.

FRP/Pirogue

FRP/pirogues have grown in popularity as a fishing vessel by fishers over the years. These boats, though open and small, tend to be much more sturdy, stable (especially on the rough Atlantic waters) and spacious which allows for a safer working environment and greater storage when fishing. As mentioned previously, the majority of the pirogue fleet comprises French-made boats, however, there is a local boat builder capable of constructing FRP vessels as well, doing so for some

Figure 20: An FRP boat

of the local fishers. Recently, we have seen the introduction of Trinidad-made and Columbian-made pirogues, but fishers generally prefer the French pirogues, especially for fishing within the channels or further off shore. Pirogues tend to measure 20-25 feet in length, but there are sizes below 15 feet and above 30 feet. Unlike canoes, pirogues are almost always powered by outboard engines (25% of which are powered by 40HP outboards). The pirogue fleet is also a multi-fishery fleet. However, due to their sturdiness, the pirogues tend to be much better served in the open sea, travelling as far as 20 miles off shore in some cases to fish off of distant Fish Aggregating Devices (FADs) for migratory pelagics. Aside from pelagics, FRP boats are used for banking as well as fish pots, but in fewer cases, or when the pelagic season is over. In rare occasions FRP boats are used in near shore net operations as well.

Keel Boat

The keel boat is the most common type of boat to be found locally, with almost 300 boats island-wide. These are also small open vessels, with about 50% of keel boats being between 15 and 20 feet in length. These boats are popular perhaps because they can be constructed and repaired locally relatively cheaply and quickly and also because they fall between the canoe and FRP/pirogue with regard to stability and price. Whereas the canoe is very cheap but not very stable, the FRP is very stable but can be very expensive. The keel offers an appealing compromise with the added benefit of tailoring the boat to the fishers' liking. Keels are capable of meeting the distance covered at sea by FRPs, fishing off the same FADs and banks. Almost 50% of keel boats use engines between 30 and 48HP. They are used to target the same fish species as well and can be used in multiple fishery scenarios although, similarly to the FRP, they tend to be used more for off-shore operations. Like the FRP, these boats usually carry a pair of oars as backup for the outboard engine.

Figure 21: A keel boat at Fond St. Jean

Figure 22: Table comparing local fishing boats

	Canoe	Keel	FRP/Pirogue
Length range	Typically under 20 ft in length. Usually 10 to 20 ft in length	Usually 15-25 ft in length	Usually 20-25 ft in length
Construction/ Description	Made of dug-out gommier trunk	Wooden planked open vessel on a skeleton frame with a keel	Fully fiber glassed open vessel
Propulsion methods	Mostly un-powered. Oars are used for propulsion. In cases where outboard engines are used, they are 15 HP or smaller	Powered by outboard engines (mainly 30-85 HP). Some boats carry two outboards. Oars are carried as a backup in some cases	Powered by outboard engines (mainly 30-85 HP). Some boats carry two outboards. Oars are carried as a backup in some cases. Some of the larger FRP vessels can carry dual 150 HP four stroke outboards
Gear used	Mainly uses net-type gear such as beach seines. Fish pots are also used	Hook and line gear is most popular, although the boats are known to carry fish pots as well	Hook and line, fish pots and even nets can be used off these boats. However, hook and line gear is most popular, especially when used for handling operations around FADs
Species fished	Small coastal pelagic such as ballyhoo, jacks and sardines. Reef fish such as parrot fish, groupers and snappers	Migratory pelagics such as tunas, dolphin fish, marlin, flying fish and wahoo among others. Reef species include snappers and groupers	Migratory pelagics such as tunas, dolphin fish, marlin, flying fish and wahoo among others. Reef species include snappers and groupers
Fishing distance	Canoes usually operate within one mile from shore	Can travel to over 20 miles off-shore, but usually operate within 10 miles	Can travel to over 20 miles off-shore, but usually operates within 10 miles

MODULE 4

Fishing as a Business

Small Business Management for Fisher Folk

By Reginald O. Severin

Rapidly changing global events continually remind us of the desires of people from all corners of the world for freedom. Economic freedom and the opportunity to better one's life through creativity, innovation, and hard work is the core of these changes. The economic situation in Dominica has dictated our times the "age of small business entrepreneurship."

Many fishers in Dominica are hoping to reach their personal goals through the creation and management of their own business. Having one's own small business is an expression of the freedom to become what we believe we are capable of becoming.

Our economy is built on risk-taking entrepreneurs, fisher folks as yourself. Your fish and fish products support our daily existence. Particularly because of the changing economic climate and drivers impacting on small businesses, including fishing, there is a clear need for owners and managers to take a more holistic and business-driven look at their fishing enterprises.

Fishers must ensure that they maximize all their skills and assets to meet their business goals and deliver on the demands of society for wholesome products and services.

However, the spirit and motivation that drives entrepreneurs will not guarantee success in today's competitive environment. Entrepreneurs must be equipped with the knowledge and skills to operate a small business successfully. This will involve a considerable culture change for a great many fisher folks, which will take time to achieve.

The Fishing Industry

The Fisheries sub-sector accounts for 14% (3,500 persons) of the national workforce comprising of fisheries administrators, fisher folks, fish vendors, boat and engine repair servicemen, net menders, fishing equipment sales persons, clerical, operational and managerial staff at the fisheries complex in Marigot and Roseau. The Fisheries Division administrates and manages the sub-sector under the guidance of the Fisheries Act (No. 11 of 1987). The division is lead by the Chief Fisheries Officer with a staff of approximately 22 individuals. Fish vending, boat and engine repair services and net and fish pots making and mending are found throughout the fish landing (berthing) areas; there are 33 designated fish landing sites in Dominica.

The fisheries sector is the highest growing sub-sector in agriculture recording an average annual growth of 1.39 % per annum while agriculture had an average annual decline of 1.71% for the period 2000 to 2005. The fisheries sector contributed US$16 million to national income in 2005 and represents a fastest growing

employer for displaced banana farmers in the agricultural sector workforce.

With the rapid decline in the major cash crop (bananas), many farmers began moving into the fishing sector. If properly managed, the returns from fishing can be considerable. The price of fish ranges from $5.00 - $7.00/lb, depending on the village where it is landed. Prices are of course lower in the more rural districts.

Beneficiaries from fishing range from the providers of bait to the vendors, the boat builders and repairers, the engine repairers and the net menders. The establishment of the Fisheries Complex in Roseau and Marigot has improved the quality and presentation of the fish catch, making it more appealing to the consumer. The use of ice and the cold storage facilities have contributed to providing a better product to consumers. Under-utilized species like ballyhoo and triggerfish (boose) are boned and filleted, respectively, and then sold to local supermarkets vacuum-packed.

Introduction to Fishing Enterprise Management, 2009

The Basic Fisherman Training Course (BFTC) is designed to include all critical areas necessary for the survival of the industry. It takes into consideration the multiple roles the fisher folks play as Captain, Mechanic, Boat Owners, and Managers. The demand for the course is drawn from the increasing number of banana farmers divesting their interest by investing in the fishing industry. These new entrants however are ill-equip and come with little prior experience.

In response the BFTC was organized by the Fisheries Division as a mandatory training program to guide participants into a mindset of viewing the investment as a business and fishing as a renewable resource as oppose to an extracting industry. The BFTC therefore seeks to introduce fishers and prospective new entrants to the industry about the basic requirements for assessing small business loans and managing their small business enterprises, train fishermen to better understand fish behavior and fishing gear construction, conduct various aspects of 'safety at sea' training and navigation, learn fish handling, processing and marketing and the development of fishing co-operatives, and become knowledgeable of the basic fisheries laws.

This introductory training course provides the tools that, with skilful application, will convert the novice fisher into an effective small business entrepreneur. The program will cover the following topics throughout the day:

Fundamentals of Fishing Enterprise Management

What is Management?

Training Program Schedule	
08:30 – 08:45	Introduction
08:45 – 10:15	Dominica's Fisheries Industry Goals of the Fishing Industry Economic Importance
10:15 – 11:00	Analysis of Fishing Business Understanding SWOT
11:00 – 11:15	***Morning Break***
11:15 – 12:00	Uncertainty and Risks
12:00 – 01:15	Fish Enterprise Management Strategic Planning
01:15 – 02:00	***Lunch Break***
02:00 – 03:30	Record Keeping
03:30 – 04:00	Writing a Business Proposal

The role of the fisher is twofold. He or she is at the same time fisher and manager. The first role of the fisher is to spend time at sea to ensure the best possible catch relative to the resources expended for the fishing trip. For the fisher, this includes the preparatory work such as procuring fuel, food, water, and bait, the tuning of the engine, ensuring that all fishing, navigational, and safety equipment are in order and going out with intent to fish either through ports raising, long and vertical line, nets. Time spent at sea can yield high dividends or it may result in zero or low catch.

The fisher will be engaged in not only harvesting activities; he/she must ensure that the catch is preserved and protected particularly though adequate quantities of ice or refrigeration space. The care of the catch and safe return on-shore are important fishing activities that influence the overall success of each fishing trip. Personal safety and care of the fishing equipment and vessel must be given equal attention as the physical activities involved in extraction or harvesting while at sea.

Another role of the fisher is as manager. Just like any business, fishing requires management. Where the skills of fishing are mostly physical, the skills of management involve activities of the mind backed up by the will. They involve primarily the making of decisions, or choices between alternatives.

Exercise 1 – Common Problems Facing Fishers

- The kind of decisions taken by fishers as managers can be summarized as:
- making choices of different fishing activities: diving, deep-sea fishing;
- how to best use the resources available to the fisher in pre-fishing and post harvesting operations;
- selecting the most appropriate technology to use; and
- deciding where and whom to sell their produce to and at what prices.

These are only some of the wide range of day to day choices that managers have to make. Common definitions of management include *"making decisions to increase profits"*, *"making the best of available resources"* and *"using, managing and allocating resources"*. There are many others. These decisions imply a number of factors:

- Firstly, the existence of a goal or goals;
- Secondly, that there are resources such as boat, labor and capital that can be used or allocated;
- Thirdly, that the resources to be used or allocated imply more than one possible use.
- Management is about doing something with the limited resources available to the fisher. Fishers need to know how to combine these resources optimally in order to attain a satisfactory outcome. Fishers require improved management skills to become more competitive as fishing becomes more market driven.

Fishers need to develop their managerial ability so that they are better equipped to take advantage of opportunities open to them, and to make their enterprises as productive as possible, with increasing profits from operations.

Exercise 2 – What is Management?

The fisher, however, is also a member of a family and local community. In effect decisions are made by the fisher family, since different operations are carried out by different members. But the ways in which tasks are shared vary from one culture to another.

There is a division of labor within the family between all of its members. While most of the decisions with respect to fishing are made by the individual fisher, decisions are made in the light of membership within the family. The fisher desires what is best for all members of his household and they have a direct influence on the decisions taken.

Nevertheless, the desire to secure a better living for the family is a compelling factor in many situations to improve the productivity of the business.

Successful management of the fishing enterprise requires the fisher to have the following qualities:

- the ability to organize and achieve specific goals and targets set by the fisher's household;
- a good understanding of technical issues involved in the harvesting, processing and marketing of fish products;
- the ability to communicate with people to obtain good information;
- the capacity to make informed and relevant decisions.

Individual fishers may already possess some or all of these qualities. However, in order to achieve their desired objectives, the fisher must develop marketing plans, make estimates on future events and forecasts, and adapt their decisions in the light of technical, market and policy changes that are regularly occurring in the broad environment within which fishing takes place. Fishers require the skills and know how to adapt effectively to external changes and ensure greater competitiveness.

Exercise 3 – Qualities of a Successful Fisher

Management takes time and work and is just as critical for success as harvesting and marketing fish product. Good fishers need to learn from their day to day experience and recognize their mistakes, become accountable for their

actions, and be willing to change their thinking based on new information.

Management is concerned with achieving the right combination of available inputs (boat, labour, and capital) in Fish production.

The common functions of management that help fishers deal with changes in the environment are:

- Planning: This is considered the most fundamental and important principle. It entails deciding on a course of action, policy, and procedure and assessing the future physical and financial performance, for enterprise as a whole. Plans are prepared based on resources available and on personal objectives.
- Implementation: Plan implementation includes the purchase of the inputs and materials necessary to put the plan into effect and overseeing the process. This is a very important function within the fishing context because in dealing with marine environment its risks and challenges, the fisher is faced with a large number of day-to-day decisions that need to be taken.
- Control: The control function includes monitoring and taking corrective action when necessary. Monitoring often requires the keeping of records of activities that occur such as the use of inputs, changes in stock, sales and purchases. Such information is analyzed to clarify what is occurring or has taken place. The results of the plan are monitored to see the extent to which the plan is being followed and producing the desired results. This process provides the fisher with an early warning of pending problems so that adjustments can be made accordingly. The process of planning, implementation and control is iterative and cyclical.

Why is Better Management Important?

As previously mentioned fishers operate within a dynamic and constantly changing environment caused by:

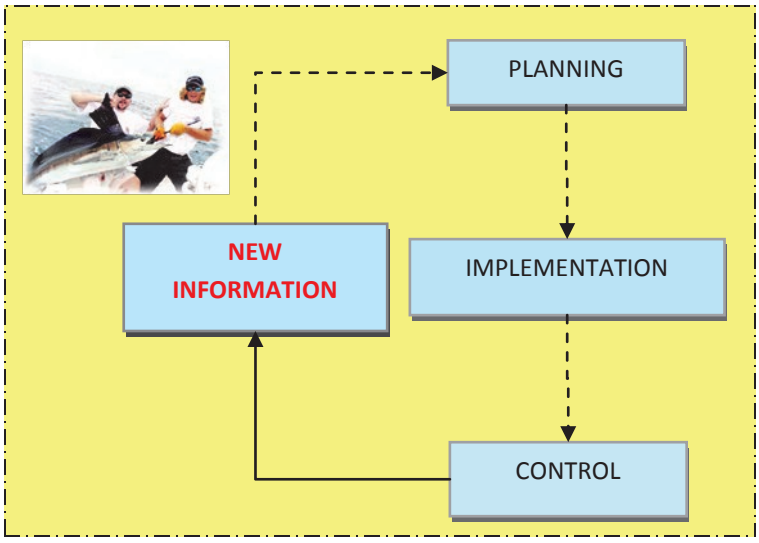
- **Changing prices:** Prices of inputs and outputs are constantly changing in line with supply and demand and market forces. Changes in the prices of fish products affect the overall business' profitability.
- **Changing resource availability:** The quantity available of any input has a direct impact on profitability. Problems of availability of supplies could result in the reduced use of fuel, bait etc. and fishers would constantly need to reassess past decisions in relation to the resources available.
- **Changing technical relationships:** The relationship between inputs and outputs changes as technological advances are made. For example, a new diesel engine may be introduced that has improved fuel efficiency over the gasoline type outboard engines and, hence, lower operating costs. This would have an effect of enhancing profitability.
- **Changing institutional/ social relations:** Factors concerning access to markets/ financial institutions, government support

and private sector linkages also affect the industry's performance.

Although fishers are in the position to control the use of their own resources, they cannot control the factors and conditions surrounding them. They have to constantly assess the potential benefits of technologies and reassess the relationship between inputs and outputs. When new technologies are introduced, increases in output take place.

In this event, market prices may fall, affecting the relationship between inputs and outputs. Fishers have to respond to these changes effectively. Improving management skills is the best way to prepare to adapt and cope with the external changes that impact on fisheries performance.

Figure 23: The functions of management



The Planning Process

There is no single and unique strategy to guide Fishers in the proper choice of enterprises to be included in the Fishing Enterprise plan. Fishers determine by themselves what Fishing Enterprise enterprises to engage in. Nevertheless, there are ways to facilitate some of the common decisions taken by Fishers: i.e. whether or not to produce a particular enterprise, in what combination and at what scale. A Fishing Enterprise planning process has been designed that follows a series of steps and is based on physical and financial data.

The planning procedure involves the following:

- Formulating Goals and Objectives
- Preparing a Fishing Enterprise Resource Inventory
- Identifying Opportunities
- Estimating Gross Margins and Choosing Enterprises
- Preparing the Whole Fishing Enterprise Budget and Action Plan

These steps are elaborated below.

Step 1: Formulating Goals

This step typically begins with identification of the Fishing Enterprise household goals and a listing of the priorities to the Fisher. This may simply consist of a single goal such as maximization of profit or competing goals such as increased profit and leisure. The goals reflect the Fishing Enterprise-family preferences. This step is closely linked to discussions on the decision-making process.

Step 2: Preparing a Fishing Enterprise Resource Inventory

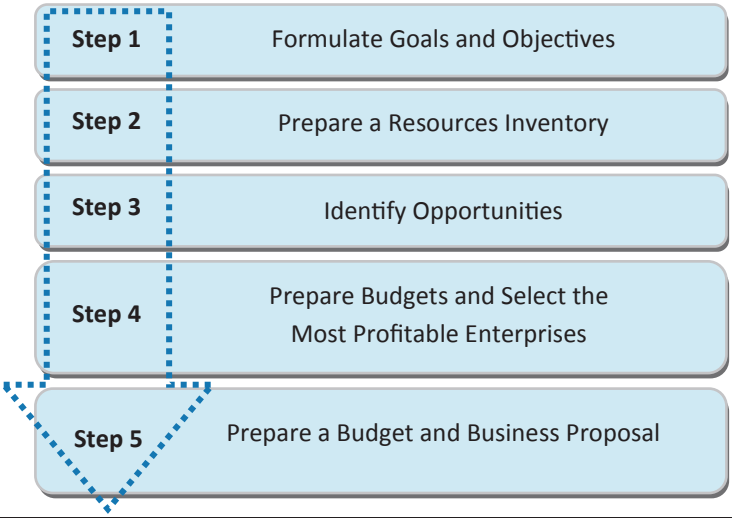
The second step involves the preparation of a resource inventory and assessment of Fishing

Enterprise resources (e.g. boat - including engine and gear, navigational and safety equipment, ports, FAD, fishing gear and human resources). Background data on the fish catch or effort of the enterprise and its past performance is required to complete the inventory. The Fishing Enterprise resource inventory is used as a base to identify problems and constraints on physical and financial performance.

Step 3: Identifying Opportunities

This step starts with a careful assessment of market and consumer demand. Even if the resource inventory shows that certain crop and livestock enterprises are technically feasible, enterprise identification must take into account market opportunities. The market appraisal should include an assessment of the demand for the product, the marketing arrangements and probable prices that can be attained, availability, cost and quality of purchased supplies, and transportation and storage of the final product. The range of potential opportunities identified and evaluated could be broad and would need to be reduced through a process of "short listing". The wide range of options open for consideration should be reviewed in the light of the goals defined in Step 1. Ideas and suggestions for activities can come from discussions held with family members, other Fishers or extension workers all of which could provide important sources of new information.

Figure 24: The procedure for preparing a proposal



Step 4: Preparing Enterprise Budgets and Selecting the Most Profitable

The next step is to assess the financial performance of the enterprises. It can be expressed through cost and income estimates for the different enterprises per trip or per pound of fish. For many Fishers the decision on what enterprises to include in a Fishing Enterprise plan is based on personal experience and preference, together with considerations of comparative advantages of the different activities. Often Fishers do not change their Fishing Enterprise plan on a regular basis, and slight adjustments and modifications are usually made to the existing enterprise combination. In this event, the planning process primarily focuses on preparing budgets of existing enterprises. However, Fishers responding to market changes may decide to introduce new fishing activities and these would need to be budgeted out to assess their contribution to Fishing Enterprise income.

***Planning** is the selection of objectives and goals and the methods to reach them.*

Step 5: Preparing a Whole Fishing Enterprise Budget and Action Plan

This is the last step in the planning process. The whole Fishing Enterprise budget checks the

effect of changes in the cropping pattern and the introduction of new enterprises on the economic viability of the entire Fishing Enterprise. The starting point for preparation of the whole Fishing Enterprise budget and ultimately the action plan is the gross margin of individual enterprises.

