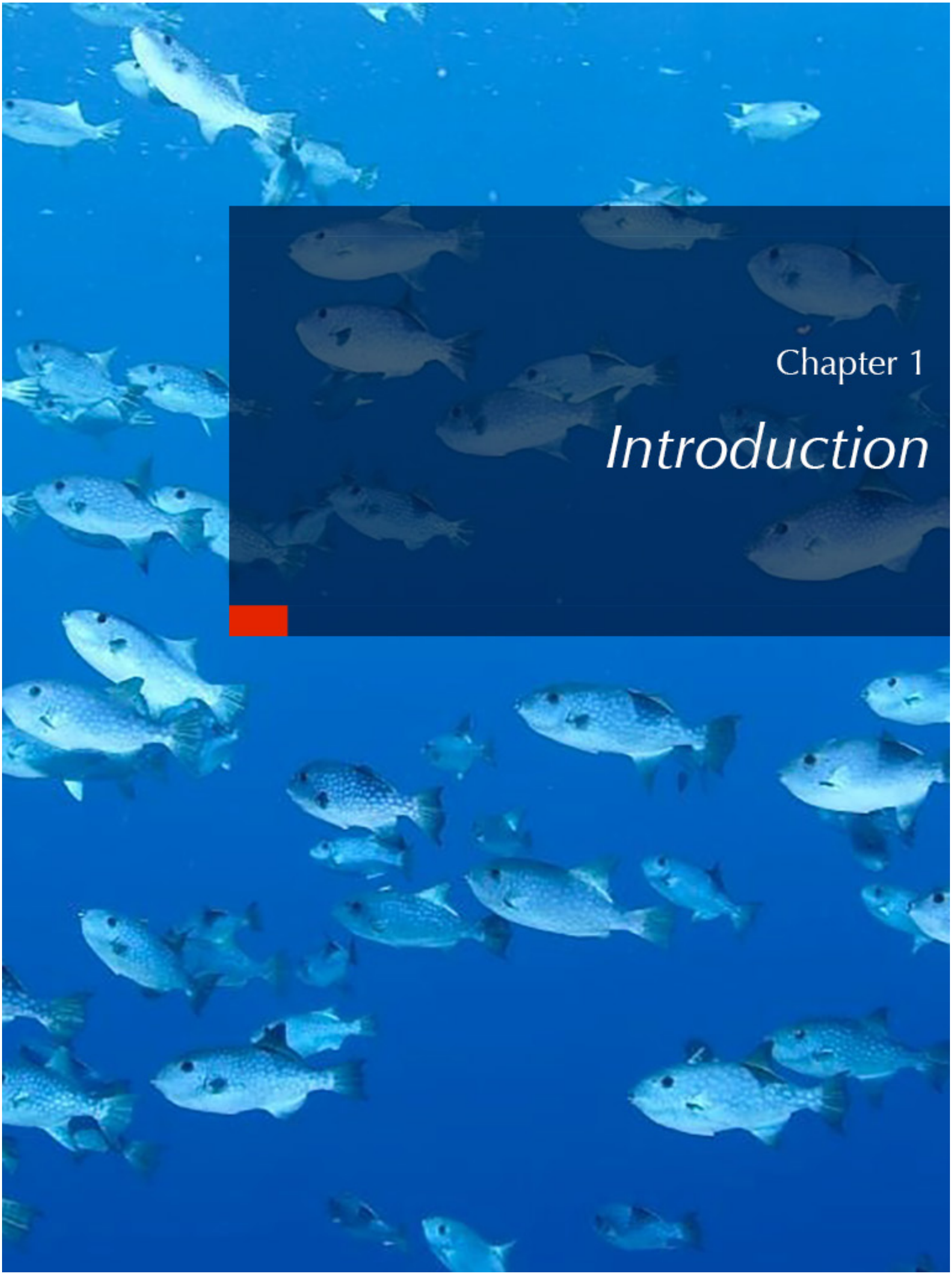
ISSF

Skippers' Guidebook to Sustainable Purse Seine Fishing Practices

Third Edition

AN INTERNATIONAL SEAFOOD SUSTAINABILITY FOUNDATION PUBLICATION

ISSF INTERNATIONAL SEAFOOD SUSTAINABILITY FOUNDATION



Chapter 1

Introduction

Chapter 1: Introduction

Welcome to the International Seafood Sustainability Foundation's guide to best practices in purse seine tuna fishing. Our goal is to share the state of the art in responsible fishing operations, review the reporting requirements and other obligations to RFMOs, and inform participants about the related ISSF Conservation Measures for the management of tuna and its larger marine ecosystem.

Chapter Objectives

1. Introduce ISSF's mission and approach.
2. Provide examples of ISSF's ongoing activities and outreach.
3. Provide information about ISSF's Participating Companies.

About ISSF

In 2008, fisheries scientists, industry leaders, and the World Wildlife Fund (WWF) founded the International Seafood Sustainability Foundation (ISSF) based on shared concerns about the future of tuna fisheries and a desire to do something about it—together. The global coalition launched publicly in March of 2009 and today has partners and supporters working in Europe, Asia, Africa, North America, South America, Australia, and Oceania.

ISSF's mission is to undertake science-based initiatives for the long-term conservation and sustainable use of tuna stocks, reducing bycatch and promoting ecosystem health.

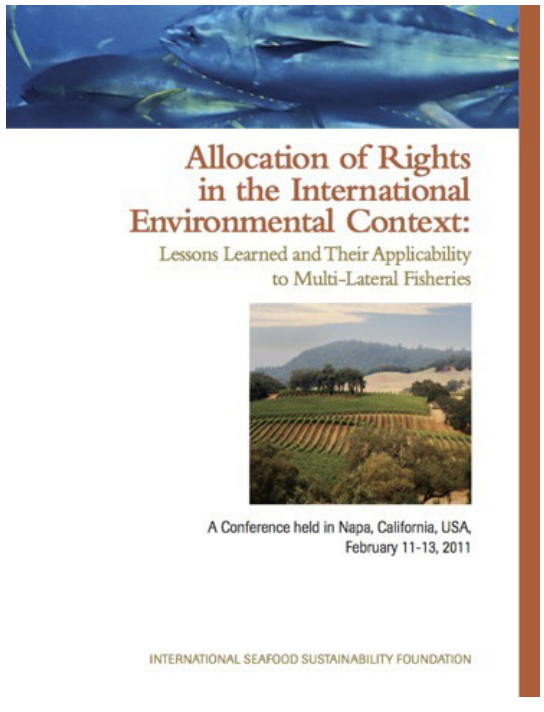
The organization's objective is to improve the sustainability of global tuna stocks by developing and implementing verifiable, science-based practices, commitments, and international management measures that result in tuna fisheries meeting the MSC certification standard without conditions, and becoming the industry standard for vessel owners, traders, processors, and marketers.

ISSF will cooperate with and support Regional Fisheries Management Organizations (RFMOs), and vigorously advocate to RFMO members for the adoption and implementation of science-based management measures so that tuna stocks and their ecosystem are managed comprehensively and sustainably.

ISSF Approaches to Improving Tuna Sustainability

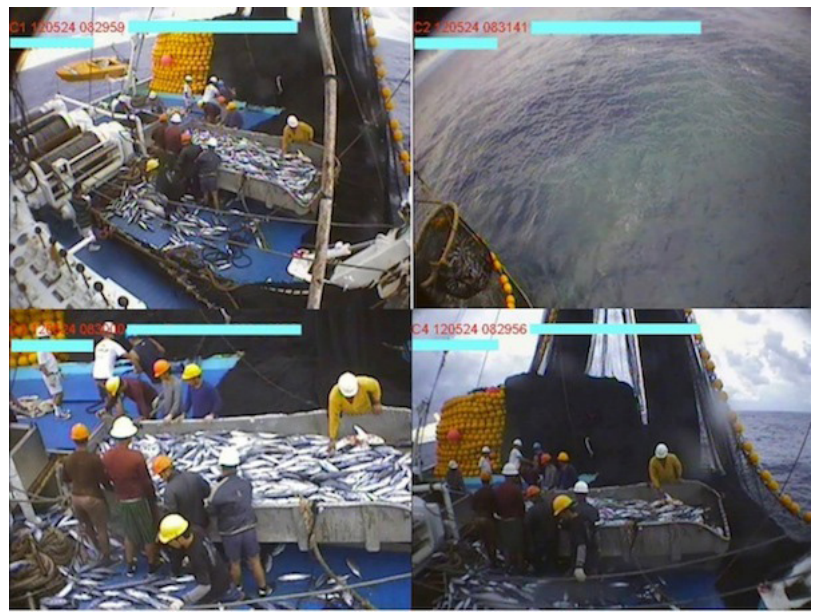
- Working with RFMOs to conserve tuna stocks and their ocean ecosystems through sponsored workshops, direct advocacy, and capacity-building
- Employing sound science to attain maximum sustainable yields of targeted tuna stocks by supporting RFMO science bodies, convening leading scientists to address research challenges, and communicating results
- Striving to eliminate illegal, unregulated, and unreported (IUU) tuna fishing by implementing the use of Unique Vessel Identifiers (UVIs), mandating 100 percent observer coverage for purse seine vessels selling to ISSF Participating Companies, and testing the viability of electronic monitoring systems
- Minimizing bycatch, discards, and abandoned gear through extensive research on fishing strategies and technologies, mandating 100 percent retention of all tuna and bycatch for purse seine vessels selling to ISSF Participating Companies, and other measures
- Collecting and exchanging data to promote better scientific understanding of tuna stocks by sponsoring workshops, side events, and meetings (as well as the individual participation of participants from developing countries) regarding a variety of issues, bringing together scientists, environmentalists, vessel owners, and fishers

Gallery 1.1: ISSF Approaches to Improving Tuna Sustainability



Allocation of Rights Workshop Report

Online Advocacy of Key Issues



Images from ISSF-sponsored electronic monitoring trials

Shark tagging on board an ISSF bycatch research cruise

A Skipper Workshop where ideas about sustainable fishing techniques are shared

ISSF Activities

ISSF conducts educational and advocacy activities, funds major research on fisheries to reduce bycatch (the catching of nontargeted species), and uses direct-market action by its Participating Companies.

Gallery 1.2: ISSF Activities

ISSF-sponsored scientist observing fish behavior during a bycatch research cruise in the Indian Ocean

ISSF-sponsored scientist tagging a tuna during a bycatch research cruise in the Western Pacific Ocean

ISSF Skipper Workshops, where scientists and fishers share ideas to improve the sustainability of tuna purse seine fisheries

Advocating for science-based conservation and management of the tuna stocks and their ecosystems at the meetings of the tuna RFMOs

> Save the date / Call for abstracts

SCIENTIFIC SYMPOSIUM

Mitigating impacts of fishing on pelagic ecosystems: towards ecosystem-based management of tuna fisheries

15-18 October 2012 Montpellier - France

ISSF Skippers' workshop (Tuna purse seine bycatch)

19 October 2012 Montpellier - France

Approximately six million tons of tunas and tuna-like species are captured every year for human consumption. These fisheries are highly complex in nature with multiple target species and fishing gears (e.g. purse seine, longline, pole and line). As such there are several issues that scientists, policy makers and stakeholders are faced with: catches of juvenile target species, bycatch, impacts of FADs, overcapacity, interactions between fisheries, etc. A symposium will be convened to present the most recent findings and provide a platform to exchange ideas and investigate optimal approaches to mitigate impacts and ensure sustainability. We encourage participation from scientists, stakeholders and policy makers from all oceans.

The symposium (15-18 October 2012) will have four main thematic sessions:

- Ecology of target and non target species (e.g. pelagic elasmobranchs) of tuna fisheries
- Mitigation techniques
- Socio-economic challenges
- Ecological-based management of tuna fisheries in the context of global change

Deadline for abstracts is **June 1, 2012**
Registration and submission of abstracts will open soon on http://ebfmtuna-2012.sciencesconf.org/

Following the symposium, ISSF will host a workshop (19 October, 2012) where skippers and scientists can interact and discuss bycatch reduction methods in the tuna purse seine floating object fishery.

Both the symposium and skippers' workshop will be held at the Aquarium Mare Nostrum in Montpellier, located in the South of France.

Funders

The EU funded MADE project "Mitigating adverse ecological impacts of open ocean fisheries" Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 212496, www.made-project.eu

The International Seafood Sustainability Foundation, www.iss-foundation.org

Sponsoring, in addition to Skipper Workshops, symposiums for scientists and fisheries managers to share information on fisheries and bycatch research

Publishing a regularly updated "Status of the Stocks" report, with information on abundance, mortality, and related bycatch issues for every major tuna stock

Working with the tuna industry to encourage the adoption of best fishing practices by tuna fleets through the ISSF ProActive Vessel Register

ISSF ProActive Vessel Register

ISSF recently launched the ProActive Vessel Register (PVR), which is an innovative and effective way for vessel owners to identify themselves as active participants in meaningful sustainability efforts. The PVR provides third-party validated information to tuna purchasers of the positive steps each vessel is taking in implementing a series of commitments designed to bring responsible practices to tuna fishing.

Each vessel that registers on the PVR also needs to ensure that its skippers do one of the following:

1. Attend an ISSF Workshop on bycatch mitigation practices, or
2. Read the relevant ISSF Skippers' Guidebook, which contains information on bycatch handling and mitigation, RFMO requirements, and other useful information about fishing sustainably. Skippers' Guidebooks can be read online at or downloaded from http://issfguidebooks.org

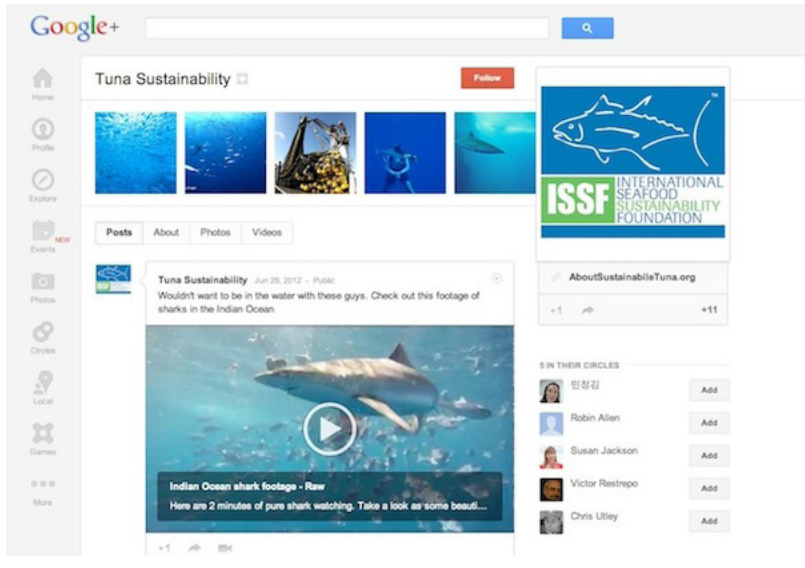
If you are assigned to a vessel on the PVR, the following website will display those actions that the vessel has committed to undertaking as part of joining the PVR: http://iss-foundation.org/knowledge-tools/databases/proactive-vessel-register/.

These actions, known as ISSF Conservation Measures, are detailed in the following section.

Gallery 1.3: ISSF's Interactive Tools and Online Outreach

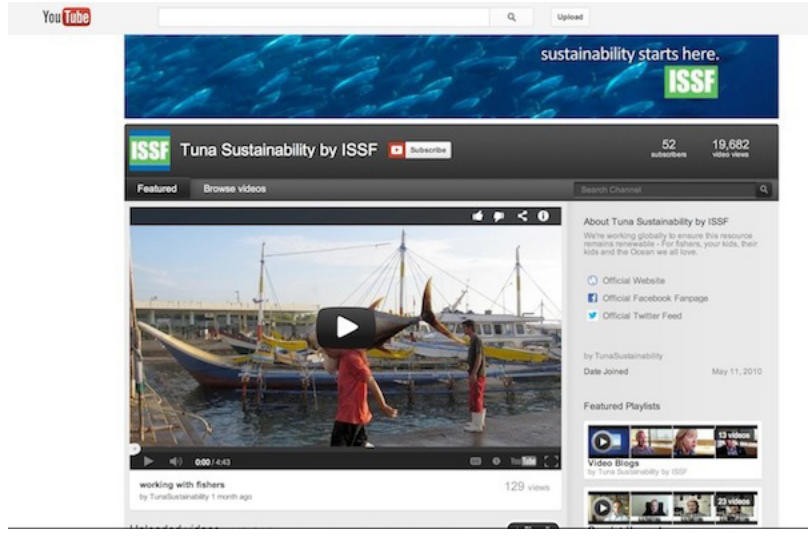
ISSF Website: iss-foundation.org

ISSF Facebook Page: facebook.com/TunaSustainability



ISSF Google+ Page: goo.gl/tgyYHO

ISSF Twitter Page: twitter.com/issf



ISSF YouTube Page: youtube.com/user/TunaSustainability

ISSF Participating Companies

ISSF Participating Companies are tuna processors or traders (primarily purchasers of raw tuna for processing, or purchasers of raw tuna or finished tuna products for resale) that are members and associate members of the International Seafood Sustainability Association (ISSA).

The Participating Companies can purchase tuna only from vessels (and vessel-owning companies) that are compliant with the relevant ISSF Conservation Measures.

Conservation Measures for All Vessels

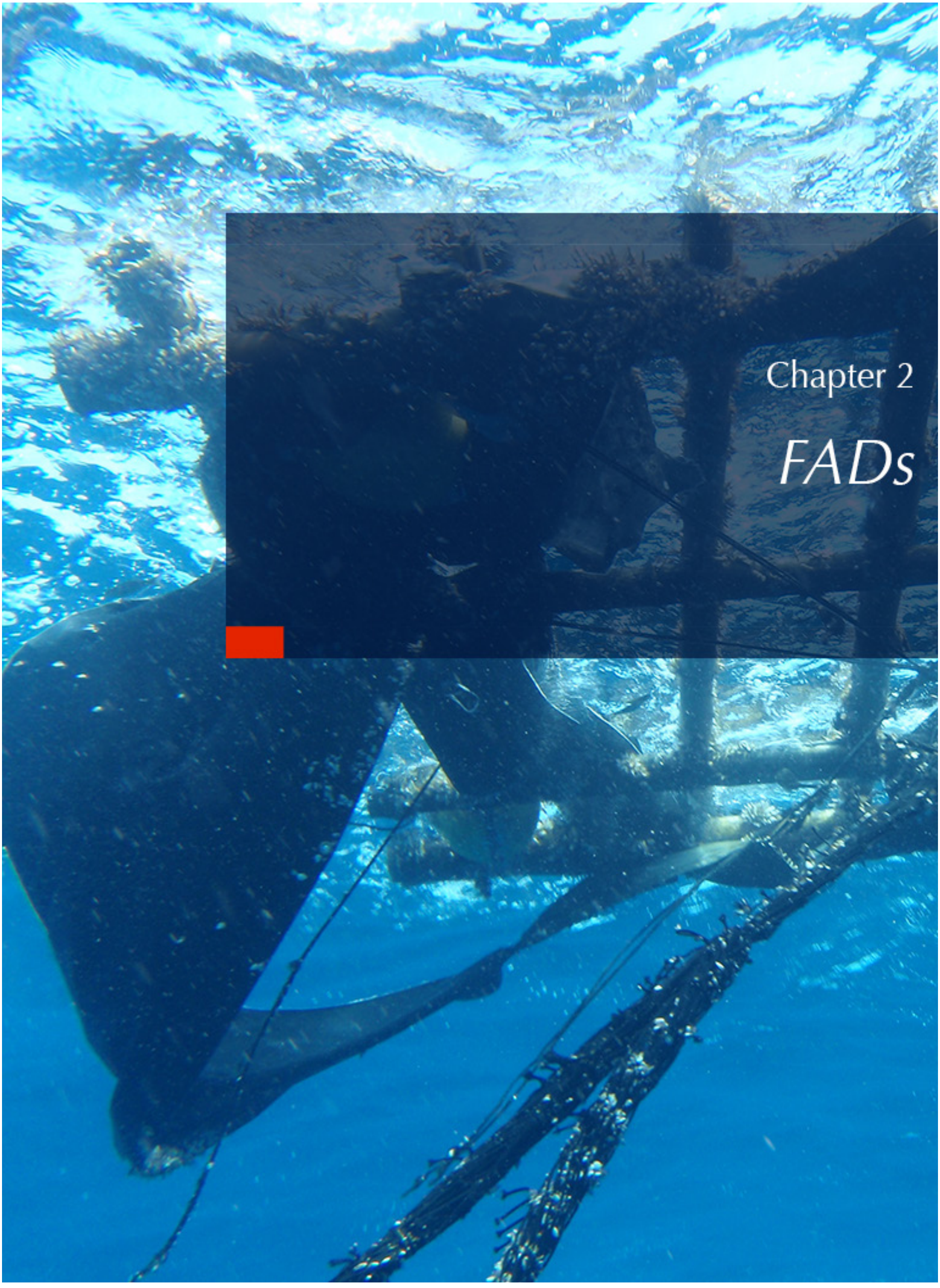
To be compliant, **all vessels** must:

- Not appear on an IUU List
- Have an IMO number (when meet IMO minimum size)
- Have a company anti-fining policy
- Not have a fining finding within 2 years
- Be on a RFMO authorized record, if required
- Be flagged to a RFMO member or CNM

Conservation Measures for Purse Seine Vessels

To be compliant, **purse seine vessels** must conform to the above list for all vessels and must also:

- Have been actively fishing for tuna by December 31, 2012.
- Have a UVI, if applicable
- Be able to prove 100 percent observer coverage of large-scale vessels (human or electronic)
- Show full retention of all tunas
- Have a ISSF-trained skipper, either via an in-person Skipper Workshop or via having read the relevant Skippers' Guidebook
- Engage in no transshipment on the high seas
- Demonstrate that any observer meets baseline standards



Chapter 2

FADs

Chapter 2: FADs

Today, fish aggregating devices (FADs) are responsible for about half of the world's tuna production. But with this growth in FAD use comes new concerns—both real and perceived—about sharks, juvenile tunas, and other bycatch. Scientists, alongside fishers and managers, have begun to address these issues through changes in FAD construction and efforts to improve data collection.

Chapter Objectives

1. Outline the major issues with FAD fishing.
2. Provide guidance on best practices in FAD construction and use.
3. Review the ISSF FAD Logbook.

Introduction

The use of FADs (fish aggregating devices) has become increasingly popular among the global tropical tuna purse seine fleet. Fishing efficiency has improved through reduced operational costs and by enabling successful fishing in times and places where free schools are unavailable. Drifting FAD (dFAD) sets are now responsible for at least half of the global tuna production. Given high and rising fuel costs, the utilization of dFADs has become a necessary aspect of tuna production for the global canning industry.

Unfortunately, the rapid increase in FAD use has resulted in a number of challenges for the fishing industry, primarily the need to understand and mitigate the negative impacts to both target and nontarget species, such as higher bycatch rates (i.e., potential for entanglement of sensitive species.)

Continuing education on this topic can help fishers to effectively apply improvements to maximize the benefits, and minimize the negative concerns, of FAD fishing. This knowledge could also prove useful in responding to recent anti-FAD campaigns promoted by certain environmental groups, who use both real and perceived problems of FAD fishing to encourage consumers to buy only free-school or pole-and-line-caught tuna.

Higher bycatch in associated sets (e.g., FAD sets, sets on floating logs) as compared to unassociated sets

Tuna RFMO and national authorities have also begun to pay significant attention to FAD use and its impact on the larger marine ecosystem, with most RFMOs considering or implementing FAD monitoring and management plans at the regional or national level. With these forces at play, it is time for fishers to begin ensuring that their FAD fishing practices are as ecologically sustainable as possible.

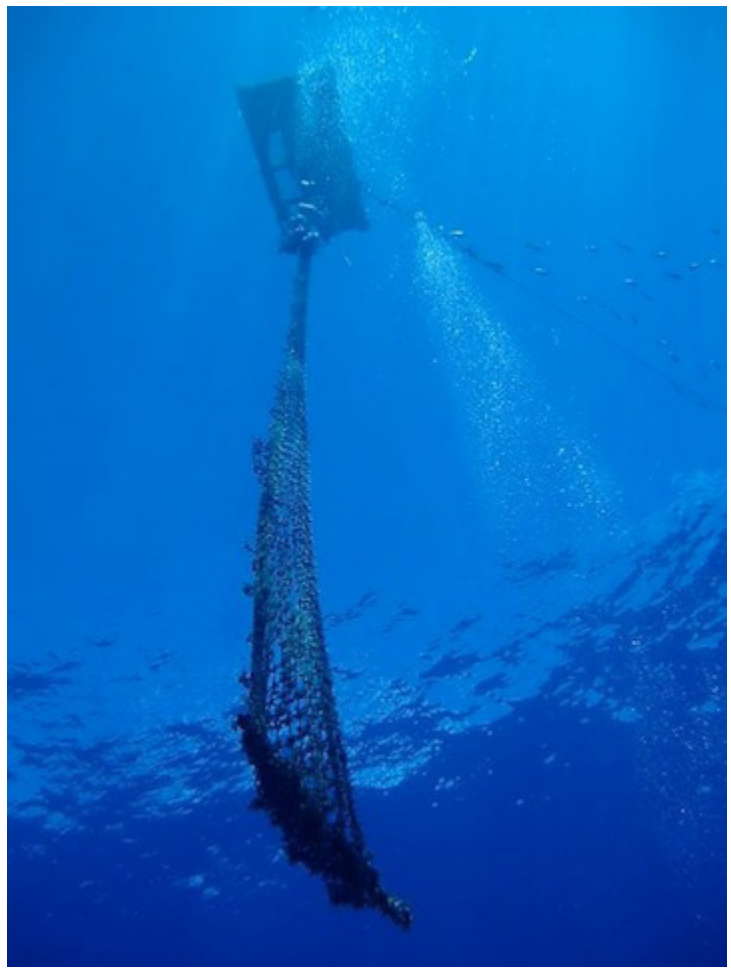
The entanglement hazard posed by some FADs, which affects sensitive species such as sharks and turtles

Gallery 2.1: NGO Action Against FADs

FAD Fishing: Bycatch on Associated Sets

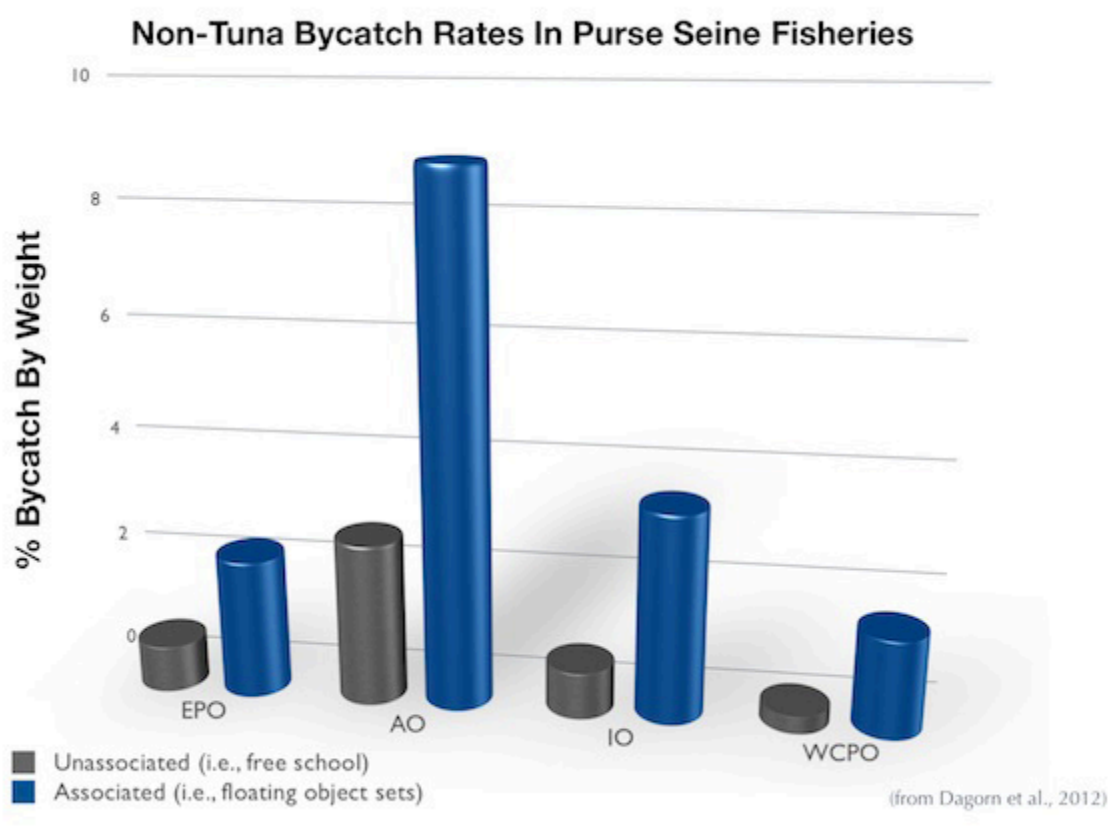
There is a greater number and variety of bycatch in associated sets than in unassociated sets, including small yellowfin and bigeye tuna, sharks, turtles, billfish, and bony fish. By weight, the primary consequence of fishing is largely other nontargeted, small tuna. This can represent 15 to 20 percent of a total catch.

Other species of fish, sharks, and other marine life are also captured; the bycatch amount of each species can vary widely depending on the region, time of the year, vessel, crew experience, and other factors. Typically, bycatch in associated sets is made up of other fish, sharks, and rays, averaging about 5 percent of the total catch. For comparison, unassociated sets result in less bycatch, ranging on average from 0.5 to 1 percent.



Typical FAD

While research is ongoing to investigate additional FAD fishing techniques that can reduce the number of bycatch attracted to, or caught under, FADs, the current best practices to mitigate FAD-related bycatch will be presented in Chapter 4.



Non-Tuna Bycatch Rates in Purse Seine Fisheries

FAD Construction

FADs are often entanglement hazards, especially when constructed with surplus purse seine netting, as is common in the fishery. This webbing, which hangs in panels suspended below the raft to a depth of 15 meters or more, can potentially entangle animals, including sensitive species such as sharks and turtles.

This "ghost fishing," does appear to be a significant source of shark mortality, particularly in the Indian Ocean.

A number of research projects have investigated alternative FAD designs that reduce the incidental entanglement and catch of sharks and sea turtles, while maintaining the FAD's ability to aggregate fish. The following galleries illustrate the Dos and Don'ts of ecologically-friendly FAD design. ISSF has produced a document summarizing the recommendations on non-entangling FAD construction: Here are some online resources.