This information would need to match the volume of physical resources available to the Fisher, and decisions taken as to the most viable Fishing Enterprise. The decision would require reconciliation between physical characteristics of the resource base, market opportunities, use of other resources (labor and capital) available to the Fisher and individual preferences of the Fishing Enterprise family. This often involves a process of trial and error. Once the enterprise combination has been selected, the overall gross margin and whole Fishing Enterprise income is assessed. The latter would require the preparation of an inventory of the fixed asset requirements. The difference between the overall gross margin and the fixed costs provides an estimate of whole Fishing Enterprise income.

An action plan could be prepared taking into account physical and financial aspects of the plan. The plan could include an assessment of equipment suitability and enterprise selection, planned calendar of operations, schedules of supplies required, an assessment of investments, labor profiles and cash flow projections and enterprise budgets.

What are the Fisher's Objectives?

In order to improve Fishing Enterprise management, it is important to understand the expectations of Fishers and their families. Fishers tend to have a number of objectives that guide their choices between alternative actions.

Some of these are:

Planning is the selection of objectives and goals and the methods to reach them.

- maximizing profits;
- increasing production;
- increasing sales;
- minimizing costs;
- avoiding debt;

***Remember:** Planning is a primary management function; it involves "thinking," which is often more difficult than "doing."*

- achieving a 'satisfactory' standard of living;
- reducing the risks involved in Fishing Enterprising;
- transferring the Fishing Enterprise to the next generation; and
- ensuring stable food supplies for the family.

Fishers often have multiple objectives and some may even conflict. Nevertheless, for market oriented production an important common objective is profit.

In the long-term, Fishing Enterprise profit must be sufficient to cover family expenses and production costs related to the Fishing Enterprise.

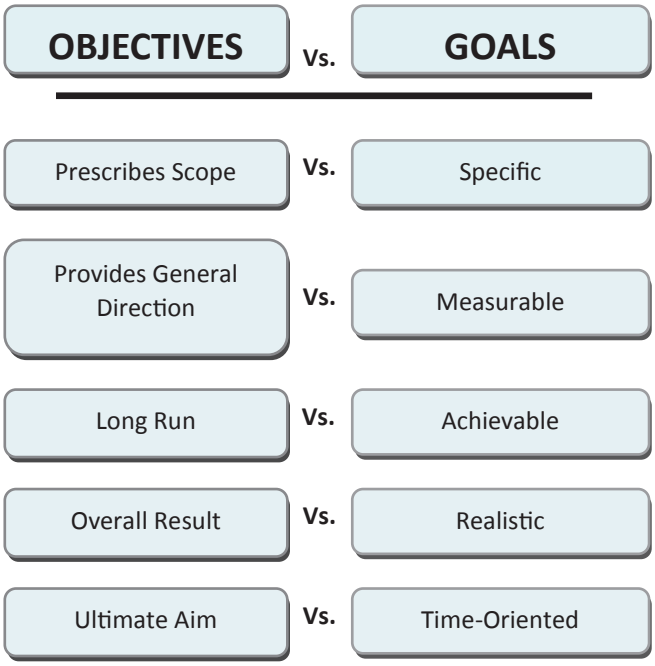
Exercise 1 – Formulating Goals & Objectives: Developing a Vision/Mission

Remember VMOGS!

- VISION: What you will be as a result of…
- MISSION: What needs to be done…
- OBJECTIVES: What will be the result of pursuing the mission…

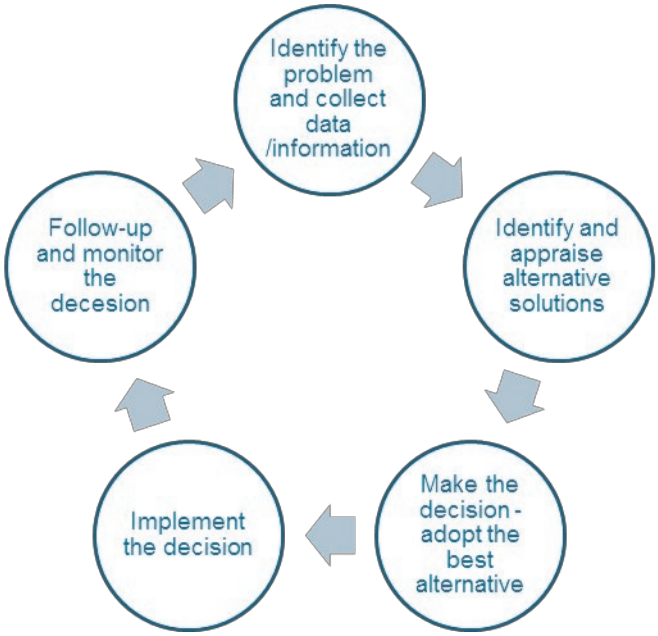
- GOAL: what time or amount will be the value of the result…
- STRATEGY: What activities must be done to accomplish the result!

Figure 25: Objectives Vs. Goals



How Do Fishers Decide?

Figure 26: The Decision-Making Process



Fishers continually make decisions and it is the role of extension workers to support them in doing so. The steps taken in the decision-making process are summarized as:

- **First Step** - Identify the problem and collect data/information: The first stage of the process is to recognize the existence and nature of the problem. This stage calls for the collection of data on current performance as the basis for making improvements to the Fishing Enterprise. For example, data could be collected to analyze Fishing Enterprise performance in comparison to other similar enterprises in the vicinity. The problems identified might be due to the use of obsolete or inappropriate production techniques, constraints on marketing and limited alternative market channels.
- **Second Step** - Identify and analyze alternative solutions: Possible solutions to the identified problems may include increasing the efficient use of fuel and bait, and introducing improved fishing methods amongst others. The consequences of the alternative actions would be evaluated to assess their likely impact on Fishing Enterprise performance.
- **Third Step** - Make the decision and adopt the best alternative: Which of the alternatives is most likely to improve Fishing Enterprise performance? Since it is rare that all the information required in making a decision would be available, selection often requires judgment by the Fisher before a decision is made. The final decision, therefore,

will frequently reflect the Fisher's attitude towards risk and more specifically, the perceived risks of each of the alternatives.

- **Fourth Step** - Implement the decision: Fishers have a role in implementing decisions and enforcing the action needed to ensure that the decisions are followed. On a small enterprise, very often different members of the fisher's family undertake the planning and implementation tasks.
- **Fifth Step** - Follow-up: Once the first four steps have been completed, it is useful to review the results of the decisions taken. Having identified the changes made, it is important to continue monitoring progress to ensure that the new plans are being followed and that revised targets are being achieved.

Introduction to the Business Proposal

- Definition
- Objectives of a Business Proposal
- Uses of a Business Proposal
- Components of a Business Proposal
- Business Proposal Sample (Strategic, Operations, Marketing, Management, and Financial Plan)

A Fishing Enterprise business proposal is a blueprint for implementing a fishing enterprise idea and the roadmap for a successful business by helping to minimize & manage risk!

It is a data-base of information related to the details of a fishing activity such as production processes or systems, raw material, finance, support services and market.

It is like a roadmap which makes it possible to know if the Fishing Enterprise is on the right track and monitor achievements against objectives.

It helps in identifying future financing needs and is a valuable document when seeking credit and other support from bankers, government and other funding agencies.

The Fishing Enterprise business plan also helps to evaluate the strengths and weakness of the proposed enterprise as well as the opportunities and threats it faces; this can be translated into a detailed strategy and action plan for every person with responsibilities.

Rationale

The purpose of planning is to place the Fisher in the best possible position to make decisions about the future. Once the Fisher has defined his/her objective(s) the next step is to develop a plan to achieve them within the opportunities offered by the marketplace. This unit analyses the planning process!

The real value of creating a Fishing Enterprise plan is not in having the finished product in hand; rather, the value lies in the process of researching and thinking about your Fishing Enterprise business in a systematic way. The act of planning helps you to think things through thoroughly, study and research if you are not sure of the facts, and look at your ideas critically. It takes time now, but avoids costly, perhaps disastrous, mistakes later.

Strategic Planning

"You've got to be careful if you don't know where you are going, you might not get there."

(YOGI BERRA)

Keeping Records of your Fishing Business

By Norman J. Norris

Good Record Keeping (Data Collection System)

The present system of collection, compilation and analysis of fisheries data and record keeping (Boat catch and effort) can be substantially improved to provide reliable and timely information for management, business and policy decision-making. Volunteering information, data, and supporting your data collector can greatly facilitate your business, your group/co-operative and your community. There are some fishermen who continue to say that the purpose of data collection is to tax fishers, hence the reluctance to provide accurate and timely data.

Most fishermen are self-employed and therefore there are little or no records of their daily business transactions. The banks and other lending institutions request evidence of income, expenditure and projections particularly for business loans. Fishermen do not possess any pay slips and in many cases cannot say or verify their income and expenditure for the current or previous year, in spite of their confessions of having been in the business for over ten years.

There is a need for fishermen to recognize that fishing is a business, and start treating it as such. Keeping daily records of their operation is much easier than it appears. Evidence convinces and lack of it convicts. The record book can act as a pay slip providing much needed information to them and their bankers. This "pay slip" would give information on fish catch and effort, fish species and quantity, fishing gear, area fished and date. A whole new world of possibilities exists when business is done that way.

Given the above-mentioned circumstances of many fisheries and fishermen in Dominica, a so-called "feedback" management system should also be considered as an effective option tool for follow up decision making.

Social Security for Fishers

By the Dominica Social Security

Modified from "Handbook for the Self Employed by Dominica Social Security"

Prior to January 1989, only employees could register and receive coverage under the Social Security Program. Following the above date, coverage was extended to all self-employed persons who fell between the ages of 16 and 60.

Initially, self-employed persons were covered for what are referred to as long-term benefits, which means that the benefits may last for longer than 26 weeks and include: Age, Invalidity and Survivors benefit. Self-employed persons were also covered for Funeral Grants.

With effect from January 2009, the package of Benefits for Self-employed persons has been extended to include Sickness and Maternity. The introduction of these benefits also necessitated an increase in the rate of contribution payable by Self-employed persons.

Who Is A Self-Employed Person?

As the term implies, a self-employed person is a person who employs himself, whether it is as a Doctor, Lawyer, Vendor, Farmer, Fisherman, Bus Driver etc. Whatever your occupation, if you are gainfully employed, and you are your own boss, you are deemed to be self-employed. By legal definition, a self-employed person is a person who:

- Is gainfully occupied in employment in Dominica and is not an employee
- Is aged sixteen or over but not sixty;
- Is ordinarily resident in Dominica

Insurance of Employees Temporarily Employed Outside of Dominica

Any person who is ordinarily resident in Dominica, is between the ages of 16 and 60 and temporarily resident outside of Dominica by reason of having been selected in Dominica for participation in an employment program by the Government of Dominica, or by an employer registered in Dominica, shall be insured during such temporary employment as if they were a self-employed person.

Payment of Contributions by Self-Employed Persons

Contributions payable by self-employed persons are based on earnings from self-employment, during the period of one year immediately preceding the contribution year in which contribution is due. Hence, the contributions you are liable to pay for the year 2009 is based on the total income you received during the preceding year, i.e. 2008. In view of the foregoing, each self-employed person is required to visit the DSS office by 31st January every year in order to reassess his income and contribution rate for the new year.

Every self-employed person shall pay 10% of their declared earnings per calendar quarter, on or before the 14th day of the month following the quarter for which payment is due. Contributions are compulsory and payable

quarterly. You may, however, opt to pay on a monthly basis if you prefer.

Late payment, i.e. payment made after the 14th is subject to 10% surcharge and interest at the rate of 10% per annum on the total sum due.

What is a Credit?

For each week that a person receives wages, he is awarded a credit. If he works for an entire month, when his contributions are paid at our office, he is assigned 4 or 5 credits depending on whether there are 4 or 5 weeks in that month. By extension, if he works and pays contributions for an entire year, he is given 52 credits for that year since there are 52 weeks in a year. The number of credits he has paid will determine whether or not he will qualify for benefit and, if so, what percentage of his earnings he will receive as his benefit.

What Benefits do Self-Employed Persons Qualify For?

The following benefits are available to self-employed persons:

- Age Pension: paid to an insured person who has attained the retirement age and has 500 or more credits paid or credited to his account.
- Age Grant: is paid if the insured person has paid 50 or more credits, but less than 500.
- Invalidity Benefit: paid to a permanently handicapped insured person who is under the age of 60 years and has at least 150 contributions paid and/or credited against his account.
- Invalidity Grant: is paid if the insured person has 50 or more paid credits but less than 150.
- Survivors Pension: periodical payment made in respect of the specified dependent(s) of an insured person, who was either already in receipt of an Age or Invalidity Pension or who, while not being in receipt of any such benefit, would have qualified for same.
- Survivors Grant: is paid to the dependent(s) of an insured person who had already received or would only qualify to receive an Age or Invalidity Grant.
- Funeral Grant: A payment made to assist with the burial expenses of a self-employed person, his uninsured spouse, or dependent child(ren). A minimum of 50 credits must have been paid to qualify for this benefit.
- Maternity Benefit: is payable to a self-employed woman who has been insured for at least one year and has paid contributions for at least three quarters in the four consecutive quarters immediately prior to the quarter in which confinement is expected.
- Sickness Benefit: is payable to a self-employed person who has been insured for at least one year and has paid at least two quarters contributions in the period of three consecutive quarters immediately preceding illness.

Relinquishment of Self-Employed Status

A self-employed person who accepts insurable employment at a subsequent date with an employer shall immediately cease to be self-employed since employment status as an employee takes precedence over employment status as a self-employed person.

Termination of Self-Employment

- Where a self-employed person ceases to be self-employed, he/she shall pay all outstanding contributions relative to his self-employment within 14 days of cessation of such employment.
- Where a self-employed person ceased to be self-employed, on paying his final contribution he/she must state the reason for the cessation of his/her self-employment.
- Where a self-employed person dies, his survivor entitled to benefit, or his personal representative shall inform the Social Security office and return the registration card of the deceased to the office.

Exemption from Liability to Pay Contributions

A self-employed person may be exempted from the payment of contributions—

- When he is in receipt of, or deemed to be in receipt of an income which is below the minimum wage prescribed for the time being under the Labor Standards (minimum wage) Regulations, for an employee in the same category of work;
- When he is in receipt of an income from a trade or business that, in the opinion of the Board, is not covered for Social Security purposes;
- On income received in the years preceding the year during which he attained the age of sixteen;
- On income received in the year of death;
- On income received during any period when he is under arrest or imprisoned;
- On income received after attaining age 60 or while in receipt of age pension or invalidity benefit under this Act.

Offences

Any person who:

- For the purpose of obtaining any benefit or other payment whether for himself or for some other person connected with this regulation;
- Knowingly makes any false statement or false representation, or,
- Produces or furnishes, causes or knowingly allows to be produced any document or information which he knows to be false,
- Fails to comply with the provisions of the law
- Is liable on summary conviction to a fine of five hundred dollars and in default of payment, to imprisonment of six months.

Final Note

Remember, every Self-employed person should realize that he or she has a personal responsibility to look after ¬his welfare and that of his family. Incapacity and death can strike the strongest person when he is in his prime. You, therefore, have a moral responsibility to, at least, make things easier for yourself and your loved ones by taking all steps in your power to guarantee your benefits.

Table of benefits for self employed persons:

- Age pension
- Age grant
- Invalidity pension
- Invalidity grant
- Survivors pension
- Survivors grant
- Funeral grant
- Sickness benefit
- Maternity allowance
- Maternity grant

It must be noted that there are qualifying conditions for all of the benefits.

MODULE 5

Fisheries Co-operative & Group Development

Fishers Co-operative & Group Development

Fisherfolk Co-operative development in Dominica goes back to 1963 when the Dominica Fisheries Co-operative was registered. This was an island wide society as it attracted members from around Dominica. Since then other fishers coops have been formed in major fish landing sites attracting membership from within their own communities. Some have been able to survive changing times and conditions (Fond St. Jean and Newtown Fisheries Co-operative), others have had to adapt and improvise to overcome (St. Marks Fisheries and Tourism Co-operative Society, St. Andrews Fisheries and Tourism Co-operative Society) and still a few have gone down under.

Presently there are twelve registered fisheries co-operative societies in Dominica. Seven have been formed within the last ten years. Some are very active while others are dormant or non-functional. Major improvements are necessary if the fisheries co-operative movement is to survive and function in such a harsh economic climate. Various types of services are provided by some co-operatives, such as marketing of fish on behalf of members, selling of fishing gear and tackle, provision of ice, storage of fish etc.

With much support from the CARICOM Regional Fisheries Mechanism (CRFM), Dominica formed a National Association of Fisherfolk Co-operative (NAFCOOP) in 2008. This Association is the umbrella organization of the twelve registered co-operatives around the island. NAFCOOP's mission statement is "To provide proper representation and greater visibility at the local, regional and international levels, while ensuring the sustainable utilization of the marine resources and enhancing the livelihood of the fisherfolk".

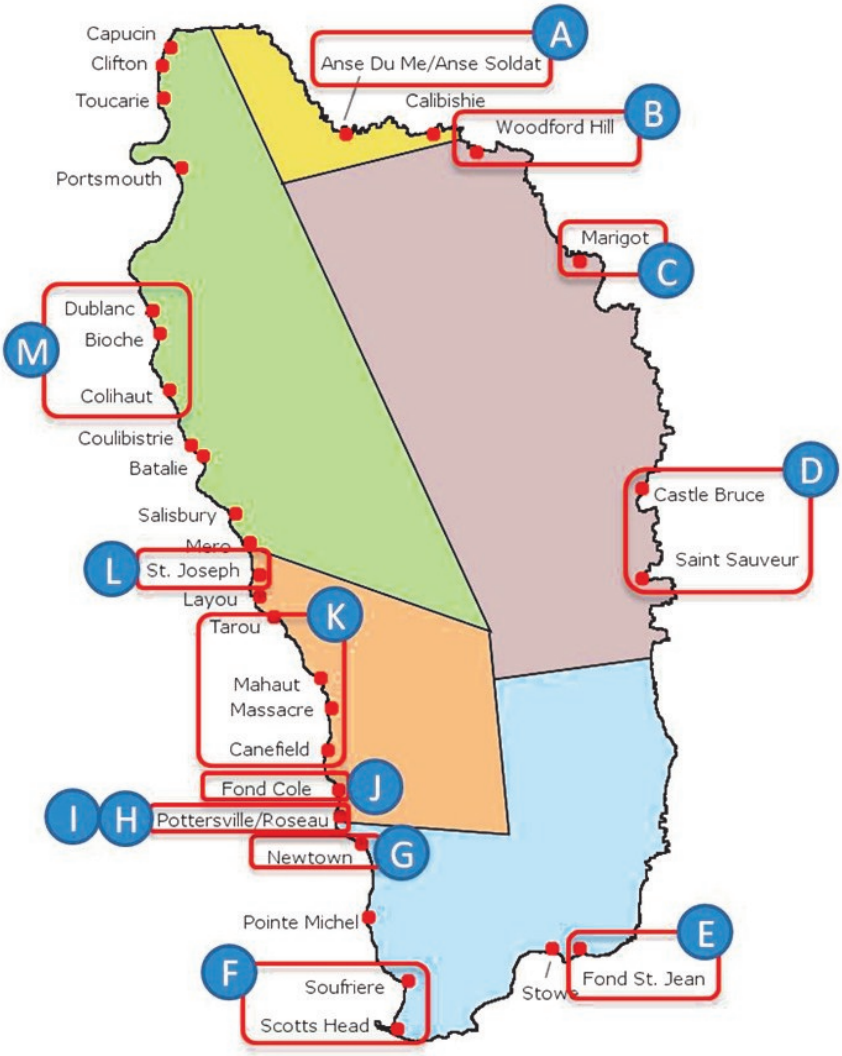
Its vision is that "NAFCOOP will become the ultimate representative of all fisherfolk in Dominica and raise the operations of the industry to a professional level".

A five year strategic development plan had been produced with special focus on advocacy, training, safety and security, communications, institutional strengthening, networking, health & wellbeing, income generation and infrastructure.

With this structure in place the NAFCOOP can now address the many challenges that confront individual associations. Major savings can now be realized from fuel purchases (rebate), fishing equipment imports, safety and navigation purchases, group insurance can be secured for members and boats and engines (individually it's too high risk). Pension or retirement packages can be negotiated for members.