Gallery 2.2: FAD Do's

To reduce the amount of marine debris, use natural or biodegradable materials (such as natural fiber rope, palm fronds, and logs). (Photo: FADIO/IRD-Ifremer/M. Taquet)

Use a raft (or equivalent floating portion) that is either uncovered or covered in a non-mesh material that is tightly attached to the raft.

When assembling the submerged section of the FAD, use materials such as loose rope, small-opening mesh or non-mesh fabric that will not entangle animals.

As a temporary step (until more appropriate materials can be located) old tuna fishing nets rolled up in "sausage" shapes and securely wrapped (or melted together) can be used. However this is only an interim step, as the nets can eventually unroll and pose an entanglement hazard.

To discourage turtles from resting on top of FADs, use log-shaped (cylindrical) or spherical floating objects.

Example: FAD design substituting net with fabric sheets

Example: Non-entangling FAD made with biodegradable sheets

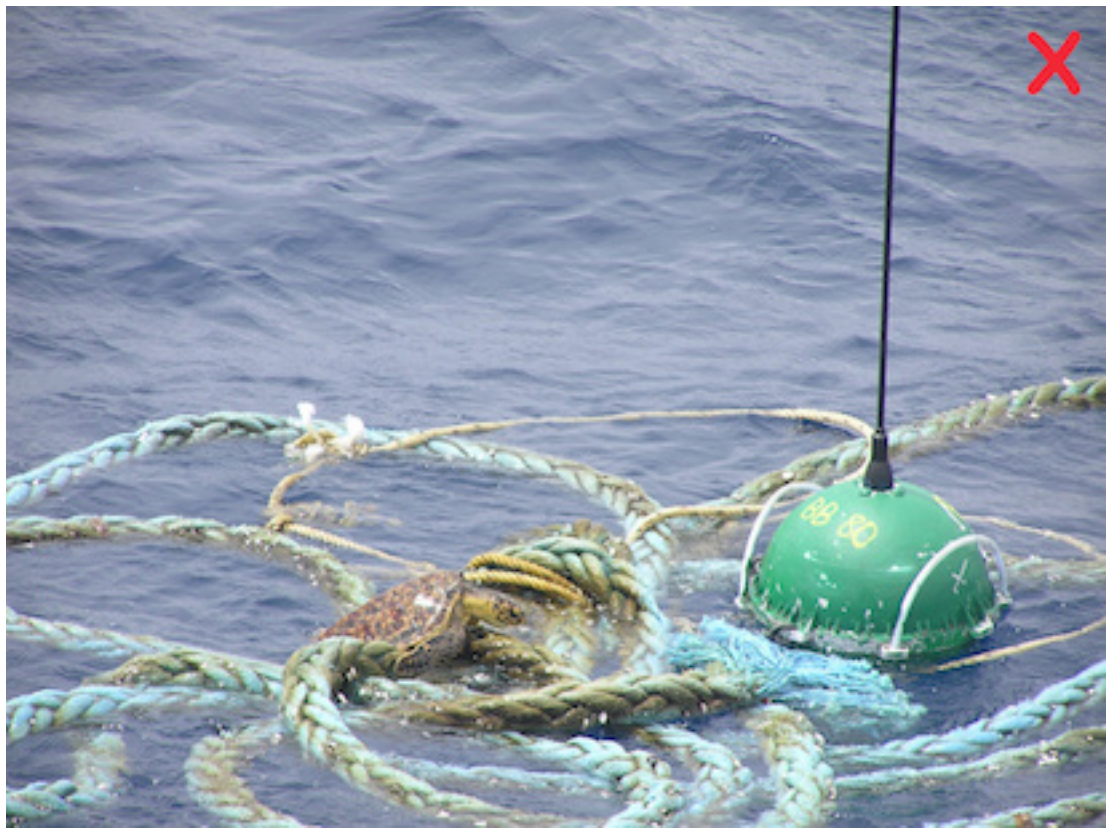
Example: Non-entangling FAD constructed with biodegradable materials including palm fronds cover and small-mesh jute netting (Photo: ANABAC/AZTI)

Example: Commercially used FAD with raft underwater and net replaced by sheets

Example: Narrow "log style" surface, supplanting traditional raft FAD, discourages turtles from climbing

Gallery 2.3: FAD Don’ts

Don’t use loosely wrapped rafts because they pose an entanglement hazard. Instead, choose small-mesh or non-mesh fabric and tightly wrap it around the raft. (Photo: FADIO/ IRD-Ifremer/M. Taquet)



Don’t use tangled ropes; they can entrap turtles. (Photo: FADIO/IRD-Ifremer/M. Taquet)

Don't use underwater panels of loose, large-mesh netting; they pose an entanglement hazard.

Movie 2.1 How to Save 500,000 Sharks in the Indian Ocean

#BYCATCHPROJECT

A video about JD Filmalter, a fisheries researcher working on our #BycatchProject, talks about the threat to silky sharks in the Indian Ocean and a simple step that can be taken to protect the species from ghost fishing. Available at http://youtu.be/jtIVjv-0NgU

FAD Data Collection

RFMOs and flag states are already beginning to take action to monitor or regulate FAD use—including mandating 100 percent observer coverage, closing areas to FAD fishing, and requiring submission of specific FAD-related data. The biggest challenge to developing a practical, science-based approach to FAD management is a lack of data on the number of FADs and their impact on both tuna and bycatch stocks.

In 2013, three out of the four tuna RFMOs adopted mandatory requirements for the collection and reporting of specific FAD data by vessel operators:

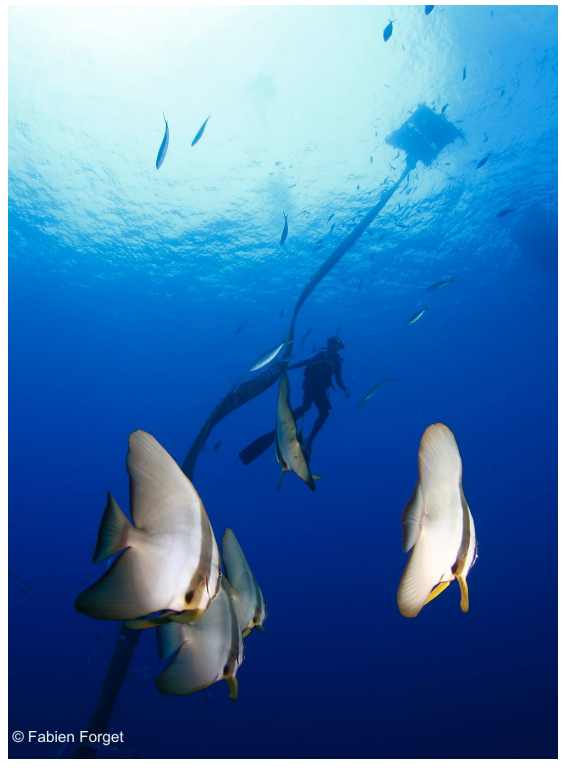
- IOTC and IATTC now will require the collection of these data starting in 2015, and in 2016 their scientific committees are to provide initial recommendations to the Commissions on possible management measures; and
- ICCAT will require the collection of these data starting in 2014 (with a 1 January 2015 start date for developing countries).

In addition, all three of these RFMOs also encourage the immediate, or starting in 2014, use of non-entangling FAD designs to minimize the risks to sea turtles, sharks, and other marine life. This is another ISSF global priority that saw significant success in 2013.

The WCPFC did not adopt similar FAD reporting requirements in 2013, or provisions encouraging the use of non-entangling FAD designs. However, the WCPFC Commission asked the Scientific Committee to make an evaluation of available FAD data from its Regional Observer Program and make recommendations to the Commission in 2014. In addition, ISSF is funding pilot projects to collect these data through electronic fishing logbooks. ISSF will continue to urge the WCPFC member nations to adopt a FAD reporting requirement and provisions for the use of non-entangling FAD designs at their annual meeting in 2014.

Summary

FAD fishing has come to play a major role in tuna purse seining, though it is clear that its bycatch issues cannot be ignored. In order for FADs to continue as a viable tool - given the ecological and political considerations - adaptations must be made. Incorporating the guidelines on FAD construction provided in this chapter is a necessary first step in this process.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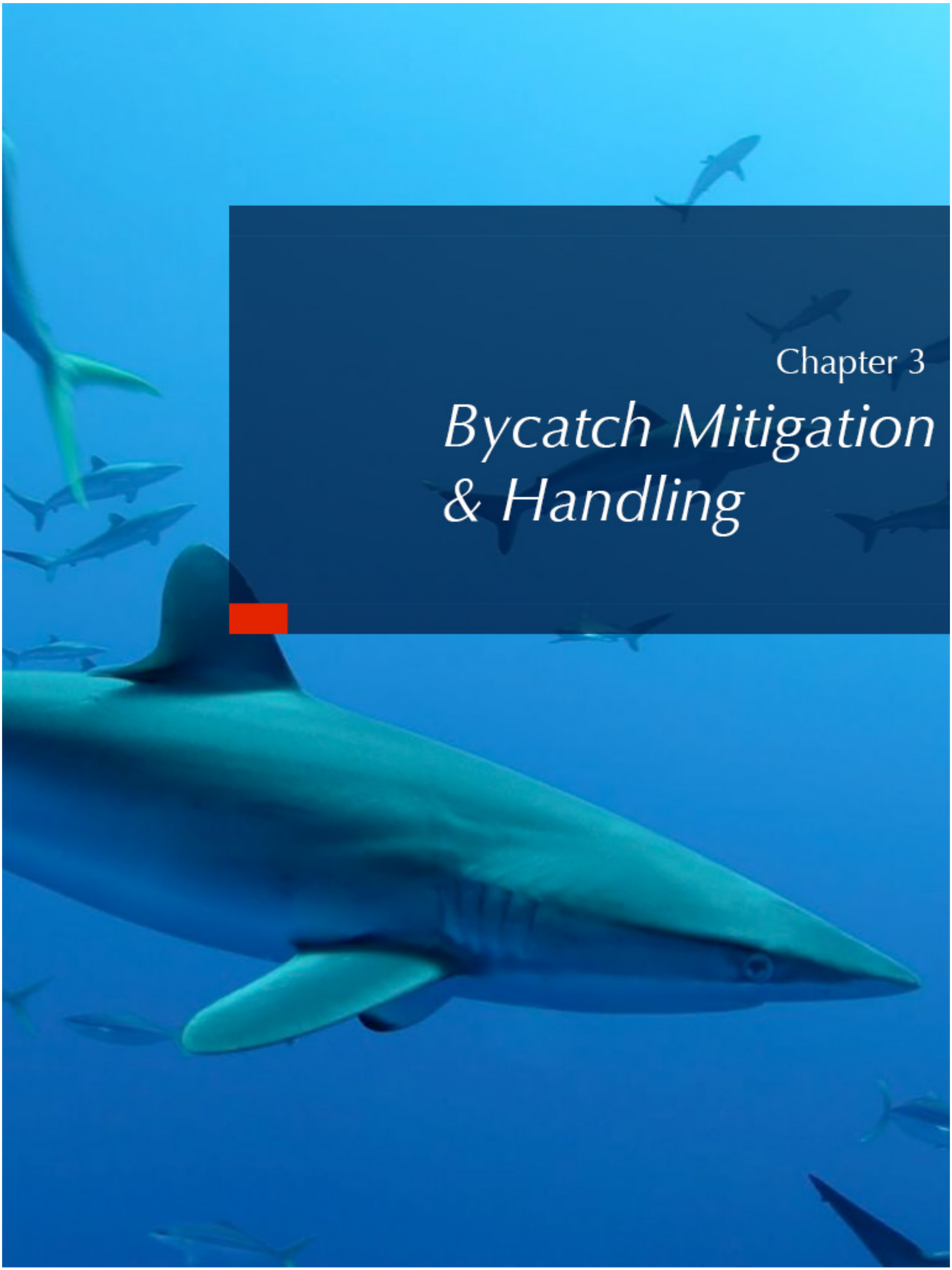