NAFCOOP is also a member of the Caribbean Network of Fisherfolk Organizations (CNFO) which is a regional body of fisherfolk organizations in the Caribbean.

Figure 27: Fisheries Co-operatives in Dominica



A. St. Andrew's Fisheries & Tourism Co-operative
B. Woodford Hill Fisheries & Farmers Co-operative
C. Marigot Fisheries Co-operative
D. St. David Fisheries Co-operative
E. Fond St. Jean Fisheries Co-operative
F. St. Mark's Fisheries & Tourism Co-operative
G. Newtown Fisheries Co-operative
H. Dominica Fisheries Co-operative
I. National Association of Fisheries Co-operative (NAFCOOP)
J. Woodbridge Bay Fisheries Co-operative
K. St. Paul Fisheries Co-operative
L. St. Joseph Fisheries Co-operative
M. St. Peter's Fisheries Co-operative

Fisherfolk Co-operatives In Dominica

By the Co-operative Division

Brief History

During the 1920s-1940's Co-operative existed informally in Dominica. These took the form of what is referred to as "Coup de main" and "sub".

It was not until 1945 that the efforts of the Communities and groups of individuals to work and save became recognized. The welfare department was organized to facilitate the development of co-operatives on the island. Among the first Co-operatives to be registered in 1951 Roseau Co-operative Credit Union, registered in 1951 and the St. Mark's Lime Co-operative registered in 1952.

Co-operative Division & Legislation

The Co-operative Division is the government regulatory body for all Co-operatives other than credit unions in Dominica. This regulatory powers is enshrine in the Co-operative Societies Act #2 of 2011 and the regulations.

Under this act the Commissioner of Co-operatives with the assistance of his/her staff performs the regulatory duties and powers. These duties include:

- Registration of all viable co-operatives societies.
- Inspect and monitor all co-operatives society.
- Supervise and regulate all Co-operative Society
- Lead and manage the regulatory process
- Stimulate Community awareness
- Initiate and encourage capacity development activities beneficial to co-operative societies

Mission Statement

The Co-operative Division aims to foster sustainable, economic and social development through viable co-operative enterprises consistent with Government policies.

What is a Co-operative?

A co-operative is an autonomous association of persons united voluntarily to meet their common, economic, social and cultural needs and aspiration through a jointly owned and democratically controlled enterprise.

Co-operative Values

Co-operatives are based on values of self-help (self-responsibility), democracy, equality and solidarity. In the tradition of their founders, co-operative members believe in the ethical value of honesty, openness, social responsibility and caring for others.

Co-operative Principles

Co-operative operate under seven (7) basic principles

- Membership – The primary purpose of co-operatives is to serve their members in a prudent and effective manner. Co-operatives are open on a voluntary basis, without political, religious, gender or social

discrimination, to all who can contribute to, and benefit from, their activities.

- Democracy – Co-operatives are democratic and participatory organizations, actively controlled by their members. One man one vote.
- Financial Participation – Members contribute equitably to the capital of their co -operative and share in the results of its operation.
- Cooperation among Co-operatives – In order to best serve the interest of their members and their communities, co-operatives actively cooperate locally, nationally, regionally and internationally
- Autonomy – Co-operatives are autonomous mutual help organizations, controlled by their members. If they enter into agreements with governments and other organizations they do so freely, on mutual accepted terms which ensure their autonomy.
- Concern for Community – Co-operatives are concern about their communities in which they exist. While focusing on members needs, they strive for the sustainable development of those communities through policies that are supportive of the environment and acceptable to the membership.
- Education - Co-operative foster reciprocal, on-going education programs for members, leaders and employees so they can teach and learn from each other in understanding and carrying their respective roles. Co-operatives have the responsibility to inform the general public, particularly young people and opinion leaders, about the nature of the co-operative movement.

FISHERIFOLK CO-OPERATIVES

What Qualifies you for registration as a fisherfolk Co-operative?

- The Group MUST have at least ten (10) persons who have met the criteria for membership as stipulated in the Act and by-laws
- A business project which must be economically viable and have provision for equity capital expansion and continuous growth.
- The word “Co-operative and Ltd” must form part of the group’s name.
- Three copies of the group’s by-laws must be presented with the application. These by-laws must be in conformity with the Co-operative Societies Act # 2 of 2011 and the regulations.
- The group must maintain an address to which all notices and communication must be sent.
- An application fee of Twenty five dollars EC ($25.00) and a registration fee of EC ($100.00) MUST be paid.

How to form a Fisherfolk Co-operative

- Organize a group of at least ten people with the same business objective.

- When the members are satisfied that the business can be viable, contact the Co-operative Division formally stating your plans.
- Attend education and training sessions conducted by the Co-operative Division.
- With the assistance of the Co-operative Division, formulate By-laws and discus with general membership
- Convene Special General Meeting at which the by-laws will be adopted and Board of Directors elected.
- Obtain application for registration form from Co-operative Division and resubmit completed form with Twenty five dollars ($25.00) application fee.

Benefits of a Co-operative

There are tremendous benefits which can be derived from being a member of a fisheries Co-operative. These include:

- Marketing of product/services resulting in a greater volume of business
- More access to new technology
- More information available
- Monitoring and supervision from Fisheries and Co-operative Divisions
- Better accountability and transparency
- Greater member participation
- Greater returns to members
- Creation of employment
- Dividends and rebates
- Special Government concessions (co-operatives are exempted from paying tax on surpluses)

FISHERFOLK CO-OPERATIVES IN DOMINICA

The first registered fisheries co-operative in Dominica was the Dominica Fisheries Co-operative in 1963. This society still exists. Their main line of business is the sale of fishing tackles and fishing supplies.

Figure 28: Fisheries Co-operatives: assets and membership

	Co-operative Name	Assets	Membership
1	Dominica Fisheries Co-operative	929,918	110
2	Newtown Fisheries Co-operative	572,997	67
3	Fond St. Jean Fisheries Co-operative	165,495	25
4	St. Peters – Dublanc/ Bioche	273,856	38
5	St. Andrews- Vielle Case/ Anse de Mae	89,717	28
6	St. David – Sans Sauveur		31
7	Woodbridge bay- Fond Cole		
8	St. Paul - Mahaut		38
9	St. Joseph		30
10	Woodford Hill		25
11	North East Multipur-pose - Marigot		32
12	St. Marks – Scotts Head /Soufriere	9,543	50

To date there are 12 Fisheries Co-operatives and one umbrella body, NAFCOOP.

The Co-operative Division is currently working with two (2) other fisheries groups namely:

- St. John's Fisheries Study Group – Portsmouth

- Salisbury Fisheries Study Group

NAFCOOP

The National Association of Fisherfolk Co-operative was registered in 2007. The society serves as an umbrella body for all the fisher folk in the island. To date the society consists of eleven (11) members (Fisherfolk Co-operatives) and aims and objectives are as follows:

- To contribute and promote human and economic development of affiliates and their members through education and advisory.
- To promote interest and cooperation among affiliates and other co-operative organizations.
- To make representations on behalf of its affiliates.
- To contribute to the development of higher standards of Co-operative Management, Operations and Supervision with a view to achieving and maintaining safety and soundness
- To promote the sustainable use of marine resources

Some of their current activities include:

- Sale of fishing supplies
- Sale of fuel to fishers
- Management of Fish Attracting Device (FAD) program in Dominica
- Management of locker rooms at the Roseau Fisheries Complex

Challenges Faced by Fisherfolk Co-operatives in Dominica

- Aging memberships
- Inadequate fishing gears
- Limited resources
- Poor management
- Lack of Proper handling sites
- Inadequate record keeping
- Lack of membership participation
- Inadequate working capital – Cash flow

Development opportunities for Fisherfolk Co-operatives

- Improved infrastructure
- Funding
- Training
- Networking
- Amalgamation /Affiliation
- Effective representation
- Greater building power
- Advocacy – newsletter/ radio program/ co-operative week
- Improved planning
- Collaboration with regional co-operatives
- Standardization of practices – catches, processing, marketing

The sustainability of the fishing sector in Dominica will depend on the following

- Fishers organizing themselves into co-operatives to maximize returns and attain legal status.
- The engagement of young people into fishing and related activities.
- Fisherfolk co-operative members must be committed.
- The Board of Directors of co-operatives must meet monthly according to the Co-operative Societies Act.
- Annual General Meetings (AGM) must be kept on a timely basis
- The financial and other records of co-operatives and fishers must be kept and maintained
- The Board of Directors of co-operatives must address issues and concerns of the society promptly.
- There must be continuous monitoring of business environment and market trends by societies
- The membership must attend Education and Training Sessions conducted by the Co-operative Division and other institutions
- Amalgamation of Fisheries Co-operatives where possible

MODULE 6

Product Development & Quality Control

Fish Quality and Handling: Best Practices

By Derrick Theophille

What is Fish Quality and Handling?

FISH QUALITY: Fish quality is the state or condition of the fish in terms of freshness for use as food. It refers to the current stage of spoilage of the dead fish.

FISH HANDLING: Handling refers to the way in which the fish is treated or handled.

Fish handling and quality are related because good quality of fish can only be obtained through good handling of fish.

Fish and seafood are known to promote good health; however they tend to spoil very quickly. Many methods have been used throughout history to preserve fish for tomorrow and also to reduce the occurrence of seafood poisoning. Though the methods may vary based on culture, the underlying principle behind preserving fish quality has been identified as proper fish handling.

Understanding Fish Spoilage

Fish spoilage is a natural process that begins immediately after death. It involves the decaying or rotting of the fish by micro-organisms or bacteria. The diagram on the following page outlines the changes that occur after death and how each stage can be identified using some of your basic senses (sight, smell, taste and touch).

Each stage of the spoilage process is indicated at the top of the table (Figure 29) with notes on some of the more noticeable changes below as well as an indication as to the general quality rating.

Though it is true that fish spoils naturally, without any human interference, humans can help to accelerate the process by further contaminating the fish with additional bacteria or assist those germs already on the fish by promoting a suitable environment for them to grow and work; however man can also slow the process by reducing the activities of the bacteria already present on the fish.

The micro-organisms live best under certain conditions. Environments that are very warm, moist and dark are the most favourable. The more comfortable the environment is for the micro-organisms, the faster they work to spoil the fish. Therefore to preserve its quality the fish must be kept away from such environments to ensure that the micro-organisms do not work as quickly.

Best Practices in Fish Handling

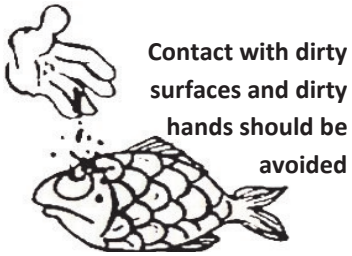
Food safety is very important as poor quality foods can cause minor to very serious health issues and maybe even death. It is the responsibility of each person along the chain of production of the food product to make sure that the food delivered to the consumer is of the best quality possible. Therefore care should be given during this 'handling stage' of the product.

The 'handling stage' involves everything that is done to the fish from the time it is caught from the sea to the moment it is sold to the consumer.

Figure 29: The changes that can be observed in the fish from death to putrefaction

	PRE-RIGOR	RIGOR MORTIS	POST-RIGOR	PUTREFACTION
	Best Quality (the time of death or soon thereafter)	Good Quality	Poor Quality	Bad Quality (rotted; some hours after death)
General Appearance	Bright with metallic lustre or gloss; shining		Some loss of lustre, slight dulling	Colour faded or bleached
Slime of Surface	Clear, transparent		Turbid (muddy, thick, not clear), opaque or milky	Thick, sticky, greyish, or yellow brown
Gills Colour	Bright red or pinkish red (depending on the type of fish)		Brownish red	Brown or grey
Gills Odour	Fresh odour; smells like seaweed		Sour or fishy	Strong odour
Flesh Consistency	Soft and elastic	Firm and elastic	Loss of elasticity	Soft and flabby
Flesh Appearance	Semi-transparent		Turbid (muddy, not clear)	
Eyes	Convex (bulging outwards), black pupil, translucent cornea	Slightly opaque pupil	Pupil slightly concave (sunken) and grey, opaque cornea	Completely sunken and grey pupil, opaque or discoloured cornea

Personal Hygiene



Contact with dirty surfaces and dirty hands should be avoided

Many of the cases of poisoning by fish were as a result of poor personal hygiene on the part of the handlers, processors and cooks. Germs are passed on to the food by direct touching with the hands or by being sent into the air (for example sneezing). Many times food handlers may forget to wash their hands before touching the food; however this is one of the simplest ways in which food can be contaminated.

It is important to take precaution when you are sick or injured. If you are sick it is best not to handle any fish. If you have a cut on your hands it is also advisable not to handle the fish, unless you use clean plastic gloves. Blood or cold germs contain bacteria that can contaminate the fish, making it unsafe to eat.

When should you wash your hands?

Before you:

- Handle fish or food of any kind

- Tend someone who is sick or injured
- Put your fingers into your eyes, ears, nose, etc.

After you:

- Use the washroom
- Handle garbage
- Eat meals or snacks
- Touch fish or other raw meats
- Touch an animal or animal waste
- Tend someone who is sick or injured
- Touch body fluids (vomit, saliva, mucus, etc.) or put your fingers in your mouth, ears, eyes, nose, etc.
- Handle money
- Put your fingers into your eyes, ears, nose, etc.

General tips on Personal Hygiene:

- Keep yourself clean and neat when handling or selling.
- Keep your hair covered.
- Use clean aprons.
- Avoid handling fish with sores, cuts or boils on the hands.
- Avoid smoking when handling fish.
- Do not handle or sell fish if you are suffering from a severe cold, fever, diarrhea, etc.

Workspace Hygiene

The workspace is the area in which you do all of your vending. This includes your vending stall and surroundings as well as the tools and equipment that you use in vending.

General tips on Workspace Hygiene:

- Keep your surroundings clean and tidy at all times.
- Only place the fish on surfaces that are clean, free of blood and other contaminants. These surfaces (e.g. scales, tables) need to be clean at all times.
- Clean up your stall at the end of each vending day
- Make sure that you use clean, sharp knives, not dirty, rusted ones for cutting.
- When cleaning equipment: wash with soap, rinse with clean water, disinfect with bleach, rinse properly and then dry the equipment immediately.

Storage of Fish

As mentioned earlier, micro-organism activity is influenced by temperature. Storage temperature as well as storage material (ice) and method are important food safety concerns. Fish may be placed on ice or chilled for short-term storage or frozen for long-term storage. However, the storage life of fish varies from species to species.

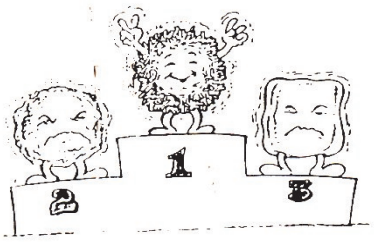
Chilled Fish

Chilling fish involves reducing the temperature to about 0ºC. It has been proven that many bacteria are unable to grow at temperatures below 10ºC, and the colder the

temperature the less active the micro-organisms are.

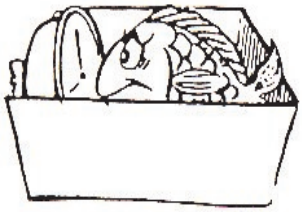
Using Ice

Ice comes in different shapes and sizes. Flake, plate, tube and block ice (block ice is crushed or ground before it is used) are most common. In general, flake ice is easier to use and does not cause bruising to the flesh (as is common with crushed ice) of the fish while still reducing the temperature. However block ice tends to last longer and is needed in less quantity to achieve the same results as flake ice.



General considerations for storing fish on ice:

- When packing fish in ice be sure to place some ice within the body cavity of the fish to ensure that the entire fish is kept cold. Also, more micro-organisms tend to live in the stomach area of the fish so it is vital to keep this area cold.
- Do not use ice that is too coarse or that has too many sharp, rough edges. These edges may bruise the flesh, helping to speed up the rate of spoilage.
- Remember, ice should only be used for short -term storage, so do not forget how long the fish has been on ice or you may end up with spoiled fish.
- To extend the storage life from the ice, do not place containers with fish on ice in a warm area.
- Always try to use clean, fresh ice. Ice that was already used to store fish may have blood and other contaminants that can cause cross-contamination.
- When packing in ice place one layer of ice then one layer of fish, then another layer of ice before another layer of fish.



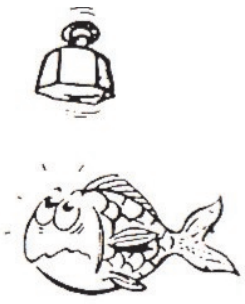
Avoid pressure from bulk storage

Frozen Fish

Fish may be frozen to lengthen the amount of time it can be kept. However freezing fish can be costly.

General considerations for frozen fish storage:

- Do not over-pack the freezer, this causes bruising.
- Freezing fish only preserves it at its current state, so if the fish is already rotting it will not be any better after freezing.
- It is best to store fish in a separate area from other meats (because cross-contamination may occur), however in most cases this cannot be avoided. In these cases try to store the other meats in sealed bags.



Avoid bruises to the flesh

A Summary to the Best Practices in Fish Handling

- CLEANLINESS IS CRITICAL: Keep yourself, your tools, equipment and workspace clean, sanitized and tidy. This helps prevent a host of contaminants from getting in contact with the fish as well as making a good impression on your customers.
- HANDLE CAREFULLY: Whenever you come into contact with the fish remember to be delicate. Bruises to the flesh of the fish can help to accelerate the spoilage process. So do not drop the fish or place heavy loads on it when storing. When packing for storage, try to avoid compressing the fish. Also, use sharp knives for cutting the flesh to avoid additional bruising.
- COOL DOWN THE TEMPERATURE FOR LONGER STORAGE: Bacteria and other micro -organisms that help to decompose the fish work best at warm temperatures (or what is known as room temperature). Therefore it is best to reduce the temperature of the fish to slow down the effects of these micro-organisms and so allow for longer storage of the fish. Use ice or place the fish in a cold storage freezer to reduce the temperature.
- TIMELINESS: It is important to clean the fish as well as it is important to cool the fish. However, if these measures are late in implementation this may result in a reduction in the storage life of the fish. Please remember to clean and cool the fish early and before storage. Also, when cleaning, do not forget to bleed the fish and remove as much blood from the body cavity as possible. Avoid storing fish that is not cleaned first.
- BE KNOWLEDGEABLE AND CONCERNED: Learn the characteristics of a good quality fish as well as the characteristics of a poor quality fish and know how to differentiate between the two. Know when fish is still good for sale as well as when fish is no longer good for sale and throw away fish that is not good. Do not sell poor quality fish to your customers.

Regulations Concerning Food Safety

No person shall engage in the handling of food without carrying on his person a photo identity card to indicate that he is a certified food handler.

Food is defined as: Cooked or uncooked fish or part thereof and any other article used for food or drink by man, or any other article which ordinarily enters into or is used in the composition or preparation of human food or flavouring matters and condiments, intended for sale, or sold for human consumption.

A person who contravenes any of the provisions of the Regulations commits an offence and shall be liable on summary conviction to a fine of one thousand dollars or to imprisonment for three months or to both, and to a further fine of $100 for each day during which the offence continues after the conviction.

Standards in the Fisheries Sector

By the Dominica Bureau of Standards

Three (3) draft standards have been prepared by the Bureau of Standards for implementation within the Fishing sector. These codes were primarily of a technological nature offering general advice on the production, storage and handling of fish and fishery products on board fishing vessels and on shore. It also deals with the distribution and retail display of fish and fishery products.

Code of Practice for the Sale of Fresh Fish

The aim of this Code is to assist the fishers, retailers and vendors in providing safe, sound and wholesome fish to the consumer. This Standard arose as a result of the increasing concerns from consumers and regulatory agencies to ensure the provision of safe fish offered for sale at local markets, fish vending facilities and mobile sale units. The common practice in Dominica is that fresh fish are sold at undesirable sites such as the beach, roadside, open mobile sale units etc. Usually that fish is uncovered and exposed to all environmental conditions making it favourable to rapid spoilage and poor product quality. This practice also has serious implications for food borne illnesses.

This Code of Practice specifies minimum requirements for the facilities, storage, handling and vending of fresh fish within the Commonwealth of Dominica. It also specifies the minimum requirements for sanitation and food safety practices in the vending of fresh fish.

General Requirements

Every person involved in the sale of fresh fish shall undergo a course in Basic Food Hygiene and shall demonstrate the necessary capacity to protect food all the time. Annual upgrading training courses shall be undertaken. Every person involved in the sale of fresh fish shall have a valid Food handlers Certificate, not known to be suffering from, or who is a carrier of any communicable disease or has an infected wound or open lesion shall be engaged in the sale of fresh fish and shall adorn themselves at all times with the appropriate clean protective clothing, head covering and footwear maintaining at all times maintain a high degree of personal hygiene and cleanliness.

No person shall conduct himself or his business in such a way as would restrict or interfere with the ingress or egress of the abutting owner or tenant or to create or become a nuisance, or increase traffic congestion or delay, or constitute a hazard to traffic, life or property, or an obstruction to adequate access to fire, police, or sanitation vehicles.

No person shall sell fish and their products unless he has available for use a lined litter receptacle, which shall be clearly marked and maintained for use nor shall any vendor leave any location without first picking up, removing

and disposing of all trash or refuse remaining from sales made by him.

Specific Requirements

Hygienic Practices

Persons in contact with and/or directly or indirectly handling fish and their products shall be in a state of health complying with the guidance set out by the Official Agency having jurisdiction.

- Hair must be completely covered during fish handling. Nails shall be short and clean.
- Persons engaged in the sale of fish and their products shall refrain from spitting, sneezing, smoking or behavior/habits that can compromise the safety of the fish.
- Fish vendors shall wear appropriate clean clothing and protect themselves with an apron or other suitable garment, which shall be changed every day or as often as necessary.
- Fish vendors shall not wear rings or bracelets while handling fish.
- Fish vendors shall as far as practicable not handle fresh fish and money at the same time.
- Hands and forearms of vendors shall be carefully washed with potable water and disinfecting soap after use of the toilet.
- Utensils water receptacles, working surfaces, etc. shall be cleaned and disinfected immediately after their use.

Hygiene Facilities

To ensure an acceptable level of hygiene, the following shall be adhered to:

- Potable water shall be kept in an appropriate container (easy to clean, non- toxic material, fitted with a cover and tap or stopcock) built in such a manner as to preserve the quality of the water and prevent contamination. It shall be sufficient for all needs.
- Containers, utensils and working surfaces for handling fish shall be of a non-toxic material, easy to clean and disinfect.
- Detergents and disinfectants used to clean and disinfect working surfaces, utensils, water receptacle and other components shall, as far as possible, be non-toxic and non -corrosive, complying with the guidelines set by the Official agency having jurisdiction.

Transport of Fresh Fish

- Mobile sales units used for the transport of fish shall have a separate compartment that is protected from direct sun, wind, dust, rain and other contaminants.
- The compartment of the unit shall be made of appropriate material for the transportation of fish and shall be waterproof and easy to clean.
- Fish shall not be placed directly on the floor of mobile sale units, but shall be placed in appropriate containers (made of non-toxic material and thoroughly cleaned and disinfected), properly sealed and protected from outside contamination.
- Fish shall be stored in layers of finely divided ice. The temperature shall be controlled,

avoiding room-temperature exposure of fish at all times.

- The mobile sale unit, containers and utensils used for the sale of fish shall be adequately cleaned and disinfected at the end of each operation to ensure food safety and quality.
- Non mobile sale units shall be at least 60 to 70 cm off the ground and be built of solid, resistant material and shall comply with the food safety requirements as mobile sale units.
- As far as is practicable waste materials shall not be in close proximity to or transported with fish for human consumption, however, in cases where this is unavoidable, waste materials shall be in special duly closed containers, to protect from the food.

Outdoor Sales Area

- The outdoor sales area shall not be used for any other purpose than for the sale of fish as far as practicable.
- The outdoor sales area shall be located in a zone determined by the Official agency having jurisdiction so that it is protected from contaminants originating from traffic, pedestrians, domestic animals and/or vectors.
- The sales area shall be free from personal belongings, such as clothes, footwear, blankets, tobacco etc. to avoid contamination of the product.
- The sale units and their surroundings shall be kept clean, free of litter and in good condition.
- When not in use, the sale units shall be protected and in the case of mobile sale units shall be kept clean and as far as practicable shall not be used for activities that would compromise the safety of the fish.

Handling and Disposal of Waste and Pest Control

- Waste containers shall have a lid and where possible, shall be fitted with an automatic closing device.
- Waste containers shall be of resistant material, waterproof and easy to clean and lined with polythene bags.
- Waste containers shall be placed in such a way that they are not in contact with the floor or against a wall.
- Waste water shall be collected and disposed of separately from solid wastes in accordance with the guidelines set out by the Official agency having jurisdiction.
- Fish waste shall be disposed of in such a way as not to attract insects and animals, such as flies, dogs and cats.
- Pest control shall be carried out in accordance with guidelines set out by the Official agency having jurisdiction.
- The application of chemical substances for pest control shall only be done by authorized technical personnel and in accordance with guidelines set out by the Official agency having jurisdiction. The procedure shall avoid the contamination of fish and their

products, fish vendors/handlers, the public and the environment.

Responsibility of Vendors

Fish handlers or vendors shall be responsible for the hygiene and protection of the food they prepare or sell, and for all aspects related to its safety.

Presentation	Feature	Criteria and description
Raw whole, gutted or un-gutted	Outer surface	**Colour:** bright, dull, bleached **Slime:** colourless, discoloured
	Skin	**Damages:** none, punctures, abrasions
	Eyes	**Shape:** convex, flat, concave **Brightness:** clear, cloudy **Colour:** normal, discoloured
	Belly cavity	Guts **(in intact fish):** intact, digested cleanliness **(in gutted fish):** completely gutted and cleaned, incompletely gutted, not washed **Belly walls:** bright, clean, discoloured, digested **Parasites:** absent, present **Blood:** bright, red, brown
	Texture, appearance of gills	**Skin:** smooth, gritty, flesh, firm, soft **Colour:** bright red or pink, beached, discoloured **Mucus:** clear, opaque, discoloured
	Odor of gills	Fresh, characteristic, neutral, slightly sour, slightly stale, definite spoilage, putrid
Raw fillets	Appearance	Translucent, glossy, natural colour, opaque, dull, blood-stained, discoloured
	Texture	Firm, elastic, soft, plastic
	Odor	Marine, fresh, neutral, sour, stale, spoiled, putrid

Sensory Evaluation

Attributes of fish used in Sensory Evaluation:

Code of Practice for the Handling of Fresh Fish at Sea

General Requirements

Pre-Requisite Program

- Every person involved in the handling of fresh fish shall undergo a course in Basic Fishermen Training and annual upgrading training courses.
- Every person involved in the handling of fresh fish shall be licensed in accordance with the Fisheries Regulations of the Commonwealth of Dominica.
- Every person involved in the handling of fresh fish shall undergo a course in Basic Food Hygiene and Annual Upgrading Training Courses.
- Every person involved in the handling of fresh fish shall have a valid Food Handlers Certificate.
- No person who is suspected to be suffering from, or who is a carrier of any communicable disease or has an infected wound or open lesion shall be engaged in the handling of fresh fish.
- Every person involved in the handling of fresh fish shall adorn themselves at all times with the appropriate clean protective clothing, head covering and footwear.
- Every person involved in the handling of fresh fish shall at all times maintain a high level of personal hygiene and cleanliness.
- Every person involved in the handling of fresh fish shall observe all safety precautions to prevent contamination and maintain best quality product.

Hygiene Control Program

The hygiene control program shall take into consideration the following:

- Cleaning Processing: A typical cleaning and disinfecting process may involve as many as six separate steps:
- "Pre-cleaning": Preparation of the vessel and utensils for cleaning. Involves steps such as removal of all fish, other equipment, material and fish scraps.
- "Pre-rinse": Rinsing with water to remove remaining large pieces of loose fish etc.
- "Cleaning": Removal of fish, dirt, grease or other objectionable matter using an approved detergent by the official agency having jurisdiction.
- "Rinse": Washing with potable water or clean water, as appropriate, to remove all fish and detergent residues.
- "Disinfection": Application of chemicals, approved by the official agency having jurisdiction and/or heat to destroy most microorganisms on surface.

Pest Control

An approved Pest Control Program shall be carried in accordance with the guidelines set by the official agency having jurisdiction. Pest control program could include preventing access, eliminating harbourage and infestations, and establishing monitoring, detection and eradication systems.

Waste Management

Offal and other waste materials shall be removed from the vessel at the end of catch.

Specific requirements

Fishing Vessel Design and Construction

For the purposes of this Code, the type of vessel covered therein is in accordance with the requirements set for Fishing Vessels within the Organization of Eastern Caribbean States (OECS). The design and construction of a fishing vessel shall take into consideration the following:

For ease of cleaning and disinfection:

- Vessels shall be designed and constructed to minimize sharp inside corners and projections to avoid dirt traps and facilitate ample drainage when cleaned.

To minimize contamination:

- All surfaces used for handling fish shall be non-toxic, smooth impervious and in sound condition, to minimize the build-up of fish slime, blood, scales and guts and to reduce the risk of physical and microbial contamination.
- All vessels shall be constructed with a cold storage facility/ice box constructed with a fitted lid and made of impervious material.
- Facilities shall be provided to prevent the contamination of fish from other materials, harmful substances, offal, birds, insects, or other pests.

To minimize damage to fish:

- Handling surfaces shall have a minimum of sharp corners and projections.

- Storage area design shall avoid excessive pressure being exerted on the fish. Fish shall not be stacked too deeply in storage.
- Fishing gear and its usage shall minimize damage and deterioration to the fish. They shall be carefully selected to ensure minimum damage during harvesting.

Design and Construction of Equipment and Utensils

The design and construction of utensils shall take into consideration the following:

For Ease of Cleaning and Disinfection:

- All equipment shall be washed and disinfected after use.
- Utensils coming into contact with fish shall be constructed to ensure that they can be adequately cleaned, disinfected and maintained to avoid contamination.
- Utensils shall be designed and constructed to minimize sharp inside corners and projections and tiny crevices or gaps to avoid dirt traps.
- Cleaning utensils and cleaning agents shall be approved by the official agency having jurisdiction.

Handling of Fresh Fish

- Where practicable, whole, large fish should be stunned, bled and gutted as soon as they are taken on board the vessel. This is aimed at avoiding these species to become exhausted before they die and thus impair their quality.
- Prompt gutting allows fish to bleed and the removal of stomach and gut is vital thus would otherwise cause a softening of the flesh and accelerate spoilage. Where rapid gutting is not practicable whole fish should be washed and chilled as soon as it comes on board the vessel.
- No fish shall be accepted if it is known to contain parasites, undesirable microorganisms, pesticides, veterinary drugs or toxins, decomposed or extraneous substances harmful to human health.
- Fish determined as unfit for human consumption, shall be removed and stored separately from the catch and either reworked (bait) or disposed of.
- Fish deemed fit for human consumption shall be handled properly with particular attention being paid to time and temperature control. Poor handling of fresh fish can lead to damage and accelerate the rate of decomposition and increase unnecessary post-harvest losses.
- Fresh fish shall be unloaded and chilled without delay.
- Fresh fish shall be stored in shallow layers and surrounded by finely divided melting ice and kept chilled at a temperature as close as possible to 0ºC.
- Monitoring and controlling the time and temperature and homogeneity of chilling shall be performed at scheduled intervals.
- Fresh fish shall be handled and conveyed with care particularly during transfer and

sorting in order to avoid physical damage such as puncture, mutilation, etc.

- Fresh fish shall not be trampled or stood upon.
- Fresh fish shall not be stored in ice boxes that are overfilled or stacked too deeply.
- Fresh fish shall not be exposed to the adverse effects of the elements (direct sunlight, wind, rain) in order to prevent unnecessary dehydration.
- Containers used to store waste shall not be used for storing fish. Wicker baskets shall be avoided.

Code of Practice for the Design and Construction of Fishing Vessels

The aim of this Code is to set out minimum requirements for the design and construction of vessels employed in the Fisheries Sector in the Commonwealth of Dominica. This Code of Practice provides guidelines on the design, construction and equipment of small fishing vessels with a view to protect the quality of the products.

This Code of Practice is intended to apply to fishing vessels of classes 1-4 in accordance with the requirements set by the Organization of Eastern Caribbean States (OECS) for fishing vessels in the Region. This Code of Practice does not apply to fishing vessels for sport or recreation or to vessels with enclosed processing areas for Fishing Vessels in the region.

General Requirements

- All Fishing vessels shall be licensed to operate in accordance with the Fishing Regulations of the Commonwealth of Dominica.
- Where practicable, the official agency having jurisdiction shall arrange for appropriate inspection of a vessel during construction and at regular intervals after completion, to ensure satisfactory condition of the vessel.
- License shall cease to be valid by the official agency having jurisdiction that they are not fully satisfied that the vessel is in compliance with the requirements of the relevant provisions of the Fisheries Regulations.

Specific Requirements

The hygienic design and construction of a fishing vessel shall take into consideration the following requirements:

For Ease of Cleaning and Disinfection:

- All surfaces with which fish might come in contact shall be of corrosion resistant material which is smooth and easily cleanable.
- Vessels shall be designed and constructed to reduce sharp corners and projection to avoid dirt traps.

To Minimize Contamination:

- All surfaces in fish handling areas shall be non-toxic, smooth and impervious to minimize build-up of and contamination with fish slime, blood, scales and guts.

- Separate facilities shall be provided to avoid contamination of the product with poisonous or harmful substances, dry storage of materials, packaging etc.

To Minimize Damage to the Fish:

- In fish handling areas, surfaces shall have a minimum of sharp corners and projections.
- In fish storage areas, the design shall preclude excessive pressure being exerted on the fish or shell fish.
- The product shall be protected from unnecessary exposure to the harmful effects of the elements of the weather.

To Minimize Decomposition:

- Design shall permit quick and efficient handling of fish.
- Suitable facilities shall be provided for transport and proper storage of ice.

To Minimize Damage during Harvesting:

- Seines, nets and traps shall be carefully selected to ensure minimum damage during harvesting.
- All equipment for harvesting, catching, sorting, grading, conveying and transporting of fresh fish shall be designed for rapid and efficient handling of fresh fish without causing damage and shall be suitable for easy and thorough cleaning as well as disinfection.

SAFETY-AT-SEA

Requirements for Safety at Sea of the Vessel and Crew shall be in accordance with the Fisheries Act No.11 of 1987.

MODULE 7

Marine Resource Management

Sustainable Fishing Practices

By Norman J. Norris

Aquatic or marine resources are largely invisible, and this makes the use of indirect methods and complicated scientific models for assessment necessary. The responsibility and authority for fisheries development does not lay only at the feet of the fisherman who are the direct users of the resource. Fisheries production depends on directly harvesting living organisms that live in the ocean or using the ocean surface for aquaculture.

The mindset is yet to change from considering fisheries as an extractive industry, to an industry based on renewable natural resources.

The demand for fish protein will continue to increase as a result of increase in population and the health benefits of eating fish compared to meat. In this regard there is a clear need for properly managed fisheries to ensure that resource waste is minimized or eliminated and that fisheries management plans are put in place that ensure long term sustainability of fish resources.

FAO's code of conduct for responsible fisheries gives every state the responsibility to manage its resources responsibly. Article 7-Fisheries Management 7.6.9 says that:

"States should take appropriate measures to minimize waste, discards, catch by lost or abandoned gear, catch of non target species, fish and non fish species, in particular endangered species. Where appropriate, such measures should include technical measures related to fish size, mesh size or gear, discards, closed seasons and areas reserved for selected fisheries, particularly artisanal fisheries. Such measures should be applied where appropriate, to protect juveniles and spawners. States and sub-regional or regional fisheries management organizations should promote, to the extent practicable, the development and use of selective, environmentally friendly safe and cost effective gear and techniques".

One might ask, "What does the term 'sustainable fishing practices' mean?" The American Heritage Dictionary definition of sustain is "to keep in existence; to maintain". In addition, fishing means "the gathering of fish". Combining these words you get a method of collecting fish (your crops) while maintaining your fish and reef resources at the same time. In other words, sustainable fishing should mean fishing activities that do not cause or lead to undesirable changes in biological and economic productivity, biological diversity, or ecosystem structure and functioning from one human generation to the next (NRC 1999). According to FAO (1988), sustainable development is "The management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment of continued satisfaction of human needs for present and future generations. Such sustainable development conserves (land) water, plants and (animal) genetic resources, is environmentally non-degrading,

technologically appropriate, economically viable and socially accepted".

The above definitions indicate the three Principles of sustainability related to the need to:

- Conserve (and sustain) the multiple resource in its environment;
- Satisfy the social and economic needs of us human beings;
- Management guidelines for requirement to changes in institutions and technology.

A fishery open to all is responsible to none. This is called "the tragedy of the commons". This occurs when resources-such as the air we breathe, the water we drink and the fish we eat-shared by everyone (or held in common) are used at a rate which exceeds the resources' sustainable limit. Ultimately, as population grows and consumption increases, the "commons" collapse resulting in a tragedy.

Fish conservation and sustainable fishing improvements have been going on internationally for years with support from a wide variety of organizations, groups and individuals. However, too many people choose to ignore the fact that you need to do your share to help. Solving those problems is not easy and it takes many people to make a difference. Some of the changes come in the form of establishing marine reserves (e.g. SSMR), educational workshops, government and conservation group activities, regulations, and just plain old fashion not over fishing. As fisher persons, we are all responsible for the management of our marine resources and should respect it as such. The biodiversity of the reef and ocean is vital. We cannot say, ok, no more fishing from the sea again. Humanity depends on too many aspects of the sea for nutrition, medicines and much more.

So exactly, how should we go about putting into action a practice of sustainable fishing practices?

Prevention of Overfishing, Over investment and Overcapacity

Overfishing may be defined as the application of an excess amount of effort to a stock. There are varieties of types of overfishing. Here, the most common one is growth overfishing. This is when the fish are harvested before they have time to grow to a marketable size, or before they have time to reproduce.

You cannot be catching fish on the same reef, month after month after month, and expect the same results. Eventually the fish size and quantity will decrease to your detriment. Prevention of overfishing involves fishing effort limitations; mesh size regulations, closed seasons etc.

Too many fishermen in a small fishing area or bank will not help the fishermen or the fish. Here in Dominica, diversification is synonymous with agriculture, but it can be applied in any aspect of a business. Monotype fishing is not the answer in small-scale fisheries. Different fishing methods should be employed at various times of the year because no one method works all year round. The ecology of fishes on coral reefs should also be a concern.

Over investment is the application of an excessive amount of investment beyond the means of reasonable returns on that investment. The investment should be conducive to the size of the fishery based on a variety of information. I.e. stock, market and other such information based on a business plan. (No need to invest in a quarter million dollar trawler with a crew of eight, and having a loan of $5,000.00 a month, when a smaller operation will do.)

Overcapacity comes from too many boats chasing too few fish. This prompts the need for licensing and registration systems to regulate the number of persons and the amount each person can extract from the resource during any given cycle.

Protection of Juveniles and Spawners

Juveniles ensure the replenishment of stocks. It should be pointed out that catching juveniles contributes to a reduction in the potential biomass of the stock and in the number of individuals which can reach maturity and reproduce. All other factors being constant, catching juveniles leads to a reduction in the biomass and the potential yield and may have an impact on restocking.

The use of small meshes for example in pots, nets and seines, may lead to the capture of immature or juvenile fish that otherwise could grow, spawn and in the case of commercial fish species, contribute more significantly to the value and production of the fishery.

This is the cornerstone of sustainable fishing, protection of juveniles and spawners. Without this non-negotiable policy, the future of fisheries is doomed. If you cannot have juveniles and spawners, you cannot have adults.

We know of some fishermen who still think that the minimum mesh size should be reduced so they can catch smaller fish. Is it just to make a dollar? It is better to have one fish weighing a pound than ten fish weighing a pound. Even if it guarantees each family member one or two fish each. The fact remains that catching bigger fish means that there will always be fish in the sea to catch in the future.

Minimize Gear Loss (Ghost Fishing), Bycatch and Discards

All fishing gears impact to a greater or lesser extent on the aquatic environment and associated resources. Inadequate management of these fishing gears can contribute to habitat destruction, resource depletion and the collapse of entire fisheries.