Chapter 3

Bycatch Mitigation & Handling

Chapter 3: Bycatch Mitigation and Handling

Bycatch and discards in fisheries have become a serious issue in recent years, both because of their very real impact, particularly on sensitive species, and because of consumers' increasing awareness, which creates demand for sustainable seafood choices. In addition to this being a major issue for the tuna-buying public, RFMOs are increasingly concerned with taking an "ecosystem approach" to fisheries management, which includes reducing the mortality of nontarget species.

Chapter Objectives

1. Provide background on those bycatch species of most concern.
2. Summarize best practices for avoiding bycatch.
3. Detail techniques for the safe handling and release of bycatch.

Scientist studying fish behavior. ISSF bycatch research cruise in the western Pacific, June 2012.

Sharks and Rays

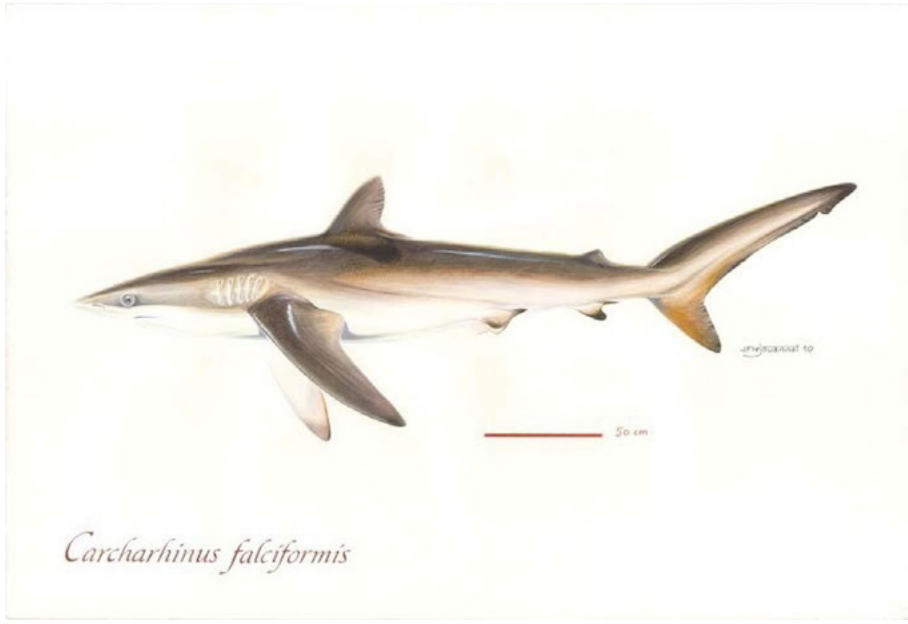
While not the most common bycatch in tuna purse seine fishing, sharks and rays are the most vulnerable to its effects. Several aspects of their biology make them highly susceptible to overfishing, including:

1. slow growth rates,
2. late maturation,
3. long pregnancies,
4. low fertility, and
5. long life spans.

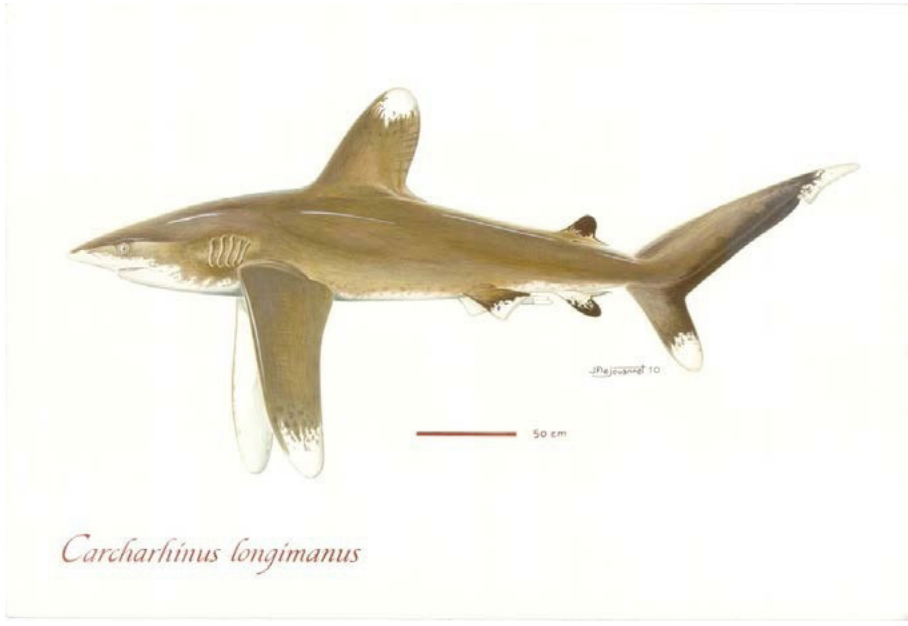
Contrary to the belief that sharks (and to a lesser extent rays) are hardy and that they can sustain rough handling or extensive exposure and still survive when returned to the sea, initial studies suggest a survivability rate of only 50 percent, even if they appear healthy upon release, most probably due to severe stress and/or injury sustained during the fishing and handling process.

This high mortality rate is surely influenced by a number of biological "weaknesses" in sharks and rays. Unlike other fish, these animals do not have a hard skeleton of bone to protect their internal organs. When out of water, the tissue that holds organs in place can tear and the weight of gravity can result in crushed or damaged organs. This same connective tissue holds the spinal cord and vertebrae in place, and for this reason, animals handled from the head or tail can suffer irreversible damage as a result. A shark's head also holds a number of sensitive and fragile organs used to detect prey, and if handling damages these, then the shark – once released—could be unable to locate prey and starve.

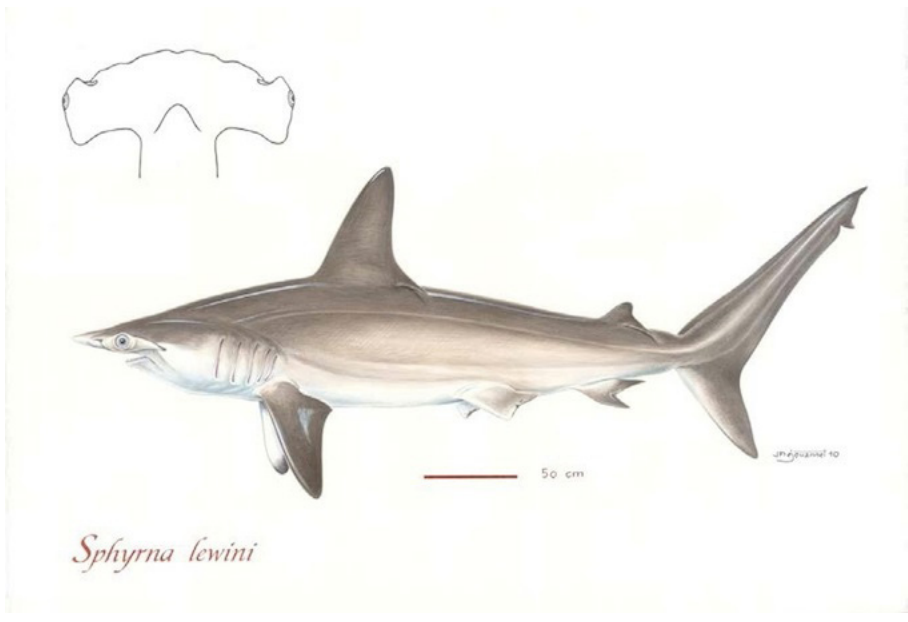
Gallery 3.1 Sharks Commonly Encountered



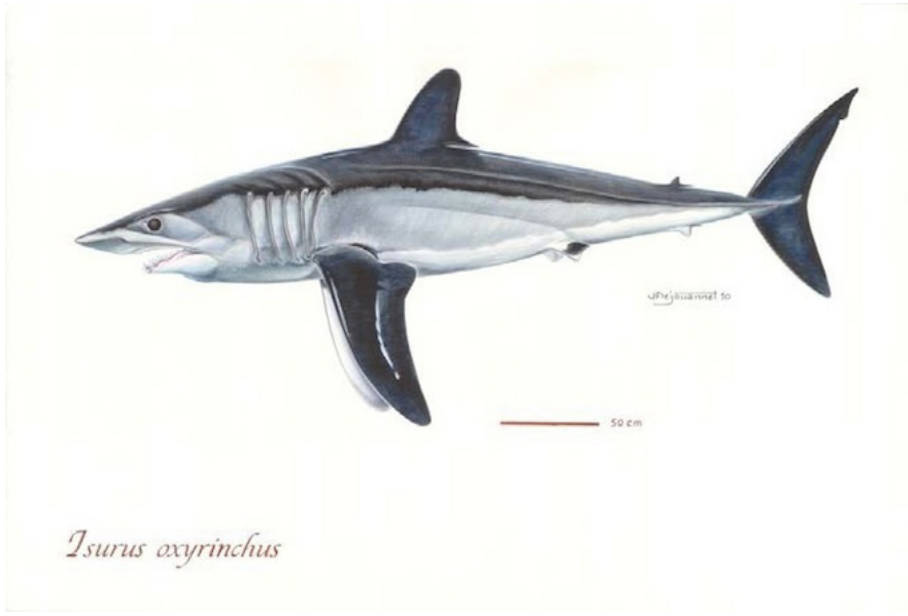
Silky Sharks (Photo: Poisson et al, 2012)



Oceanic Whitetip Sharks (Photo: Poisson et al, 2012)



Scalloped Hammerhead Sharks (Photo: Poisson et al, 2012)

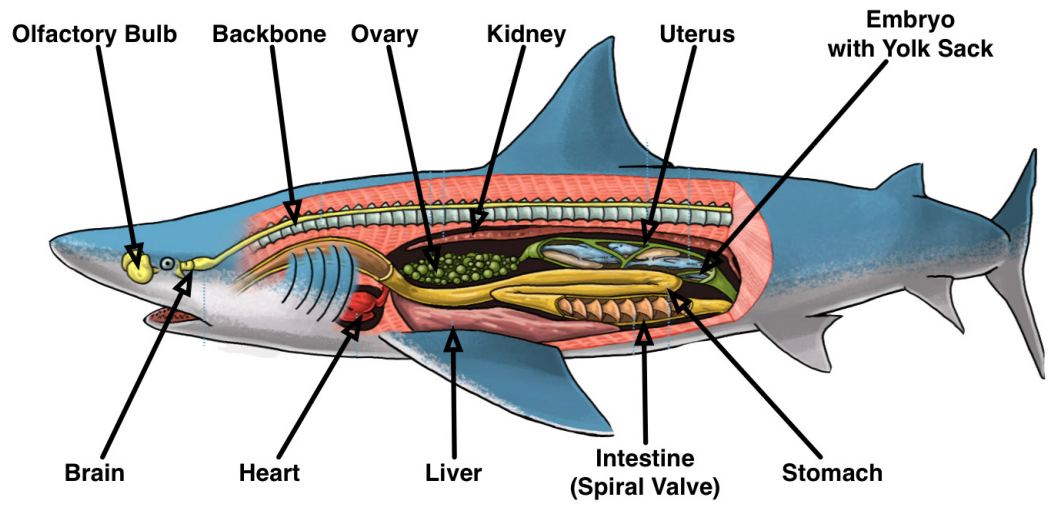


Shortfin Mako Sharks (Photo: Poisson et al, 2012)

Reducing Shark and Ray Bycatch

While there are several strategies currently being tested, there are still relatively few proven techniques for reducing the catch of sharks in purse seine fishing.

However, ISSF continues to sponsor bycatch research cruises to study the most promising strategies, including the use of escape windows in the net. Further developments in this field will be included in future versions of this guidebook.



Shark Anatomy

Gallery 3.2: Whale Sharks and Rays

Whale Sharks

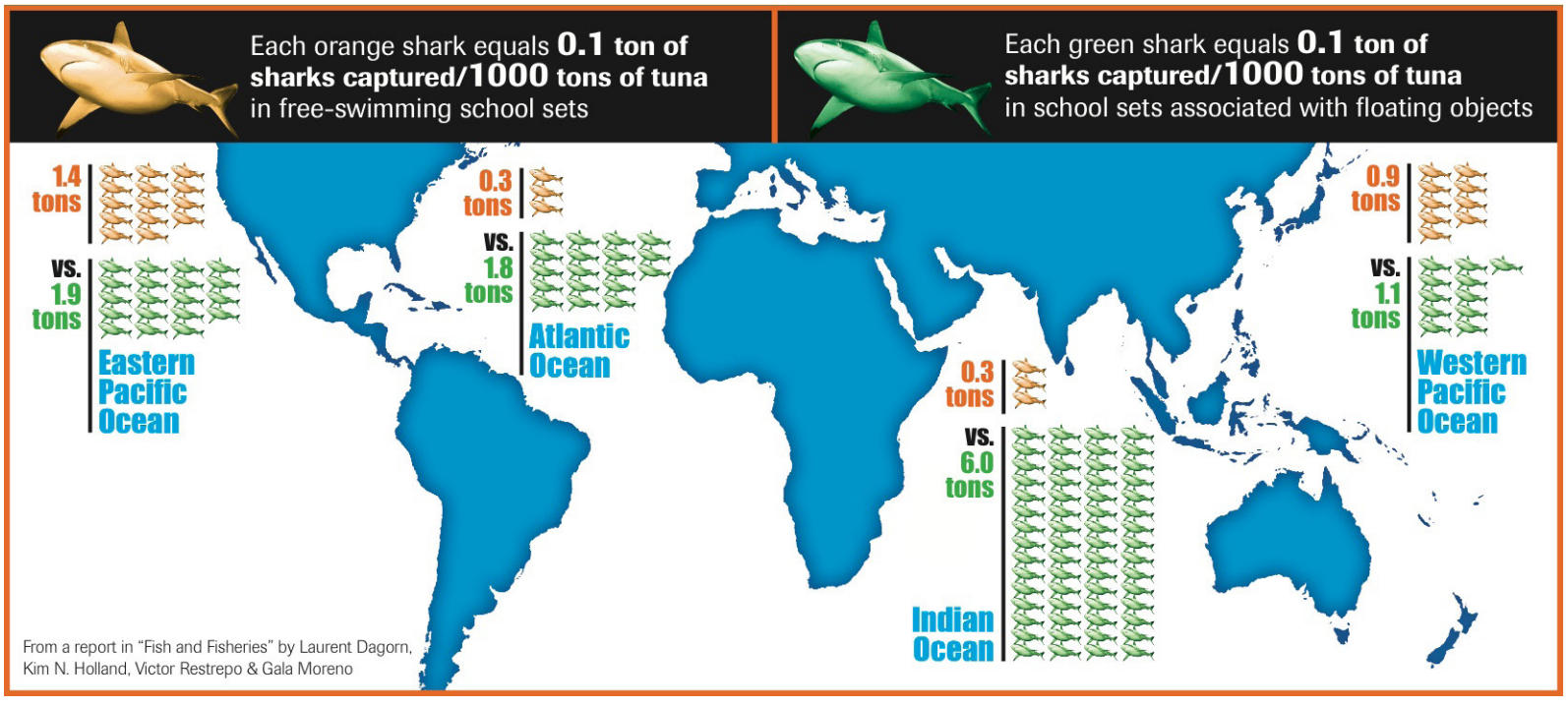
Reef and Giant Manta Rays

Devil Ray

Target Large Schools

Published science shows that fishers can reduce bycatch simply by targeting larger schools of tuna. In the Canadian Journal of Fisheries and Aquatic Sciences, Dagorn et al. found that the total amount of bycatch is more dependent on the number of sets than the total catch of tuna.

Fishers should target schools larger than 10 tons to reduce shark bycatch by 23 to 41 percent. Overall, using this method will cut the amount of bycatch by 23 to 43 percent, depending on the ocean region (see shark/tuna chart on the next page.)



Tons of sharks captured per tons of tuna.

Movie 3.1: ISSF Shark Research

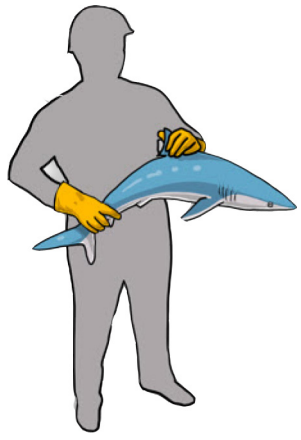
A video about testing a chum lure. Available online at http://youtu.be/ap8aYwDEcqA

Safe Handling Techniques for Sharks and Rays

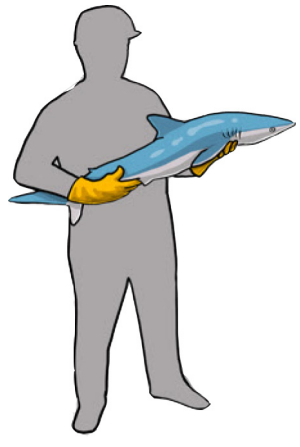
Have the crew prepared for safe handling PRIOR to net hauling – this includes instructing them on correct handling techniques and ensuring they have the right tools at hand, while putting personal safety always first.

The following galleries illustrate handling techniques as well as other dos and don'ts.