Ghost fishing can be defined as the ability of a fishing gear to continue fishing after all control of that gear is lost by the fisherman. All fishing gears no longer under the control of a fisherman can be treated as “ghost gears”. Lost fishing gears and ghost fishing are separate. Some lost gear cannot continue to fish because of their characteristics. Therefore, this means that lost fishing gear are not necessarily catching fish. Ghost fishing is very much gear specific. Pots and nets are the most common gears.

Bycatch is that part of the gross catch, which is captured, incidentally to the species towards which there is direct effort (targeted species).

Discard is the practice of returning to the water, fish which are caught by a fishing operation. Some seine operations are characterized by high discard rates of unwanted or unmarketable fish, and of juvenile or undersized commercial species.

In tropical coastal countries like the Caribbean, and Dominica in particular, on average hundreds of fish pots and nets are lost every year to hurricanes and other disasters. Many governments are now encouraging their fishermen to us pop-ups and biodegradable material in the construction of their gear.

You fishers need to know that unless you fish in a sustainable manner, your pots and nets will come up empty and your livelihoods will disappear. You can neither wish that situation away nor leave it unattended.

Fisheries Data for Resource and Fishing Business Management

By Derrick Theophille

During the Fisheries Industry Census, only about 28.5% of fishers mentioned that they keep records of their fishing business. For those who did not keep any records, we asked them what the reason was for not doing so and arrived at three conclusions: 73% could not give any reason, 21% said that their reason was that they simply did not know how to keep the records and 6% said that record-keeping was unimportant.

Of the small number of fishers who did keep some records, most kept records of the income or expenses of their operations. Only 49% of them kept records of their fishing operations or landings. That means, only about 14% of all fishers keep details of their fishing operations or landings. This is a poor situation for the fisheries industry as the wealth of information that is being ignored by most of the industry could help focus activity, improve landings and maximize profits, making for a very wealthy and happy fisher.

It is the intention of the Fisheries Division to improve the current situation and raise the standard of the local fisher to a more efficient and self-sufficient individual who is business oriented as well as aware of the status of the resource he exploits.

Words and Meanings

In dealing with the topic of data, there are various words that occur frequently. This prompts an explanation or at least an introductory summary of what these words mean in this context and how they apply.

Some of the major words we will come across:

Data

Data can be simply described as facts that become useful information. It is the lowest form of facts from which information and knowledge can be derived. Data, plural form of datum, is a Latin word meaning “to give” or “something given”. So it is something given from one individual to another. You may have heard about “raw data”, which people normally refer to as untouched or unprocessed numbers. It is worth knowing that data is often “cleaned” after collection for the purpose of accounting for errors in data entry or collection or for standardization of labels within the database. A database is a tool used for entering the data into the computer.

An example of data would be:

“One tuna at 20 lbs is landed at Marigot on May 3rd 2007.”

The Fisheries Division collects data like this as a means of learning about the fisheries industry.

Information and Knowledge

Information is a collection of facts from which conclusions may be drawn. It can be considered to be almost synonymous to the word knowledge as it was first used to mean the act of informing or giving shape to the mind, such as education, training or instruction.

Information is the knowledge derived from study, experience or instruction. But overall, information is the result of processing, manipulating and organizing data in a way that adds to the knowledge of the person receiving it.

An example of information would be:

"For the month of May 2007, 40% of the fish landed at Marigot was tuna."

We gain a better understanding of what the situation of fisheries is at Marigot because of this new information. This information was determined after collecting and looking at the data over a period of time.

Trends

A trend can be defined as the general direction in which something tends to move. Trends make use of time series data, that is, records collected over a period of time, to determine the behavior of the dataset. This way we can tell if the data is showing an increasing or decreasing trend. This is particularly useful for making quick predictions as to what will happen next with a dataset.

An example of a trend would be:

"We have seen a steady increase over the years in tuna landings and expect to see an increase of 2% in tuna landings for the coming year."

Trends help make sense of the information and add the important component of time into the mix of variables.

About Fisheries Data (An Overview)

Fisheries Data comes in many types based on what it is the fisheries scientist or even the fisherman himself is looking at assessing. Each type has its particular purpose in the grand scheme of things relating to fisheries resource and business management.

Catch and Effort

Catch and effort data is the most simple, common and basic type of fisheries data available. It involves recording the catch and the effort from a fishing trip.

Catch: Weight and Number

Catch can refer to two factors; number of fish and the weight of the fish. The number of fish is basically a count of the number of fish caught. So we can say a fisherman has caught 10 yellow fin tunas. Weight refers to a measurement of the mass of the fish. This measurement can be done at the time of catch (on the boat), or at the time of landing (as in the local situation). A scale is the only tool required for this task, but accomplished and experienced data collectors are able to carry out a fairly accurate visual estimation of the weight of the fish caught. Fish weight is usually measured here in pounds (lbs). These are some of the most basic pieces of data collected from the fisheries industry.

One other consideration to the weight dataset is the status of the fish at time of measurement. This means that a fish that is gutted will weigh less than the same fish if it is not gutted. Therefore it is important to clarify with additional details as to the status of the fish at the time of weight measurement.

Weight and number of fish can help determine the amount of fish extracted from the available stock. Another important use of this data is that it can show where undersized fish are being caught as correlations can be made between weight and number of fish caught per species. Smaller fish will have a higher number to weight ratio than bigger fish.

Activity/Effort

Fishing activity or fishing effort refers to many factors. It can refer to the size of the fleet (number of boats), number of fishers, amount of gear, and the methods used on or within the fishery. Boat trips are also used as a measure of fishing effort. Boat trips are simply the number of trips per boat for an area, landing site or country. Gear effort can be measured as sets or soak time (with regard to pots/traps or nets). This dataset gives us an idea as to how much activity takes place within the fishery. It can also be used to determine how much money and time is spent fishing as well.

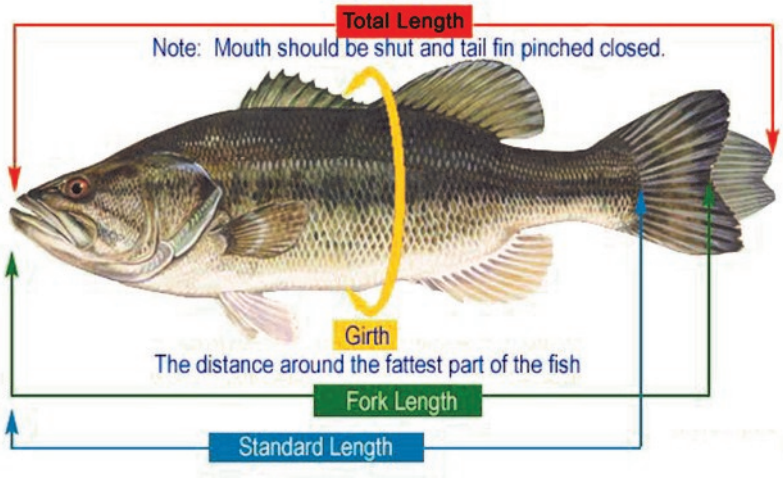
Biological

Biological fisheries data refers to measuring, studying or determining the biological or body characteristics of the fish.

Length

This refers to fish length data. Fish length usually comes in three varieties: (a) total length, (b) standard length and (c) fork length. Total length (TL) refers to the length from the tip of the snout to the tip of the longer lobe of the caudal fin (tail fin), usually measured with the lobes compressed along the midline. It is a straight-line measure, not measured over the curve of the body. Standard length (SL) is the length of a fish measured from the tip of the snout to the posterior end of the last vertebra or to the posterior end of the midlateral portion of the hypural plate. Simply put, this measurement excludes the length of the caudal fin (tail fin). Fork length (FL) is used for fishes with forked tails. This is the length measured from the tip of the snout to the end of the middle caudal fin (tail fin) rays and is used for fish in which it is difficult to tell where the vertebral column ends.

Figure 30: Measuring fish length



Length data is mainly used with weight data to generate length weight relationships of fish species. This is useful for cases where either but

not both the length and weight data is unavailable. Either can be calculated using the other available data.

Age, Maturity and Sex

In fisheries management, fish sex is another vital piece of information. This basically refers to determining the sex of the fish. In many cases this is not as simple as looking at the appearance of the fish (the dolphin fish can be determined by looking at the shape of the head). Gonads or the reproductive organs are sometimes harvested from the body for further study to measure reproductive capacity or fecundity (the number of eggs produced for each reproductive cycle). Typically, fecundity increases with age and size.

Fish age and maturity are used to determine growth rate (speed at which fish grow over time) and also to determine when the fish is ready to begin reproducing. Age can be determined by harvesting and studying otoliths. The otolith is an organ used for hearing and balance in fish. As the fish grows so does the otolith and as such it can be used for measuring the age of the fish by counting the rings.

Socio-economics

The last census done within the fisheries industry was focused on better understanding not just the characteristics of the fleet or fishers, but also the way in which fisheries-related activities affected other aspects of the lives of these fishers. Socio-economic refers to the study of the interactions between social and economic activities.

Social and economic benefits of fisheries to the fisher and his family and society

The census looked at the status of fishers' families, their communities, how they earned their money and how they spent it. Some persons may object to giving all of their personal information to a fisheries official. However, they should understand that this information is collected for the purpose of better understanding how the industry is meeting the needs of those who rely on it as a means of making a living. It is necessary from time to time to reassess how well the industry is performing.

Socio-economics in fisheries also involves the village or community and the country as a whole. For a long time the impact of fisheries on our society has been measured in the form of a GDP figure (GDP being Gross Domestic Product). GDP basically tells us how much the fisheries industry has contributed towards the economic performance of our country. The contribution of fisheries to GDP has generally been low; however, in rural communities the value of fisheries is undeniable as a mechanism for generating wealth.

There is also the problem of supplying our communities with the protein it needs. Once again, fisheries play a vital role in our rural communities. However, other factors such as the rise in fuel prices are having an impact in the price at which fish is sold even in those remote communities. All of these factors need to be addressed in order to maintain a low price for fish in our rural communities.

Methods of Data Collection in Fisheries

Now that we have some idea as to the many pieces of details that make up fisheries data, we now need to find out how all of this is collected.

Fisheries surveys

If data is lacking, then a survey is needed. There are landings surveys, boat and gear counts and censuses.

Landing surveys

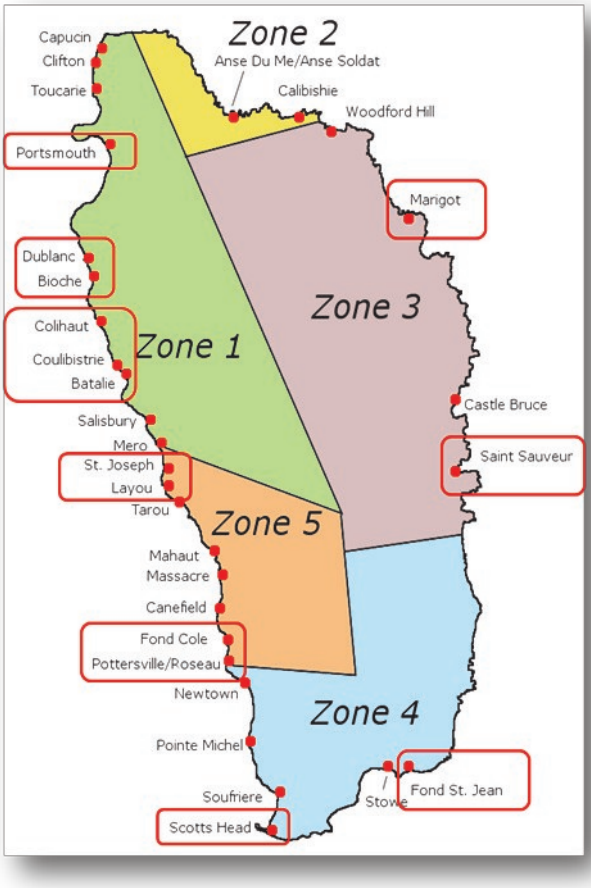
This is the typical survey found locally. This is a study of the fishing trip and fish landed. When fishers return to their landing site after a day of fishing, they are met by a data collector, a person whose responsibility it is to capture details about the fishing trip. These details normally include where the boat went fishing during the trip, what gear was used, what fish was caught and how much and how many persons were on the boat. This information is written on a supplied data book and returned to the Fisheries Division for processing and data entry.

Locally, landing surveys are done at 13 landing sites by nine data collectors who work on a part time basis. They are required to capture details for only a fraction of all trips for their designated landing sites. Landing surveys help collect sample data on total catches and effort. This survey is done continuously and almost daily.

Fisher and Boat Registration

In order to control the number of persons, boats and gear operating in the industry a register must be maintained. Fishers are registered at the Fisheries Division office and obtain a registration card as proof of registration. There are three types of registration cards: (a) part-time, (b) full-time and (c) investor-only. Each card type is based on the amount of time the fisher works within the industry. This allows the Fisheries Division to know how many fishers are operating and to what degree. A certificate of registration is issued to fishers who register their fishing boats. This is basically a document certifying the boat as a fishing vessel.

Figure 31: Areas where data collectors are based



The Importance of Standards for Fisheries Data

Standards are necessary for assuring the collection of the best possible and highest quality

data. Standards represent ensuring that the correct data is collected in the proper manner by data collectors. Common names and sometimes codes are used to prevent confusion as to what was meant by collectors. Field data collection is considerably streamlined as collectors know who to interview, when and how and what to ask for and how to record it all on the data book.

In the office, standards continue to play the role of monitoring how the data is processed, stored and reported.

Estimating Total Catch and Effort

As mentioned, the data collected during most of the surveys can be just a sample of the total population. That is, if there are 100 boats at a site, a sample of these would be 10 boats. But these 10 boats would have to be randomly chosen to represent a true picture as to what is the reality at the site. Samples allow for researchers to save on time, money and effort when trying to gather details about a situation. Sometimes there is no way to capture all of the data (census), so a sample is used very frequently in research.

However, when the data needs to be reported, sometimes a sample figure is not enough to represent what is really happening at the site. Hence, an estimate needs to be calculated. In estimating the total figure, the sample figure is "raised" to represent what the total could be in reality. Various methods are used based on the sample method employed and the situation being assessed. In fisheries a generic formula is used to estimate catch: Catch = CPUE x Effort.

CPUE or catch per unit effort is calculated by finding out how much fish is caught for each unit of effort. Effort is the total number of boat-days or boats fishing per day. Although this may seem simple it can become quite complex.

Individual Data Collection

Benefits of Individual Data Collection

Although the Fisheries Division is in the business of fisheries research and data collection, there is no guarantee that the Fisheries Division will have every piece of data relevant to you, the individual fisher. Data sampling does not allow for collecting details on every activity that occurs on the landing site every day of the year. Therefore it may be in the individual fisher's best interest to collect some of his own fishing records for his future use.

One of the main benefits of individual data collection is having a record of your income (as in value of fish caught) that can be used as a sort of income statement for a bank or other lending institution. It is well known that lenders require some record of your earnings and also your expenses as a prerequisite to granting a loan. Keeping a daily log of your fishing activities, amount of fish caught, amount spent for the trip and so forth can be invaluable in securing a loan.

Another benefit is that, your records can give you an idea as to the state of your business. You can tell if your business is making money or losing money and where the money is coming

from or going. With that sort of information informed management decisions can be made to improve your business.

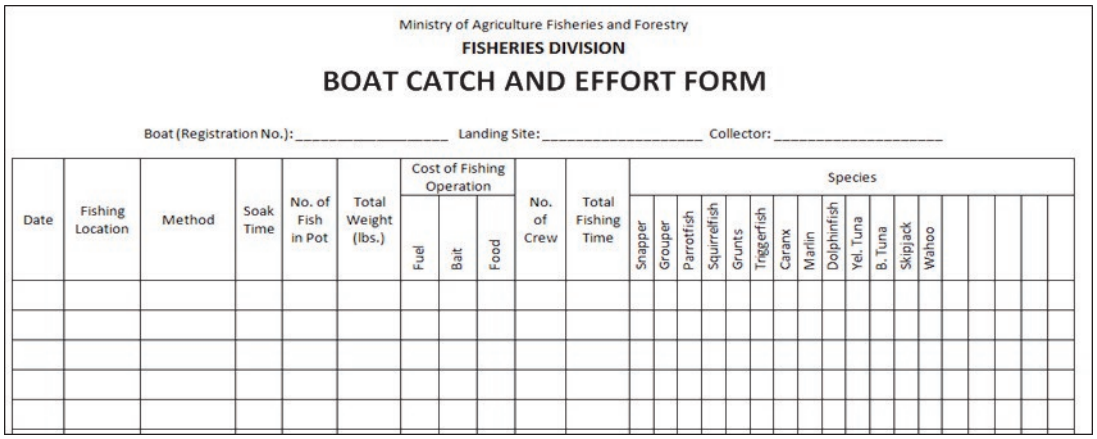
Good data on your fishing business and operations can also help the fisher in planning his fishing trips. Keeping records of the catches at various fishing locations at different times of the year can help immensely in this regard.

The Individual Fisher Catch and Effort Data Book

A "Boat Catch and Effort Book" is available at the Fisheries Division for the purpose of assisting fishers in collecting some of their own individual catch and effort data.

The book comes with individual forms which can be used by the fisher to record details of his fishing trip. These details can then be used by the fisher to calculate income and expenses.

Figure 32: A sample of the individual boat catch and effort form



Ministry of Agriculture Fisheries and Forestry

FISHERIES DIVISION

BOAT CATCH AND EFFORT FORM

Boat (Registration No.):_____ Landing Site:_____ Collector:_____

Date	Fishing Location	Method	Soak Time	No. of Fish in Pot	Total Weight (lbs.)	Cost of Fishing Operation			No. of Crew	Total Fishing Time	Species																
						Fuel	Bait	Food			Snapper	Grouper	Parrotfish	Squirrelfish	Grunts	Triggerfish	Caranx	Marlin	Dolphinfish	Yel. Tuna	B. Tuna	Skipjack	Wahoo					

Fisheries Regulations & Marine Laws

By Norman Norris

Comply with Fisheries Regulations

There is something that I call the "Only in Dominica syndrome". Many persons travel, and one of the first conditions that they agree to abide to, is the law of the land. Be it "No Smoking" or "Don't litter", we voluntarily comply. Here in Dominica we have difficulty respecting our own rules and regulations for the management of our country's natural resources, including fisheries.

All countries including Dominica face serious challenges in fisheries conservation and management. The sharing of information can help meet the new challenges.

The Fisheries Act No. 11 of 1987 and subsequent regulations are the bible for fisheries development in Dominica. Particular areas of interest to fishers in the regulations would be:

Safety-at-Sea

Part 1, section 4 and 5, safety equipment and fines for infringement of it: Concerning safety equipment this section says that: (4) Every vessel shall carry on board:

- a bailer capable of removing water from the vessel;
- a hand-held compass or other compass approved by the Chief Fisheries Officer;
- not less than 13.64 liters of fresh drinking water stowed in a closed container for each person on board a vessel less than 7.62 meters in length over-all or 22.73 liters per person on board a vessel 7.62 meters and over;
- one set of oars and one main sail;
- a battery-operated water-proof flash light;
- non-perishable rations stowed in a water-proof container, sufficient to sustain each person for at least five days;
- a small glass mirror capable of being used as a reflector;
- at least two flares suitable for use at night;
- at least two flares suitable for use in daylight;
- a sea anchor of a size and design appropriate for the vessel;
- at least one life jacket for each person on board the vessel;
- at least two (2) persons on board once the vessel is at sea engaged in fishing;
- the vessel must have at least one VHF radio, and
- a radar reflector

Fine for infringement of regulation 4; (5): Any owner, master or charterer who contravenes the provisions of regulation 4 shall be guilty of an offence and shall be liable on summary conviction to a fine not exceeding five thousand dollars ($5,000.00)

Licensing and Registration to Fish

Part IV, Local fishing licenses and registration:

- application for license of local fishing vessel (12)
- a register of local fishing vessels (13)
- registration markings
- notification of change of ownership
- fisheries data compilation
- registration of local fishermen
- fishing without a valid registration card

Resource Conservation Measures

Part VII, deals with fishery conservation measures regarding lobsters, turtles, conch, traps (pots), erection of Fish Aggregation Devices (FADs) and the unlawful removal of nets.

Concerning FADS

- No person shall undertake any activity or build, construct or erect or cause to be built, constructed or erected any building or structure on, over or under any waters for aggregating fish or to be used for that purpose without written permission from the Chief Fisheries Officer and in accordance with such conditions as he specifies,
- Permission to place a Fish Aggregating Device shall not, of itself, confer any exclusive right to fish in the vicinity of the device.
- Anyone who places any matter which may constitute an obstruction, impediment or interference with fishing around a FAD or removes, destroys or damages a deployed FAD in that area
- Any sport fishing vessel that engages in any fishing activity within one nautical mile from any deployed FAD; or
- Any vessel without a valid FAD permit that fishes within one nautical mile from a deployed FAD;

Commits an offence and liable on summary conviction to a fine of five thousand ($5,000) dollars and in default of payment thereof to imprisonment for twelve (12) months.

The conditions for use of all Fish Aggregating Devices (FADs) will be set out from time to time by the Chief Fisheries Officer.

Voluntary Self-Policing

All persons do not readily accept reform. There should be some pressure on offenders to do the right thing. The responsibility is on every stakeholder to police each other. The dangers and damages of destroying this fragile resource will affect fishers and non-fishers alike. Fishermen should encourage other fishers to:

- Catch good size fish
- Use regulated mesh sizes for fish pots and nets
- Comply with boating safety regulations
- Support their data collector
- Observe closed season for lobsters and turtles

- Have their boat and fishermen (crew) registered

There is growing recognition that effective fisheries management requires active participation by those for whom regulations must apply. Without, the assent of fishers and the acceptance that the necessary regulations to limit or direct fishing activity in some way make sense, there is little hope of sustained success. In other words, there are just too many ways to "beat the system". One key emphasis is on modifying attitudes and, where practicable involving the entire community in the management process. This should be encouraged.

MODULE 8

Safety-at-Sea

Safety-at-Sea

By Derrick Theophille

Safety-at-Sea refers to the preservation of one's life while at sea. This document will cover the basics of preparing for a sea journey, deliver some pointers on surviving at sea in the event of an emergency situation occurring, and finally provide a checklist that can help the reader prepare for his upcoming sea trip.

Preparations

Being prepared is the most important rule of safety, as someone once said: "prior planning prevents poor performance". Prior planning can also mean survival. The following information serves to assist fishermen and seafarers in getting prepared for sea trips by providing a few tips for safety.

The Individuals

Preparation should begin with the boaters: the crew, the captain and any other person venturing out to sea, as individuals. Each person must be prepared mentally and physically for the trip. He must be ready to cope with any emergency that may arise while at sea. Generally, it is advised that persons should not go to sea while under the influence of any drug or alcohol, which may slow response time and blur judgment. In the event of an emergency, he may not be able to respond properly. This could mean life or death for him or for any other person on the boat.

Individuals need to be responsible for their own safety, and then the safety of others. Each person must see to it that the boat has everything needed for his or her own comfort and safety for the duration of the sea journey. Be sure that there is enough food and water and that each person has his own Personal Floatation Device (such as life jackets).

One major advice is that every person willing to venture to sea is comfortable with being in the water and above all is able to swim. It may be seen as an absolute joke that someone wish to go out to sea and is not able to swim. However, many sea goers do not know how to swim, which means that during an emergency this inability may pose a great risk to himself and the life of his fellow sea traveler.

Basic First Aid and Rescue training may also come in handy for sea journeys. If possible, try to get First Aid and Rescue training, which may prove invaluable in emergency situations.

The Plan

It is important that each trip be planned properly. This plan should be communicated to persons not going out to sea for the duration of your own sea journey. These persons should be responsible and reliable; someone such as a family member, friend or even a police officer. The plan should include the following information:

- A description of the boat you will be traveling on: This means the colour, size, type (whether wooden or fiberglass) and registra-

tion number on the boat. This allows the Coast Guard or any other Search and Rescue (SAR) persons to know what boat to look for.

- The engine type: This can help to determine how fast the boat is able to move. Very helpful in SAR operations, as velocity or speed can determine what areas the searches will cover.
- The size of the crew: The number of persons aboard the boat.
- The name or a general description of the area(s) fishing will be carried out and the general route of travel: This will be the most important piece of information the SAR team will need. Therefore it is important to give as best a description as to where your travel will cover, and to stick to that plan as much as possible. SAR can use this to determine where to start looking for you if you get lost or encounter difficulty getting back to land.
- The Estimated Time of Departure (ETD) and the Estimated Time of Return (ETR): This can give the person on the ground some sort of idea as to when you will be back. If you are not back by a certain time, the person can contact rescue services.

As mentioned previously, it is important that you, as the sea traveler, stick to your plan. If, for some reason you decide to stay out at sea a bit longer than normal, or dock in at some other landing site without notifying your "person on the ground", he may become worried and contact the rescue services. This could result in a SAR operation for someone who does not need the assistance, hence wasting resources and time.

The Boat

The boat must be in good condition before venturing out to sea. Just as a driver checks his tires, oil and engine on his vehicle for safety and reliability before driving, a boater should check his boat for safety also before going out to sea. The hull should be checked for leaks and cracks. If large leaks or cracks exist, it may be best to postpone the sea trip until they can be repaired, especially if the trip will be long or involve crossing rough waters. Rotten wood is a sign that the boards need replacing.

Make sure that the hull is strong and stable enough to accommodate the crew, gear, supplies and the catch. Remember, do not load your boat beyond its capacity (do not put more stuff in the boat than it can hold).

To aid identification of your boat during SAR operations, it is advised that your boat be painted in bright colours, such as red, yellow or orange, anything that can stand out in the big blue sea.

The Engine

For long life of your engine and for reliability, it is recommended to get your engine serviced every three (3) to six (6) months. Of course, this is based on how often you use your engine. Engines used more frequently need servicing more often.

Before each trip, remove the engine cover and look over the engine. Make sure that all of

the parts look O.K. and are in order. The spark plug is one component that should not be overlooked. If it needs replacing, make sure that you get the right type of plug for your type of engine.

It is also a good idea to carry along a set of tools. Screwdrivers, spanners and other tools can help to replace a bad spark plug at sea and help you get home.

The Fuel System

Poor fuel system installation and dirty fuel are frequently the cause of engine breakdown. To prevent this, you should check the fuel system connections to make sure they are secure and working properly. Look for blockages in the fuel line, make sure the fuel flows freely to the engine.

To ensure there is enough fuel for the entire fishing trip, the One-Third (1/3) Rule is recommended. Basically, this rule recommends that one-third (1/3) of the fuel is used to get to the fishing site and out your fishing operations (such as trolling), another third is used to get back to land after fishing, and the last third is kept as a reserve. For example, if you carry three (3) drums of fuel: one drum is used to go fishing, one drum to return, and the other drum is used only in the event of an emergency.

The Equipment and Supplies

Perhaps one of the most important aspects of preparations is to get your equipment and supplies together. Equipment and supplies include:

- Food and water; enough to supply all of the persons aboard the boat for the duration of the trip.
- Navigation aids, such as GPS receivers, radar reflectors, charts, compass
- Personal Floatation Devices (PFD's), which include life jackets and life rings.
- Signaling and Communication devices, such as a VHF radio, flares, a mirror, flashlight or a horn.
- Tools and spare parts for the repair of the engine, boat and other equipment.
- A knife can be very handy in certain situations, be sure to carry a sharp one aboard.
- Your fishing gear and equipment; hooks, line, bait, pots, rope, net and so forth are needed to conduct your fishing. Be sure to carry everything you need to make the catch so that your trip can be as profitable as possible. It is also a good idea to carry ice to preserve fish quality.
- Fuel. Make sure you have enough fuel for the entire trip.

During an Emergency

Sometimes, regardless of how prepared we are accidents do happen. The sea is an alien environment not intended to support human life. The sea and climate are factors that cannot be accurately predicted or measured. However, if we are sufficiently prepared there is a good chance of survival if something does go wrong or not as planned. Above all remain calm and keep sharp during emergencies.

Some of the possible accidents that happen at sea are:

- Engine failure
- Collision
- Capsizing of the vessel
- Sinking
- Fires
- Grounding
- Losing course or not knowing your location or heading (getting lost)
- Persons getting sick or injured
- Drifting

Dealing with Accidents at Sea

The table below describes possible accidents that can occur while at sea as well as recommendations for preventing and or surviving such situations.

Possible Accident	Description	…Happens Because…	…Could Result in…	Recommendations
Engine failure	The engine ceases to function	Spark plug may fail. Fuel system may be clogged or carry dirty fuel to the engine. Fuel filter may be clogged or damaged.	Drifting, collision, grounding	Carry extra engine repair tools (e.g. screwdriver, pliers, etc.). Check engine and fuel system before going to sea (correct any possible problems). It may also be a good idea to carry along a backup for your engine, such as a pair of oars, or a sail, or a backup engine. Have food rations and water available.
Collision	The boat collides with another boat or other floating object	Poor navigation. Poor visibility. Loss of control of the boat (due to engine failure, rudder failure or steering problems, among others)	Sinking, fires, drifting, damage to vessel, injury or loss of life	Carry and use properly accurate and reliable navigation equipment. Travel with great care in areas of low visibility. Use lights in low visibility. Make sure engine and steering machinery is functioning properly before the trip. Always carry tools to conduct emergency repairs. Prepare a plan for abandoning the vessel in the event of sinking. Have Personal Floatation Devices (PFD's) available for all aboard. Have a first aid kit available. Have a bailer or bucket available to remove water from the boat.
Capsizing of the vessel	The event of the boat accidentally turning over in the water	Collision. Breaches or large leaks within the hull of the boat, which allows the boat to take on water. Rough or violent waters. Poor distribution of the weight on the vessel (too much weight on one side, causing the boat to turn over).	Injury or loss of life, sinking	Practice careful navigation practices. Have PFD's available. Have an evacuation plan for abandoning the vessel. Have a first aid kit available.
Sinking	The event of the boat taking on water an going below	Collision. Breaches in the hull, the vessel takes on water. Fires.	Loss of life, loss of vessel and equipment	Practice careful navigation practices. Have PFD's available. Have an evacuation plan for abandoning the vessel. Have a first aid kit available.

Possible Accident	Description	…Happens Because…	…Could Result in…	Recommendations
Fires	Smoke and flames occur at some part of the vessel.	Collision. Grounding. Electrical or fuel problems. Engine problems.	Damage to vessel and equipment (possibly navigation and certain signaling devices). Injury or loss of life to persons.	Maintain careful preparations before a sea trip. Make sure the fuel system is installed properly and functioning correctly. Have fire extinguishers available, if possible to handle both electrical and oil fires. Have a first aid kit available.
Grounding	The vessel hits land	Poor navigation. Engine or steering malfunction.	Damage to hull of vessel. Damage to equipment. Injury to persons.	Practice careful navigation. Use accurate and proper navigation equipment. Have a first aid kit available.
Losing course or not knowing your location or heading	This means that you are lost, not knowing which direction to take to get back home or to your destination	Poor planning of the trip. Poor navigation or no navigation skills. Poor or no navigational equipment.	Wasting of fuel, this could result in drifting.	Be knowledgeable about navigating at sea – get trained. Get accurate and reliable navigation equipment. Have signaling devices (such as VHF radios, flares, horns, radar reflectors, flash lights, etc.) on hand. Have plenty of water and dry rations available.
Persons getting sick or injured	Persons may get sick or injured on the boat during a journey or during work on the boat	Little care and attention given to dangerous or high risk tasks done on the boat (e.g. catching fish, handling sharp, heavy or otherwise dangerous equipment). Collision or grounding.	Loss of the abilities of an important person on the boat if he gets sick or injured (such as the captain, who is responsible for navigation).	Carry first aid supplies on board the boat and make sure everyone knows where it is and how to use its contents. Make sure the crew has some experience and ability to navigate the boat, at least to get back home. Depending on the severity of the sickness or injury it may be important to get help quickly, have some form of communication device, such as a VHF radio or even a cellular phone available to contact help.
Drifting	This can refer either to the boat or the persons on the boat. In any case it involves uncontrolled movement through the water by the ocean currents.	Engine failure. Collision, grounding, capsizing or fires which can result in sinking of the boat.	Persons abandoning the boat.	Always have a backup for your engine – a sail or a pair of oars. Nets, pots or other equipment can be thrown overboard, still attached to the boat, to create more drag to slow drifting speed. Use signaling devices sparingly and only when most needed, do not waste all of them at once. As long as it is possible remain with the boat as it will be easier for SAR officers to find than a person's head in the waves; it also allows for the persons to remain warm, being away from the water. Keep away from the boat if it begins to sink, it may pull you down also. Have PFD's available. Make sure to not drink the salty sea water as it causes dehydration and additional sickness.

Marine Radio Communications

By the Dominica Coast Guard

Communications

Communication between mariners has long been recognized as a necessity. Using the radio proficiently and knowing proper radio protocol reflects well upon the boat crew's and the radio operator's professionalism. It is essential that each boat crew member is completely aware of the common distress signals and how they are used in emergencies. Most marine communications are done by using voice radio transmissions. These are very much like two people talking on the telephone, but with significant differences that boat crew members must understand.

Typically, voice radio communications are "simplex", or one way at a time - when one person is speaking, the second person must wait. This differs from face-to-face and telephone conversations where voices may overlap. Simplex communication is the reason for many of the procedural regulations for voice radio communications

Radio Signal Characteristics

Modulation and frequencies are the two basic characteristics shared by radio signals. To understand radio communications, it is fundamental for all crew members who use the radio to know about types of modulations, use of the different radios, and frequencies. Modulation is a variation in radio wave amplitude or frequency. There are two types:

- Amplitude Modulation (AM) - Single Side Band (SSB) MF/HF, some VHF systems and UHF
- Frequency Modulation (FM) - very high frequency (VHF) systems

Radio Systems

There are several basic types of voice radios, on boats they are frequently MF/HF and VHF-FM, usually, they are identified by the radio's mode of transmission. Understanding the basic differences of the types of radios and their use will assist crew members in using them most effectively and professionally.

VHF Line of Sight Radio

VHF-FM (156-162 MHz) is used for local, short range marine communications. Frequencies in this band operate on the line-of-sight principle (LOS), its range depends mainly on the height of antennas for both the receiving and transmitting stations, and somewhat on the power output of the transmitting station. VHF equipment is called "line-of-sight radio" because its radio waves travel in nearly a straight line, meaning, if one antenna can "see" another antenna, communications between the two is possible. Occasionally, atmospheric conditions allow VHF signals to bounce or bend in their line of travel, increasing the transmission's range farther than normal.

MF and HF bands

Boats use the MF band typically to communicate with the Group when out of VHF radio range. The MF band uses low frequencies, so the ground wave travels along the surface of the earth, permitting communications at distances up to 100 miles during daylight hours.

The low frequency also makes communications at much greater distances at night easier. MF and HF radios of any modulation type usually have greater range than VHF. The operating range for MF and HF radios can shift as conditions change, and the conditions that affect the operating range will typically vary from hour to hour. As a consequence, communications between two vessels can be lost due to a number of factors, including changing weather.

Choosing Your Marine Radio

Submersible Construction

Choose a radio that is built tough to withstand the punishing marine environment. A unit specification such as “waterproof protection 3 feet deep for 30 minutes” is a minimum requirement for working at sea. The antenna or microphone cap must be attached to the unit. It is important to note however that the battery contacts may be prone to rust or corrosion if the radio is kept in the water for prolonged periods or not washed clean with fresh water and then thoroughly dried.

Floating on water

The transceiver should be able to float on fresh or salt water even when the supplied accessories are attached. This is even more of a concern on smaller open boats like what is available locally.

Large, Easy to Read Display

The function display should be easy to read and show the unit’s operating condition at a glance. Back-lighting and contrast can be adjusted to suit your preferences.

Easy to Use, Easy to Hold

The unit should be easy and comfortable to hold while on a rocking boat. The weight of the unit is a concern if constant use is expected. The controls should be easily accessible to the user. Large buttons and knobs (properly labeled in your language) on the front of the unit are suitable for most situations. Ensure you read all instruction carefully and completely before using the radio.

Operating Rules

Priorities

Read all rules and regulations pertaining to priorities, and keep an up-to-date copy handy. Safety and distress calls take priority over all others. You must monitor channel 16 when you are not operating on another channel. False of fraudulent distress calls are prohibited under law.

Privacy

Information overheard but not intended for you cannot lawfully be used in any way. Indecent or profane language is prohibited.

Radio/Operator's Licenses

Ship Station License

When your boat is equipped with a VHF radio you must have a current radio station license before using that radio. It is unlawful to operate a radio which is not licensed. Inquire through your appropriate Government agency for a ship-radio telephone license. This license includes the call sign which is on your boat registration. Only a licensed radio operator may operate a radio.

Basic Operation

A quick note: before using the radio for the first time, the battery pack must be fully charged. To avoid damaging the transceiver, turn the power off while charging.

Practice

Before heading out to sea it is important to make sure that you are comfortable with the unit. Practice the following:

- Receiving and transmitting
- Adjusting the volume level
- Volume mute function
- Adjusting the squelch level
- Lock function
- Automatic backlighting

VHF Channel 16

If your vessel requires assistance contact other vessels and the coast guard by sending a distress call on channel 16. This is the international calling and distress frequency used by vessels in emergencies or to establish contact with others. Shore stations use it to announce broadcasts of general information on other frequencies. Boat crews use Channel 16 to:

- Transmit/receive distress calls and distress messages.
- Transmit/receive urgent safety broadcasts and messages.
- Identify vessel traffic concerns.
- Place a preliminary call to other units in order to establish communications and shift to a working frequency to after contact

Do not use this channel to deliver general information messages. All vessels equipped with a VHF-FM radio are required to monitor Channel 16. Use this channel only when unsuccessful in establishing contact with units on a working frequency.

Verbal Communications

Prowords

Prowords (procedural words) speed the handling of radio messages by abbreviating single word or phrases to replace common words, phrases, sentences, and even paragraphs. Among other things, knowing and using prowords help to reduce radio traffic by performing radio transmissions efficiently. The following table contains the most common prowords used.

Proword	Meaning
AFFIRMATIVE	Yes.
ALL AFTER	The portion of the message to which I make reference is all which follows.
ALL BEFORE	The portion of the message to which I make reference is all which comes before.
BREAK	I hereby indicate the separation of text from other portions of the message.
CORRECT	You are correct, or what you have transmitted is correct.
CORRECTION	An error has been made in this transmission. Transmission will continue with the last word correctly sent. The correct version is...
ETA	Estimated time of arrival.
ETD	Estimated time of departure.
ETR	Estimated time of return or repair.
FIGURES	Indicates numbers or numerals to follow. Used when numbers occur in the text of a message.
FROM	The originator of this message.
I SPELL	I shall spell the next word phonetically.
OUT	Used following the last line of the message transmitted, signifying the end of the transmission and nothing follows. No reply is required or expected.
OVER	Used following a transmission when a response from the other station is necessary. It is an invitation to the other station to transmit.
NEGATIVE	No.
ROGER	I have received your transmission satisfactorily.
I SAY AGAIN, or SAY AGAIN	I am repeating transmission or the portion indicated, or you should repeat your transmission or the portion indicated.
SILENCE (Spoken 3 times and pronounced “SEE-LONS”)	Cease all transmissions immediately. Silence will be maintained until lifted. Used to clear routine transmissions from a channel only when an emergency is in progress.
SILENCE FINI (Pronounced “SEE-LONS FEE-NEE”)	Silence is lifted. Indicates the end of an emergency and resumption of normal traffic.
THIS IS	This transmission is from the station whose designator immediately follows.
TO	The addressees immediately following are addressed for action.
WAIT OUT	I must pause longer than a few seconds.
WILCO	Will comply with your last order or request.
WORD AFTER	The word to which I have reference is that which follows.
WORD BEFORE	The word to which make reference is that which proceeds.
WRONG	Your last transmission was not correct. The correct version is...