Gallery 3.3: Handling Small Sharks (1 Person)



One hand on the dorsal (top) fin and the other holding the body from below (Photo: Poisson et al, 2012)

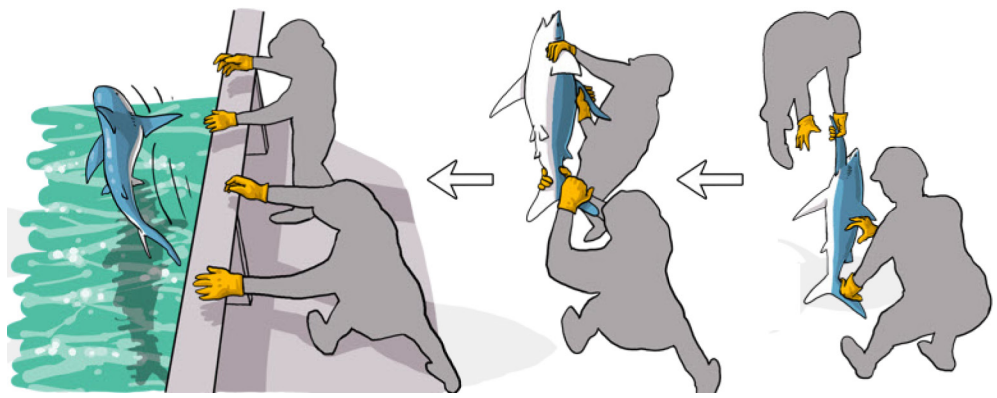


Both hands holding the body (Photo: Poisson et al, 2012)

One hand on the pectoral (side) fin and the other holding the tail (Photo: Poisson et al, 2012)

Release the fish by pointing its head down toward the water and dropping it in (Poisson et al, 2012)

Handling Medium Sharks (2-3 People)



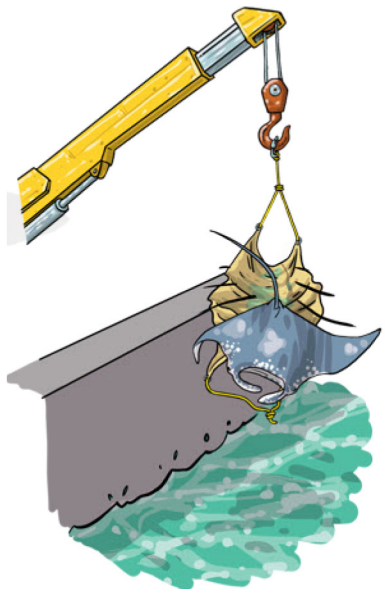
One or two people should hold the dorsal and pectoral fins, with the other person holding the tail. Release over the side by dropping, not throwing, the animal. (Photo: Poisson et al, 2012)

Handling Stingrays

The ray's stinger is located at the base of its tail. The sting is not very harmful, though it is painful. It is best to avoid the rear of the ray and grasp it near the head. Hold the ray away from the body. (Photo: Poisson et al, 2012)

Gallery 3.4: Handling Large Sharks and Manta Rays (with vessel's crane)

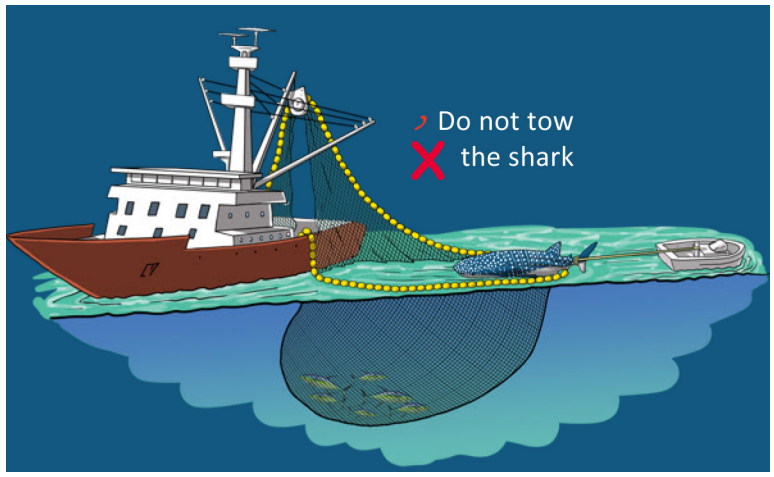
If the animal can't be released directly from the brailer (e.g., by tipping one edge), then large sharks, rays, and other fish (e.g., moonfish) can be returned to the sea using a piece of net, plastic tarp, or canvas that can be lifted by the crane. The material should be ready on deck before brailing, and when a large animal is encountered, it can be placed on the material, which is then hooked up to the crane and lifted over board.



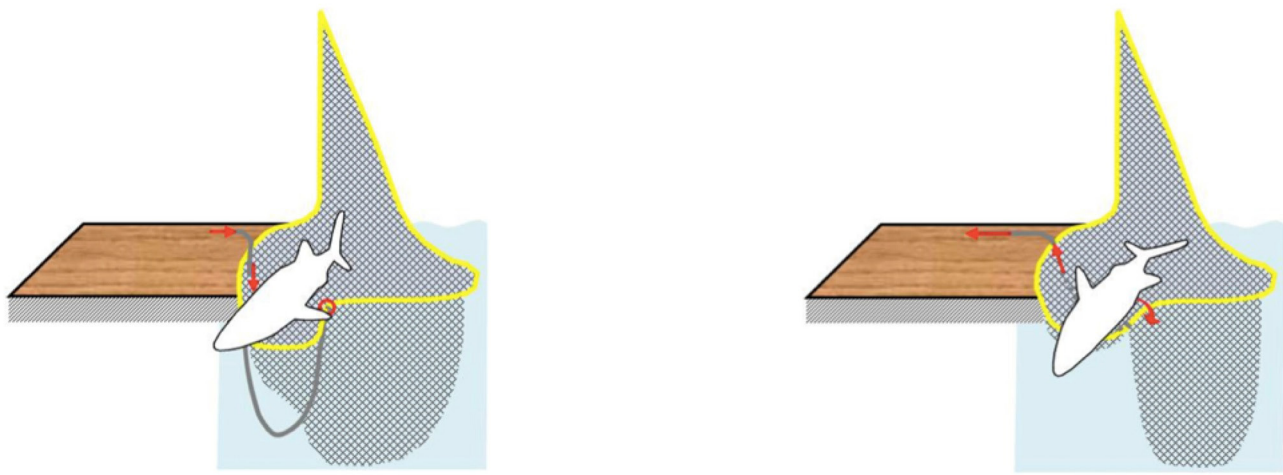
If the animal can't be released directly from the brailer (e.g., by tipping one edge), then large sharks, rays and other fish (e.g., moonfish) can be returned to the sea using a piece of net, plastic tarp or canvas that can be lifted by the crane. The material should be ready on deck before brailing, and when a large animal is encountered, it can be placed on the material, which is then hooked up to the crane and lifted over board. (Photo: Poisson et al, 2012)

Gallery 3.5: Releasing Whale Sharks

Unlike the handling techniques for sharks and rays discussed above, whale sharks should always be dealt with in the water.

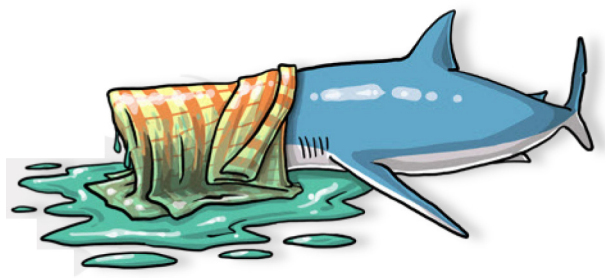


At no time should the whale shark be handled by its tail (e.g., lifted using the crane, or towed it with a speed boat). This can cause severe injury to the animal. (Photo: Poisson et al, 2012)

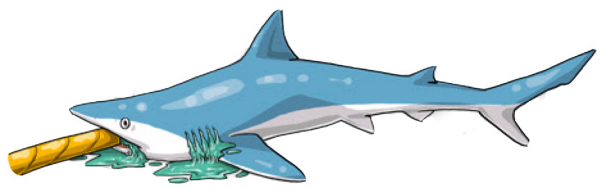


If a whale shark appears early during hauling and is at the surface while the tunas remain below, then the animal may tear the net on its own or a crew member can cut a few meters of net near the head of the animal to allow it to escape. Alternatively, the crew in charge of the net hauling operation can use the winch and the capstan to bring the animal close to the hull, to drain the animal, and then to roll it outside the bunt. A rope placed under the animal and tied on the cork line could help roll it outside the net (Photo: Poisson et al, 2012)

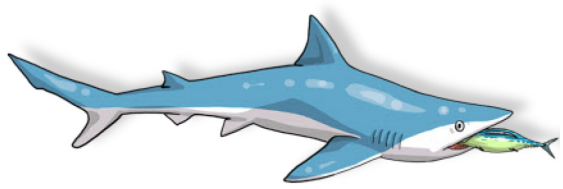
Gallery 3.6: Shark Handling and Release Dos



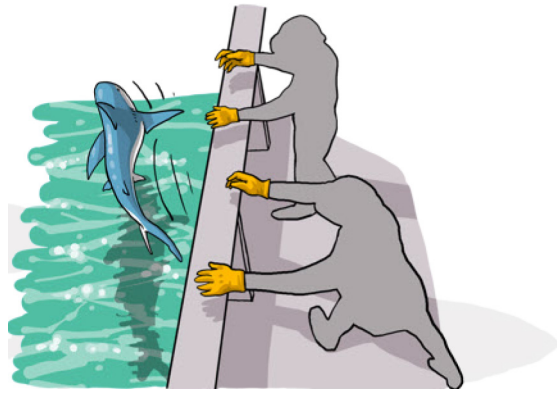
A cool, wet cloth lightly draped over its head can calm an energetic shark. (Poisson et al, 2012)



Inserting a seawater hose in its mouth might improve an animal's chance of survival if, for an unavoidable reason, the shark cannot be released right way. (Poisson et al, 2012)



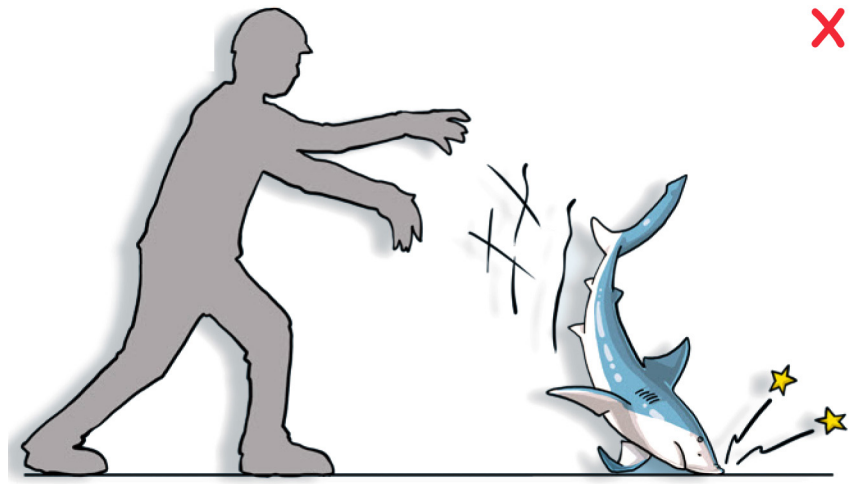
For crew safety, avoid the animal's jaws (some suggest placing a fish in its mouth to prevent bites), and regardless of the animal's state (live or moribund) be cautious at all times. (Poisson et al, 2012)