Phonetic Alphabet

Speaking the phonetic alphabet

The Phonetic Alphabet is based on the assumption that it is easier to understand a word than a letter. The Phonetic Alphabet is a series of words, each standing for a letter in the alphabet. Boat crew members should memorize each word of the Phonetic Alphabet listed below and always be ready to pair them to the correct letter in the alphabet.

Using the phonetic alphabet

To use the phonetic alphabet to spell out difficult words within a message, always precede the actual spelling with the prowords "I spell".

Example: "Search from Soufriere , I spell, Soufriere - SIERRA, OSCAR, UNIFORM, FOXTROT, ROMEO, INDIA, ECHO, ROMEO, ECHO - Soufriere to Cabrits Point."

Alphabet	Phonetic Alphabet	Pronounced
A	ALPHA	AL-FA
B	BRAVO	BRAH-VOH
C	CHARLIE	CHAR-LEE
D	DELTA	DEL-TAH
E	ECHO	ECK-O
F	FOXTROT	FOKS-TROT
G	GOLF	GOLF
H	HOTEL	HOH-TEL
I	INDIA	IN-DEE -AH
J	JULIET	JEW-LEE ET
K	KILO	KEY-LOH
L	LIMA	LEE-MAH
M	MIKE	MIKE
N	NOVEMBER	NO-VEM-BER
O	OSCAR	OSS-CAR
P	PAPA	PAH-PAH
Q	QUEBEC	KAY-BECK
R	ROMEO	ROW-ME-OH
S	SIERRA	SEE-AIR-RAH
T	TANGO	TAN-GO
U	UNIFORM	YOU-NEE-FORM
V	VICTOR	VIK-TAH
W	WHISKEY	WISS-KEY
X	XRAY	ECKS-RAY
Y	YANKEY	YANG-KEY
Z	ZULU	ZOO-LOO

Radio Operating Procedures

As a boat crew member, operating a voice radio will be a frequent task for you, so you should be familiar and comfortable with using a radio. It is important to learn basic procedures and ways for properly using the radio so that messages are sent and received in the most effective and professional manner. Learning and understanding the following will help you use voice radios effectively:

Check setting	Be certain the radio is set on the proper frequency.
Squelch control	Squelch control blocks out weak signals. Adjust the squelch control until the noise can be heard, then adjust it slightly in the opposite direction until the noise stops. Setting the squelch control adjusts the receiver so only signals strong enough to pass the level selected will be heard and reduces the amount of static noise on the speaker
Do not interrupt others	Before beginning a transmission, listen for a few seconds to avoid interrupting other communications that are already in progress.
Microphone placement	Keep the microphone about 1 to 2 inches from your lips. When transmitting, shield the microphone by keeping your head and body between noise generating sources (such as engine noise, wind, helicopter, etc.) and the microphone.
Know what you will say	Before keying the transmitter, know how to say what you are going to say. Keep all transmissions short and to the point. Never “chit-chat” or make unnecessary transmissions on any frequency.
Speaking	Speak clearly, concisely, and in a normal tone of voice, maintaining a natural speaking rhythm.
Phonetic Alphabet	Use the Phonetic Alphabet to spell out a word or a group of letters.
Proper Prowords	Use proper prowords, ending each transmission with "over" and the last with "out." Never say "over and out."
Messages are not Private	Remember, your transmission may be heard by anyone with a radio or scanner

Use of Appropriate Radio Language

The following is a list of things not to do while using the radio. Items on this list are either not protocol, they are illegal, or they cause misunderstandings of messages.

Do not:

- Break Radio Silence! Break it only for emergencies or ensuring safe navigation .
- Use profane or obscene language.
- Use unauthorized prowords, abbreviations, and procedures.
- Speak using extremes of voice pitch, this will cause distortion.
- Key the microphone unless you are ready to transmit. Keying the microphone also transmits a signal, causing interference on that frequency.

Emergency Voice Communications and Distress Signals

Whether you are providing emergency assistance or in need of it yourself, your knowledge of the correct procedures and available equipment can save lives. When an emergency occurs, use the proper prowords to show the degree of urgency. Hearing one of these urgency calls should trigger specific responses in a listener, such as, preparing to collect information on an emergency or refraining from transmitting on the frequency until all is clear. The meaning of each urgency call is outlined below:

- MAYDAY is a distress call of the highest priority. Spoken three times, it shows that a

person, boat, or aircraft is threatened by grave or imminent danger and requires immediate assistance. Broadcast on Channel 16. A MAYDAY call has absolute priority over all other transmissions and shall not be addressed to a particular station. All boats hearing a MAYDAY call should immediately cease transmissions that may interfere with the distress traffic, and continue to listen on the distress message's frequency. When working a distress situation on Channel 16, do not attempt to change (shift) to a working channel until enough information is obtained to handle the distress in case communications are lost during the act of shifting.

- PAN-PAN: Broadcast on 2182 kHz or Channel 16, this urgency signal consists of three repetitions of the group of words "PAN-PAN" (PAHN-PAHN). It means that the calling station has a very urgent message to transmit concerning the safety of a ship, aircraft, vehicle, or person.
- "SECURITÉ" (SEE-CURE-IT-TAY) is a safety signal spoken three times and transmitted on 2182 kHz on Channel 16. It indicates a message on the safety of navigation, or important weather warnings will be transmitted on 2670 kHz or Channel 22.

Distress Signals

If voice communication is not possible or not effective, you will have to use other means of communication. These may include signals using pyrotechnics; flag hoist signals, hand signals, or a flashing light S-O-S

Pyrotechnics

The following are some pyrotechnic emergency signals you may encounter:

- Gun or explosive signal fired at about one minute intervals
- Red or orange flare fired one at a time in short intervals
- Rocket parachute showing a red light
- Smoke
- Any flame on a vessel may be used for signaling

Flag hoists

Flag hoists are a quick way of emergency signaling, but can only be used in the daytime. These are some of the best known examples:

- A square flag with a ball, or ball-shaped object above or below the flag
- Hoisting an orange flag
- November Charlie Flag

Flashing Light or Recurring Sounds

The Morse Code symbols 'SOS' (Save Our Ship) transmitted by a flashing light may be used to communicate distress. This same code may be transmitted by a sound. In both cases the code retains the same format:

S O S

. . . - - - . . .

Three short flashes or sounds followed by three long flashes or sounds and finally three short

flashes or sounds once again. A short pause is given in between SOS messages.

Initial Information

Once stable and repeatable communications are established, the most vital pieces of information to immediately record are:

- Location
- Number of people on board (POB)
- Nature of distress
- Name, radio call sign of distressed craft
- Description of the craft

Radio Checks

Radio checks test the signal strength and readability of transmitted radio signals. Checks are a simple way to determine that the radio used to send and receive messages is working properly. This is accomplished by transmitting a request for a radio check and receiving a response from any other station that provides a standardized description of the strength and readability of a transmitted signal. If you are ever in doubt about the readability of the signal you are sending out, you should initiate a radio check to confirm the strength and readability of your signal.

Any station transmitting voice traffic assumes that its signal is clearly readable unless another station responds and reports that the signal strength and readability is less than loud and clear. If you respond to requests for a radio check, always be concise and use a combination of the following standard terms.

Signal Strength	Meaning
Loud	Your signal is strong
Good	Our signal is readable
Weak	Your signal is poor but readable
Very Weak	Your signal is unreadable
Signal Readability	**Meaning**
Clear	Excellent quality
Readable	Satisfactory
Distorted	Having difficulty reading the transmission because of signal distortion
Unreadable	The quality of your transmission is so bad, I cannot understand
With interference	Having great difficulty reading your transmission because of interference

Appendices

How to Register as a Fisherman

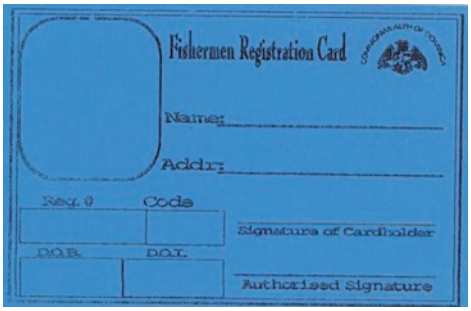
It is a fairly simple process for someone to get registered as a fisherman here in Dominica. This is mainly because there are no restrictions to the number of persons who can become fishers.

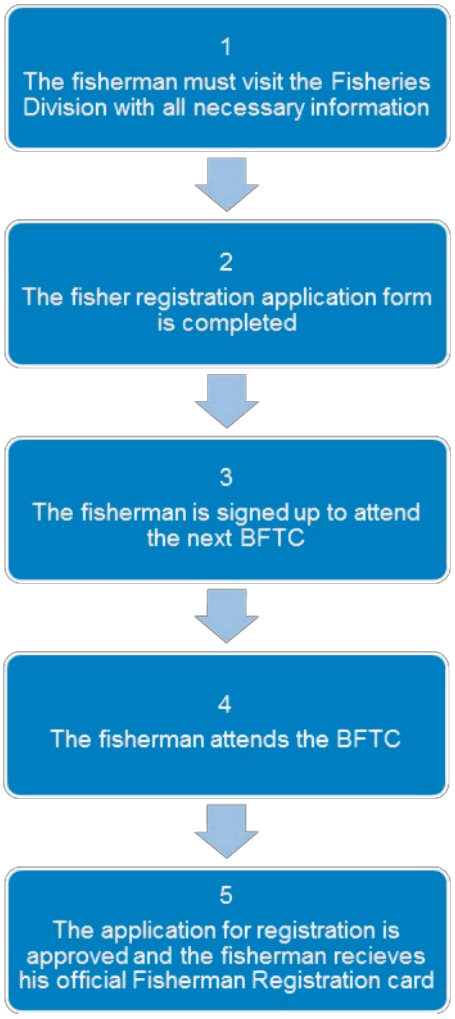
The process of getting a new fisher registered is outlined as follows:

1. Visit the Fisheries Division office with all of the necessary information. The new fisher may also talk to his local Fisheries Liaison Officer at his landing site or fishing community. When visiting the office the new fisher should walk with the following:
    - The fisher's full name (first name, nickname and last name) and date of birth
    - Valid photo identification of the fisher, such as driver's license, passport, social security card to confirm identity
    - Contact information for the fisher: telephone or mobile number, residential address
    - Next of kin details: this is the name, address and other contact information of someone who can be contacted on behalf of the fisher
    - Education and training information: last school attended and details of any fisheries or marine-related training received
    - A recent driver's license-sized photo of the fisher's head and face
2. Complete the registration application form with the assistance of a Fisheries Official. A Fisheries Official will write the information on to the form using the information the fisher supplies. After this, the fisher is required to sign the application form to validate the details recorded on to it. Fishers who are already registered but hold a card that has expired or nearing expiration do not necessarily need to complete a new registration application form. These fishers however, may be required to provide any new information and details that will help keep the information the FD has current. A recent picture of the fisher is required for the new card.
3. The fisher is then required to sign up for the Basic Fisherman Training Course (BFTC) in order for his application for registration to be approved and endorsed by the Chief Fisheries Officer. The fisher is required to pay a fee for participating in the one-week course. Fishers who already hold a registration card can renew that card for a small fee and are exempt from attending this otherwise mandatory course.
4. The fisher now has to attend the one-week training program hosted by the Fisheries Division.

5. After the course, the application for registration is approved by the CFO. The fisher receives a certificate for completing the course. The fisher also receives his official picture ID fisher registration card. This card expires annually. The fisher is required to pay a small processing fee annually to receive and also renew the card. It must be noted that if the fisher has not paid his renewal fees for any annual period, those fees will accumulate for each successive year.

Figure 33: A sample of a fisher registration card





How to Register a Fishing Boat

Fishing boats must be registered by the boat owner. Here is the process in getting a fishing boat registered with the Fisheries Division:

1. Visit the office with all necessary information. The boat owner should come to the office or his Fisheries Officer with information about himself and his boat:
    - A photo ID of the owner to confirm identity
    - Specifications of the vessel (dimensions and weight): length, width (or breadth), weight (if available)
    - General description of the vessel: colour, materials of construction (wood, fiber glass, aluminum, etc.), type of vessel (canoe, keel or FRP), condition (new, used, etc.)
    - Propulsion details: method of propulsion (engine, oars or sails), specifications of engine(s) (type (inboard or outboard), make, model, horse power (HP), serial numbers, condition)
    - Details on the boat's regular crew: names, contact information and fisher registration details of the captain and other crew members
    - Safety equipment inventory: list of all safety equipment carried on board the vessel
    - Fishing activities: inventory of fishing gear (types and quantities), description of major fishing activities, list of major fish species targeted
    - Proof of ownership of the boat: a bill of sale, certificate of transfer of ownership and certificate of de-registration can be provided in cases where the boat was already registered and then purchased from someone else. A copy of the original certificate of registration in the name of the seller is also required.
2. The Fisheries Official uses the information supplied to complete a registration application form which then needs to be signed by the boat owner.
3. Once the application is approved and signed by the CFO, the boat is issued a fishing vessel registration number. In cases where the boat was already registered by a previous owner, the same number may be assigned to the vessel for the new owner. This number must be printed on to the bow of the boat with characters at least 1 foot tall. A certificate of fishing vessel registration can also be provided to the boat owner at a fee.

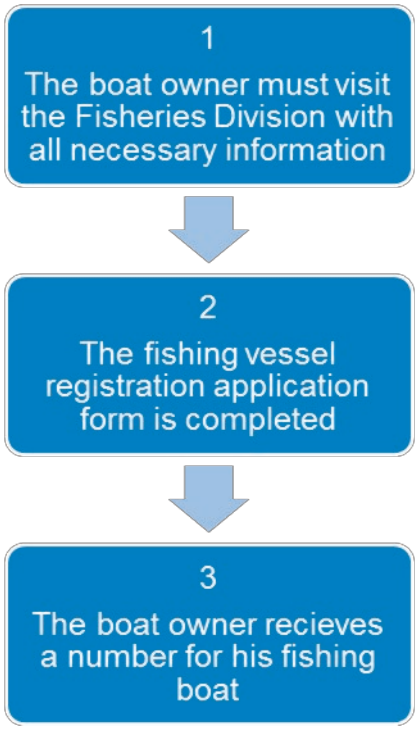
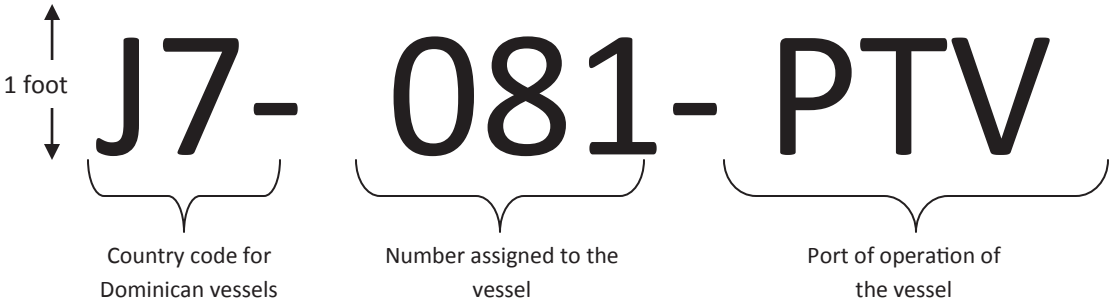


Figure 34: An explanation of boat registration numbers



List of Fish Species

English/Common Name	Patois/Local Name	Scientific Name
Albacore	Thon	***Thunnus alalunga***
Amberfish (Amberjack), Greater	Hotboy	***Seriola dumerili***
Angelfish, Blue	Portijay	***Holocanthus isabelita***
Angelfish, Clarion		***Holocanthus clarionen***
Angelfish, French	Portijay	***Pomacanthus paru***
Angelfish, Gray	Portijay	***Pomacanthus arcuatus***
Angelfish, Potter's		***Centropyge potteri***
Angelfish, Queen	Portijay	***Holacanthus ciliaris***
Ballyhoo	Balau che jaune	***Hemiramphus brasiliensis***
Ballyhoo, Common halfbeak	Balau	***Hyporhamphus unifasciatus***
Barracuda, Great		***Sphyraena barracuda***
Big eye, Atlantic	Soleil	***Priacanthus arenatus***
Bonito, Atlantic	Bonic	***Sarda sarda***
Butterflyfish, Banded		***Chaetodon straitus***
Cero	Thazard blanc	***Scomberomorus regalis***
Chromis, Blue		***Chromis cyanea***
Chromis, Yellowedge (Brown)		***Chromis multilineata***
Conch, Milk		***Strombus costatus***
Conch, Pink	Lambis	***Strombus gigas***
Conch, Rooster-tail		***Strombus gallus***
Creole-fish		***Paranthias furcifer***
Damselfish, Yellowtail	Mamsel	***Microspathodon chrysurus***
Doctorfish	Seawisien	***Acanthurus chirurgus***
Dolphinfish, Common	Dorade	***Coryphaena hippurus***
Durgeon, Black	Boose negre	***Melichthys niger***
Filefish, Whitespotted		***Cantherhines***
Flounder, Peacock	Wavet	***Bothus lunatus***
Flyingfish, Mirrorwing	Volant	***Hirundichthys speculiger***
Full moonfish	Carangue zasiette	***Selene brownii***
Glass eye	Soliel	***Priacanthus cruentatus***
Goatfish, Spotted	Cabriton	***Pseudupeneus maculatus***
Goatfish, Yellow	Babawen	***Mulloidichthys martinicus***
Grouper, Black		***Mycteroperca bonaci***
Grouper, Nassau		***Epinephelus straitus***
Grouper, Red		***Epinephelus morio***
Grouper, Tiger	Vierge	***Mycteroperca tigris***
Grouper, Yellowfin		***Mycterperca venenosa***

English/Common Name	Patois/Local Name	Scientific Name
Grunt, Bluestriped	Gorette	***Haemulon sciurus***
Grunt, Cottonwick		***Haemulon meianurum***
Grunt, French	Gorette	***Haemulon flavolineatum***
Grunt, Sailor's	Gorette	***Haemulon parrai***
Grunt, Small mouth	Gorette	***Haemulon chrysargyreum***
Grunt, Spanish	Gorette caco	***Haemulon macrostomum***
Grunt, White	Gorette blanc	***Haemulon plumieri***
Gurnard, Flying	Poule La men	***Dactylopterus volitans***
Hamlet, Barred		***Hypoplectrus puella***
Hamlet, Butter		***Hypoplectrus unicolour***
Hind, Red		***Epinephelus guttatus***
Hind, Rock	Tanche guisse	***Epinephelus adsocensio***
Hogfish	Capitane	***Lachnolaimus maximus***
Hogfish, Spanish	Banana	***Bodianus rufus***
Jack, Almaco	Hot Boy	***Seriola rivoliana***
Jack, Cottonmouth	Carangue gros oeil	***Uraspis secunda***
Jack-knife fish		***Equetus lanceolatus***
Jewfish	Vierge	***Epinephelus itajara***
Lobster, Slipper	Whoma	***Scyllarides***
Lobster, Spiney	Whoma	***Panurilus***
Mackerel, Chub	Waylay commet	***Scomer japonicus***
Mackerel, King	Waylay blanc	***Scomberomorus cavalla***
Mackerel, Serra Spanish	Thazar	***Scomberomorus brasiliensis***
Marline, Blue	Vaiway	***Makaira nigricans***
Marline, White	Vaway	***Tetrapturus albidus***
Needlefish, Flat	Zorphie	***Ablennes hians***
Needlefish, Keeltail	Zorphie	***Platybelone argalus argalus***
Octopus	Shatoo	***Octopodidae***
Palometa pompano	Zailwon	***Trachinotus goodei***
Parrotfish, Blue	Zawa bleu	***Scarus coeruleus***
Parrotfish, Midnight		***Scarus coelestinus***
Parrotfish, Princess		***Scarus taeniopterus***
Parrotfish, Redband	Caca belly	***Sparisoma aurofrenatum***
Parrotfish, Spotlight	Caca belly	***Sparisoma viride***
Permit		***Trachinotus falcatus***
Pompano, Florida	Carangue (couvalli)	***Trachinotus carolinus***
Porgy, Spotfin	Dobanet	***Calamus cervigoni***
Porkfish	Lippi	***Anisotremus virginicus***
Reef Shark, Caribbean		***Carcharhinus perezi***
Rock Beauty	Mamsel	***Holacanthus tricolour***

English/Common Name	Patois/Local Name	Scientific Name
Rockfish, Yelloweye		***Sebastes ruberrimus***
Sailfish, Atlantic	Mea balau	***Istiophorus albicans***
Sardinella, Round	Cayee	***Sardinella aurita***
Sea Chub, Bermuda	Chub	***Kyphosus sectatrix***
Sea Chub, Yellow	Chub	***Kyphosus incisor***
Seabass, Coney	Tanshe	***Cephalopholis fulva***
Seabass, Grasby	Tanshe	***Cephalopholis cruentata***
Sergeant Major		***Abudefduf saxatilis***
Shad, Blue black	Sardine	***Alosa aostivalis***
Shark, Blacktip	Requin (waychen)	***Carcharhinus limbatus***
Shark, Dusky		***Carcharhinus obscurus***
Shark, Nurse		***Ginghmostoma cirratum***
Shark, Oceanic Whitetip		***Carcharhinus longimanus***
Shark, Scalloped Hammerhead		***Sphyrna lewini***
Snapper, Dog	Pag dent chien	***Lutjanus jocu***
Snapper, Mahogany	Sad	***Lutjanus mahogani***
Snapper, Queen	Piwan	***Etelis oculatus***
Snapper, Red	Vivaneau	***Lutjanus campechanus***
Snapper, Schoolmaster	Pag	***Lutjanus apodus***
Snapper, Silk	Vivaneau	***Lutjanus vivanus***
Snapper, Vermilion	Tetewon	***Rhomboplites aurorubon***
Snapper, Yellowtail	Cola	***Ocyurus chrysurus***
Soapfish, Greater	Savon	***Rypticus saponaceus***
Soldierfish, Blackbar	Gros Tete	***Myripristis jacobus***
Spadefish, Atlantic		***Chaetodipterus faber***
Spearfish, Longbill	Mea balau	***Tetrapturus pfluegeri***
Spotted Drum		***Equetus punctatus***
Squid, Common	Schech	***Loligo pealei***
Squid, Diamondback		***Thysanoteuthis rhombus***
Squirrelfish, Longspine	Mawiyan	***Holocentrus rufus***
Surgeon, Ocean	Seawisien	***Acanthurus bahianus***
Surgeonfish, Blue tang	Seawisien	***Acanthurus coeruleus***
Top Shell, West Indian	Brigo	***Cittarium pica***
Triggerfish, Queen	Boose rene	***Balisties vetula***
Trumpetfish		***Aulostomis maculatus***
Tuna, Bigeye	Thon gros oei	***Thunnus obesus***
Tuna, Blackfin	Thon dos noir	***Thunnus atlanticus***
Tuna, Bluefin	Thon france	***Thunnus thynnus thynnus***
Tuna, Skipjack	Biolet	***Katsuwonus pelamis***
Tuna, Yellowfin	Thon che jaune	***Thunnus albacares***

English/Common Name	Patois/Local Name	Scientific Name
Turtle, Green	Tortue vert	***Chelonea mydas***
Turtle, Hawksbill	Tortue	***Eretmochelys imbricata***
Turtle, Leatherback	Cawigne	***Dermiochelys coriacea***
Turtle, Loggerhead	Tortue	***Caretta caretta***
Wahoo (king fish)	Waylay bois	***Acanthocybium solandri***
Wrasse, Yellowhead		***Halichoeres garnoti***

Regulations Concerning Lobster

The closed season for lobster is the 30th day of April to the 1st day of September in every year.

During this time it is illegal to:

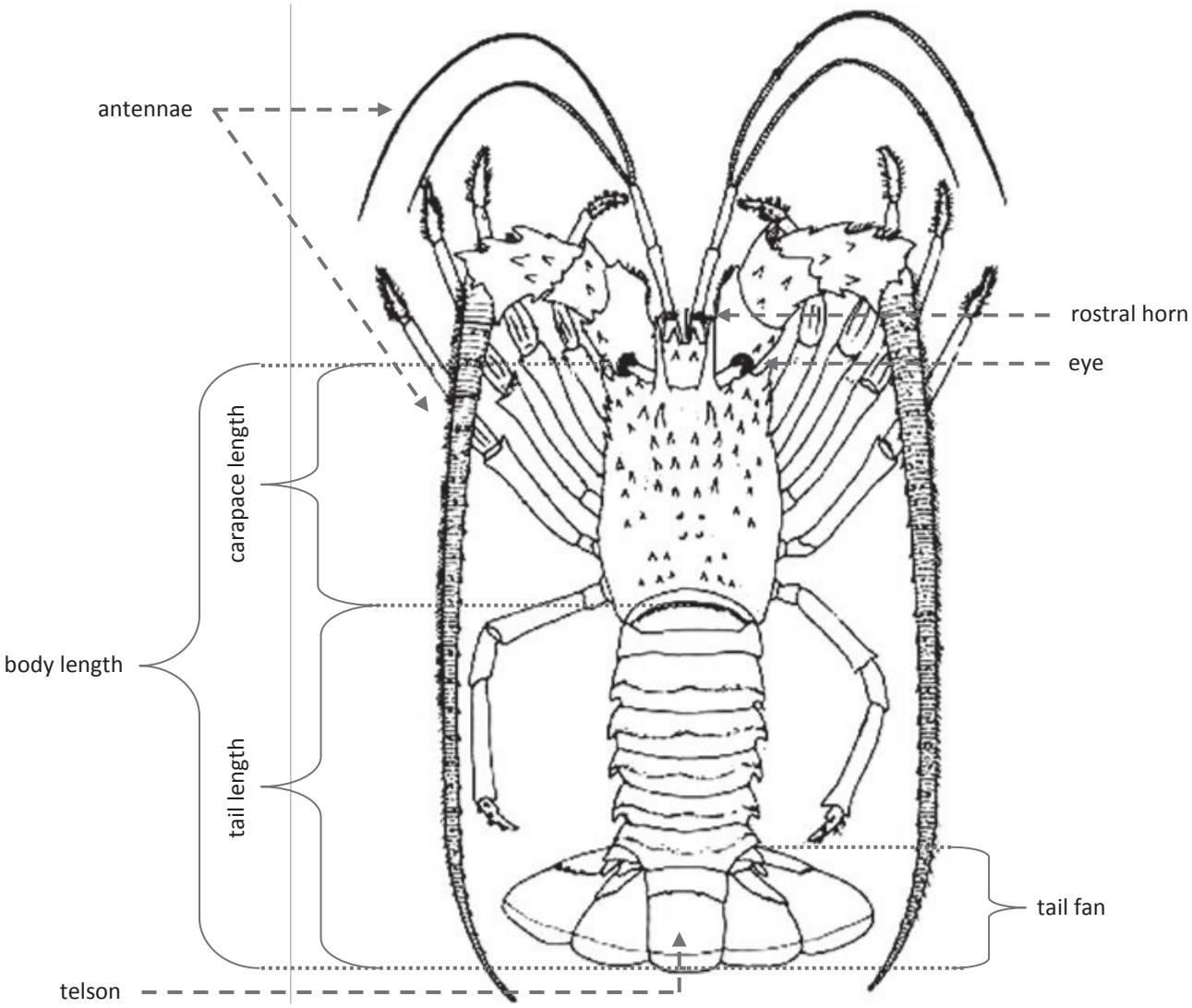
- catch
- buy,
- sell, or
- possess

any of the following:

- A female lobster carrying eggs
- Lobsters from which the eggs have been removed
- Lobsters with soft shells (moulting)
- Lobsters with a carapace length of less than 3 inches
- Lobsters which are undersized
- Lobsters with body length of less than 9 inches
- Lobsters weighing less than one and a half (1.5) pounds (680 grams)
- Lobsters which are not caught by hand, loop, pot or trap

Anyone found violating these regulations is guilty of an offence and liable on summary conviction to a fine of up to $5000.00 and in default of payment thereof to imprisonment for twelve (12) months.

Figure 35: Diagram of a lobster showing the parts of the body



Small Business for Fisher Folk: Training Exercises

Training Session Plan	Fishing Business Management Module	Unit 1
Training Exercise No. 1		
Formulating Goals & Objectives		
In groups of 3-4 individuals, the trainees will: 1. Formulate a mission and vision for the Fishing Business. 2. Brainstorm on the objectives and goals of a fishing operation based on the characteristics of goals and objectives. 3. Select the top Five (5) objectives and the top Five (5) goals. 4. Identify the particular activities that will be done on the Fishing Business to achieve the goals. 5. Follow up with a discussion on the overall purpose of the Fishing Business.		
Vision Statement:		
Mission Statement:		

Objectives	Goals	Activities

Training Session Plan	Fishing Business Management Module	Unit 1
Training Exercise No. 2		
COMMON PROBLEMS FACING YOUR FISHING BUSINESS		

Trainees' tasks:

The trainees should work in pairs and list what they consider to be the main problems facing Fishing Businesses in their communities. The main problems should be ranked according to importance and should be arranged in two main categories: organization and operations.

Main Features

Training Session Plan	Fishing Business Management Module	Unit 1

Training Exercise No. 3

WHAT IS FISHING BUSINESS MANAGEMENT?

Purpose of exercise:

To understand the role of Fishing Business management as related to the experience of Fishers operating in Dominica.

Trainees' tasks:

The trainees should work in pairs and list what they consider to be the main tasks in which Fishers are involved. The tasks should be arranged into two main categories: planning and operations.

Main Tasks

Training Session Plan	Fishing Business Management Module	Unit 1
Training Exercise No. 3		
QUALITIES OF A SUCCESSFUL FISHER		
The aim of this exercise is to encourage trainees to think about what makes a Fisher successful in managing his or her Fishing Business. The exercise is designed to provide an opportunity for extension workers to draw on their field experience and open a discussion amongst the training participants.		
Trainees' tasks: 1. The worksheet is distributed and trainees are asked to arrange the suggested characteristics in order of importance (1 = very important; 3 = less important). 2. The trainees should work in groups and should reach some consensus on what they regard as the most desirable characteristics of a successful Fisher. 3. Suggestions are written down. 4. Discussions follow. Some of the most important characteristics that are usually reported are listed below. This list is not exhaustive. Participants may come up with additional points. The participants may need some assistance when prioritizing the qualities listed.		

Trainer's Note:

The trainer should encourage participants to discuss the varying Fishing conditions among the different countries of the Caribbean. This will enable an assessment to be made of the trainee's experience to be made and will provide an opportunity for them to express their opinions.

Qualities of a Successful Fisher	Priority
1. Education	
2. Age	
3. Ability to work with people	
4. Knowledge of Fishing Business practices	
5. Relevance of technical knowledge and qualification	
6. Knowledge of market and marketing	
7. Experience in training program	
8. Range of contacts	
9.	
10.	
11.	
12.	
13.	
14.	

Training Session Plan	Fishing Business Management Module	Unit 1
Training Exercise No. 4		
ASSESSING FISHING BUSINESS ENTERPRISES		

In groups of 3-4 individuals, the trainees will:

1. Assess the resources in your Fishing Business.
2. Identify the limitations on each type of resource and the reasons for them.
3. Identify opportunities under the limited conditions.
4. Present the limitations and opportunities in two columns.
5. Follow up with a discussion.

	Limitations	Possible Solutions

The Safety-at-Sea Checklist

The Individuals

- ☐ Fisherman Registration card
- ☐ Personal Floatation Devices (PFD's) for everyone on the boat (life jackets, life preservers, life rings, etc.)
- ☐ Dry clothing (store in a water-tight container)
- ☐ Rain coat or coverall
- ☐ Non-perishable food that can last for at least two (2) days: crackers, canned foods, bottled drinks, bread.
- ☐ First Aid supplies: plasters, antiseptics and bandages.
- ☐ At least five (5) gallons of water

The Boat & Equipment

- ☐ Tools for making minor repairs: hammer, nails, etc.
- ☐ Navigational compass (a GPS may be used but is not as reliable)
- ☐ A flashlight
- ☐ Flares (have both night and day types, if possible)
- ☐ A box of matches
- ☐ A signaling mirror
- ☐ A whistle, horn or conch shell for signaling
- ☐ A knife
- ☐ A bucket or bailer to remove water from the boat
- ☐ VHF Radio
- ☐ Oars, sail or spare engine
- ☐ Rope
- ☐ An SOS flag
- ☐ A radar reflector
- ☐ Appropriate fishing gear and equipment (hooks and line or pots or net)

The Engine

- ☐ Sufficient fuel for the trip
- ☐ Tools to perform basic repairs to the engine: spanners, pliers, screwdrivers, wrenches
- ☐ Spare parts and accessories: pull cord or rope, spark plugs, fuel hose, bolts, nuts

TASKS

- Make sure that all necessary supplies and equipment are available and on the boat before leaving the shore
- Have a backup for your engine available, just in case it fails (such as oars, sail, or a spare engine)
- Make sure that all persons traveling are mentally and physically prepared for the trip
- Inspect the boat and engine for faults. Repair these faults before heading to sea.
- Notify someone who will be remaining on land of your plan, such as where you will be going to fish, and how long you expect to be at sea.
- Make sure that you have enough fuel, and if the fuel has to be mixed with oil, that it is mixed properly.
- Make sure that you have safety equipment on the boat and that they are in a good working condition.

Summary of Conventions to Which Dominica is Party

INTERNATIONAL CONVENTIONS

Convention	Status
1. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.	Acceded 5th May 1998. In effect 3rd August, 1998
2. UN Convention on Biological Diversity. Cartagena Protocol on Biosafety	Ratified 5th July, 1994 Ratified 13th July 2004
3.Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Oil Spill Protocols MARPOL Protocol Annex 2 and 5	Ratified 7th September 1990 Ratified 7th September 1990 Acceded 2000
4. International Convention on Civil Liability for Oil Pollution Damage.	Acceded August 2001
5. UN Framework Convention on Climate Change Kyoto Protocol	Ratified 21st March, 1994 Ratified February 2006
6. Cotonou Agreement (Replaced the Lome Convention).	Ratified. 26th July, 2002
7. UN Convention to Combat Desertification	Ratified 28th November, 1997
8. UN Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES).	Ratified 30th June, 1995
9. Third UN Convention of Law of the Sea (UNCLOS)	Ratified 3rd September, 1991
10. Convention on the Limitation of Liability for Maritime Claims Relating to the Arrest of Sea Going Ships	Acceded August, 2001
11. Treaty for the Non-proliferation of Nuclear Weapon.	Acceded 3rd August, 1983
12. International Convention on Oil Pollution Preparedness, Response and Cooperation	Acceded August 2001
13. International Plant Protection Convention	Ratified April 1979
14. UN Convention on the Prohibition and Use of, Stockpiling Production and Transfer of Antipersonnel Mines and their Destruction.	Ratified 26th March, 1999
15. UN Convention on the Prohibition of the Development, Production and Stockpiling and Use of Chemical Weapons and (weapons of mass destruction) their Destruction. (Chemical Weapons Convention)	Ratified 12th February, 2001
16. Geneva Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques.	Ratified 9th November, 1992
17. Treaty for the Prohibition of Nuclear Weapons in Latin America.	Ratified 26th April 1993
18. UNESCO Convention on the Protection of the World Cultural and Natural Heritage.	Ratified 4th July, 1994
19. International Convention for the Regulation of Whaling	Acceded 18th June 1992
20. Suppression of Unlawful Acts Against Safety of Maritime Navigation	Acceded August 2001
21. International Convention for the Safety of Life at Sea	Acceded 2000
22. Stockholm Convention on Persistent Organic Pollutants (POPs)	Acceded 3rd August 2003
23. Vienna Convention for the Protection of the Ozone Layer Montreal Protocol on Substances that Deplete the Ozone Layer London Amendment Rotterdam Convention	Ratified 30th March, 1993 Ratified 20th June 1993 Ratified 30th March, 1993 Ratified 30th December 2005

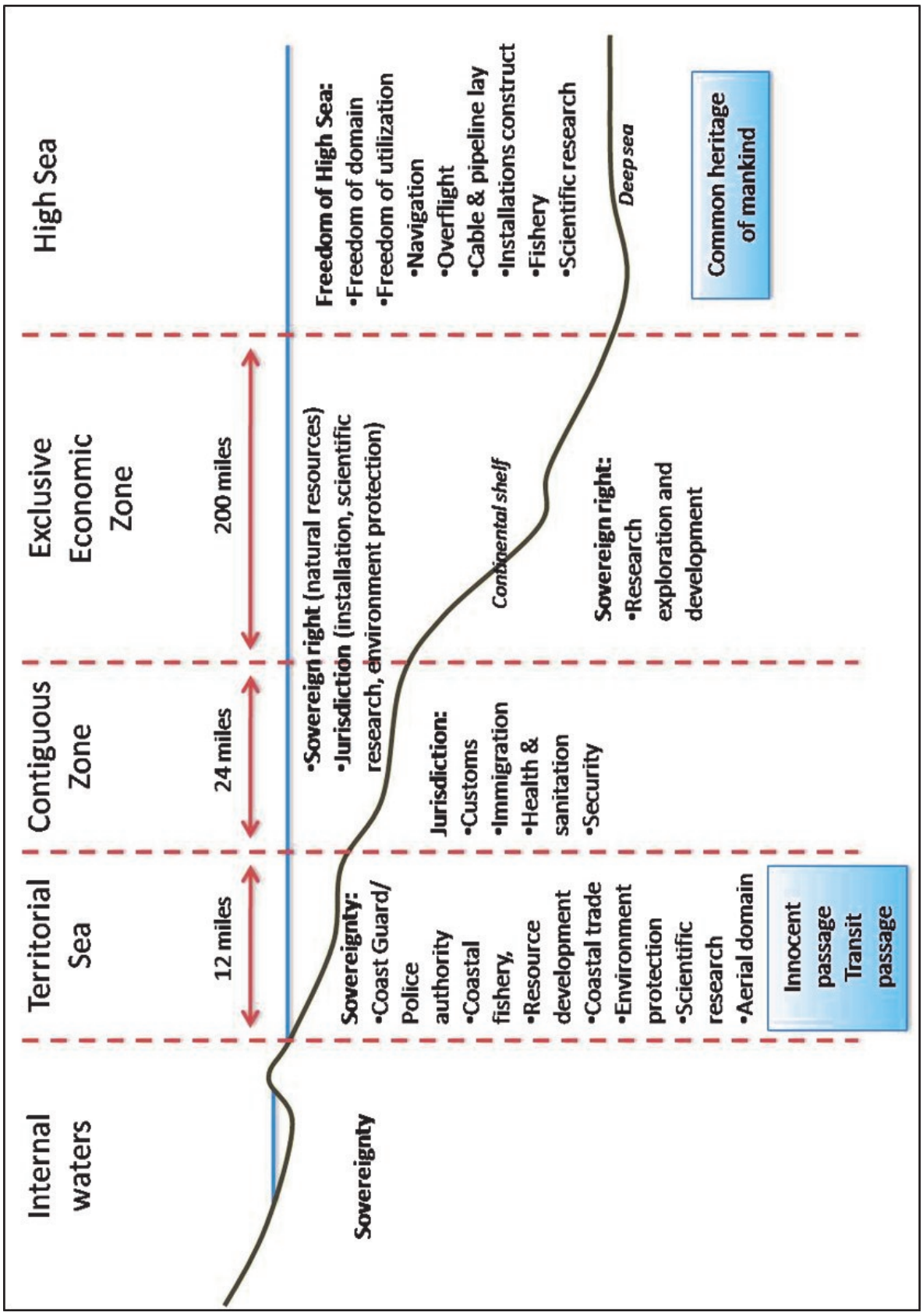
Convention	Status
1. CARICOM Regional Fisheries Mechanism	Signed 2002
2. St. Georges Declaration	Signed April 2001

For further information, please contact the Environmental Coordinating Unit

Tel: 767 448 2401 ext. 3456 or 767 448 4577

Email: ecu@dominica.gov.dm

Maritime Boundaries



Fisheries Facilities

The Roseau Fisheries Complex (Main office)

The Marigot Fishing Port Facility

The Portsmouth Fisheries Complex (artist impression)