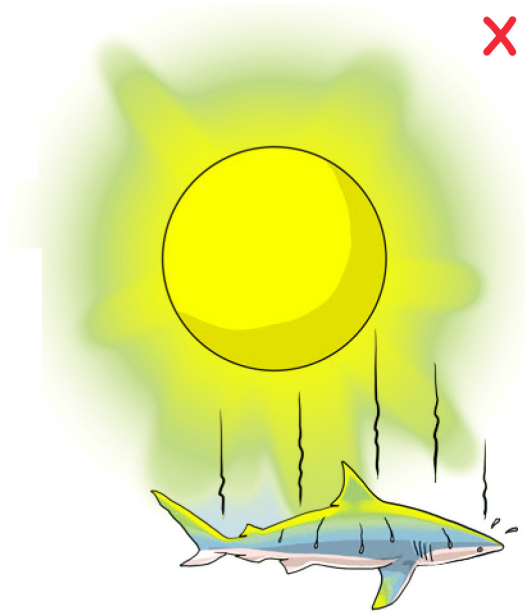
Most importantly, attempt to release the animal AS SOON AS POSSIBLE. (Poisson et al, 2012)

Gallery 3.7: Shark Handling and Release Don'ts

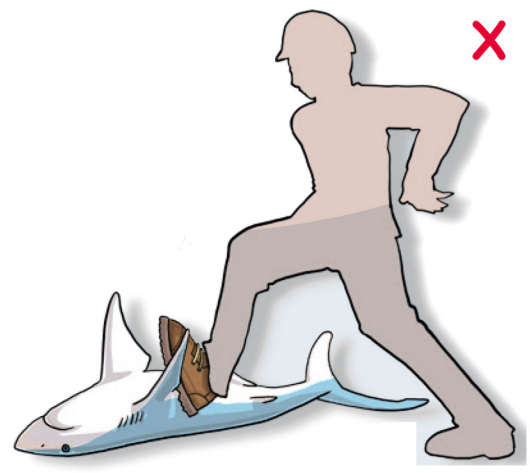
DO NOT lift the animal by its head or tail, as this can severely damage the spinal cord (Poisson et al, 2012)



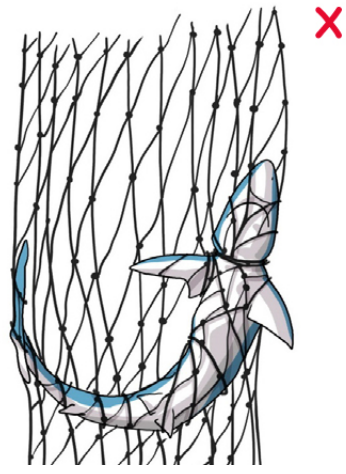
DO NOT throw, hit, or squeeze the animal. Prevent the animal from battering itself against the deck or other hard objects. (Poisson et al, 2012)



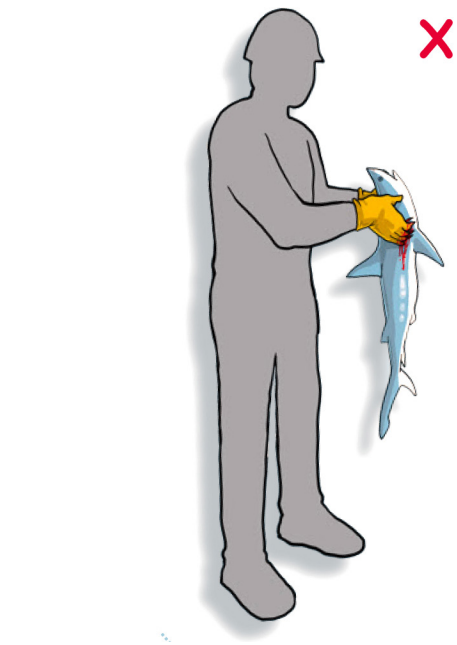
DO NOT leave the animal in the sun. If possible, handle the animal in the shade or otherwise reduce its exposure to the sun. (Poisson et al, 2012)



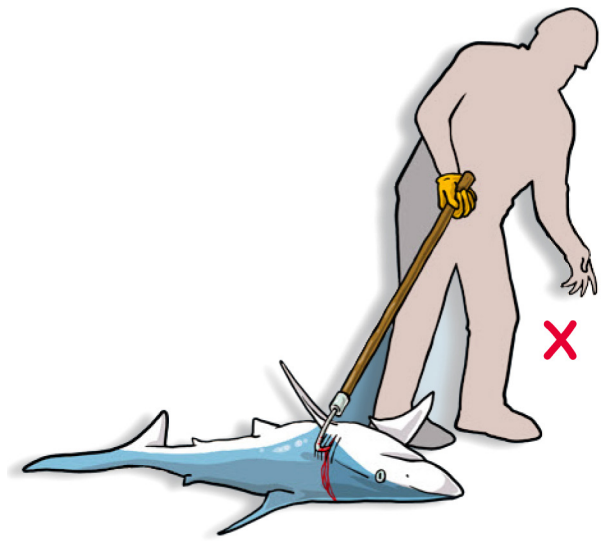
DO NOT yank or push the animal sharply. (Poisson et al, 2012)



DO NOT tug or yank the net around an entangled animal. Instead use clippers, if necessary. For animals entangled in the net, reduce the speed of the net reel. Once the tension is reduced, carefully remove the animal. (Photo: Poisson et al, 2012)



DO NOT insert hands or objects into the gill openings. (Poisson et al, 2012)



DO NOT insert a gaff, hook, or other pointed object to drag or lift the animal. (Poisson et al, 2012)

End Wasteful Shark Finning

Shark finning is the practice of retaining shark fins and discarding the remaining carcass while at sea. The practice is against the FAO Code of Conduct for Responsible Fisheries and its International Plan of Action for the Conservation and Management of Sharks, as well as the resolutions of a number of other international marine bodies, all of which call for minimizing waste and discards.

There are major uncertainties about the total quantity and species of sharks caught, and shark finning has added to this problem.

ISSF has called on industry to adopt policies against finning. All tuna fishery operators should prohibit shark finning, and should retain, land, and report all sharks caught, except for species that are prohibited by national law or RFMO regulations, or those individuals that are released alive.

Sea Turtles

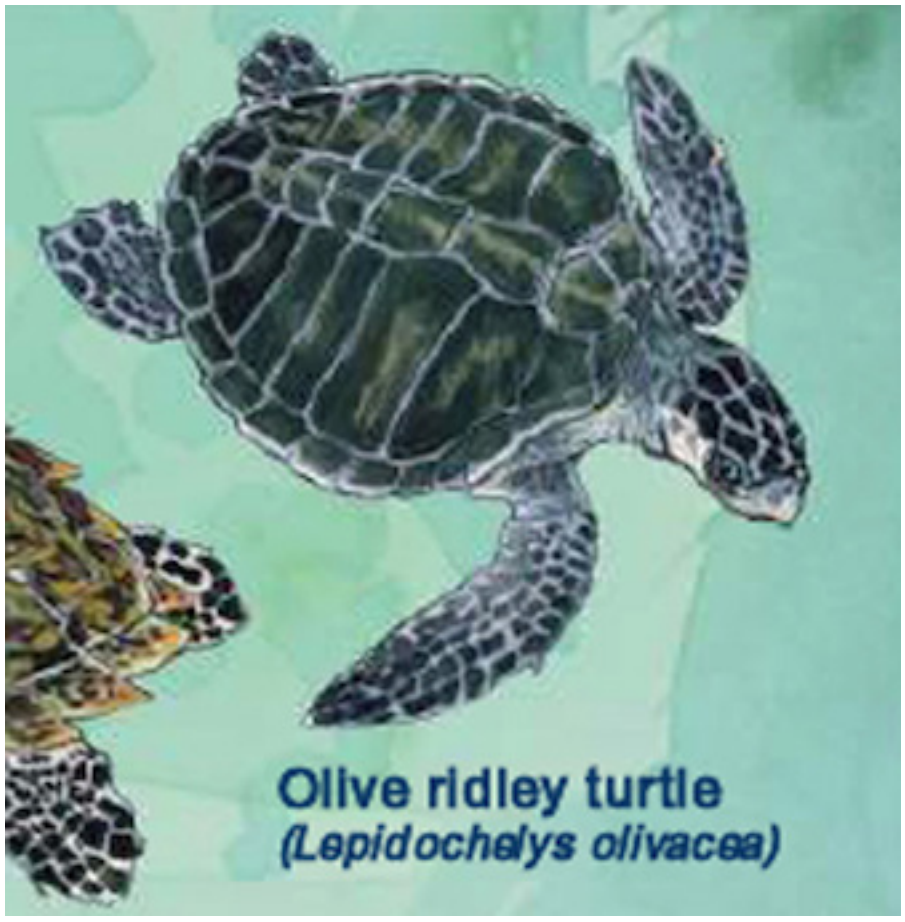
Sea turtles can be found entangled in the nets of FADs or associated with the tuna school in the bunt. Regarding sea turtles and FAD fishing, the most effective bycatch mitigation focuses on the structure and/or configuration of the FAD itself, which was reviewed in the previous chapter.

All sea turtles are protected internationally, as these long-lived animals face a number of environmental challenges (breeding ground destruction, boat collisions, ingestion of marine debris, disease linked to ocean pollution), including interactions with fishers. There are seven species of sea turtle, with five commonly encountered during tuna fishing.

The current, and best, practice to avoid turtle mortality once the animal is entangled is the use of speedboats to release the turtles unharmed from the net before passing through the power block. The best time for this action is when the entangled turtle and net leaves the water on the way to the power block (at this point the hauling should be paused). If necessary, use clippers to cut the net. Disentanglement at the earliest possible stage maximizes survival. Speedboats can also be used to remove any free-swimming encircled turtles. When handling, do not lift the turtle by its flippers or use sharp objects (e.g., gaffs) to retrieve them. Hold the turtle by the sides of its shell and ease it into the water head-first as soon as possible. If the turtle appears unconscious (possibly due to entanglement underwater), place the turtle on a tilted surface so that its hindquarters are approximately 15 cm (6 in) higher than its head. This allows water to drain out of its lungs. Keep the animal moist (cover the body—but not the nose and mouth—with a wet towel or spray it periodically with water) and at a temperature above 15° C (60° F). Check the turtle's reflexes by touching its tail or eyelid every three hours. An unconscious, but live, turtle may not react. If, after 24 hours, the turtle shows no recovery, it is likely dead. However if it does recover, release it gently into the water.

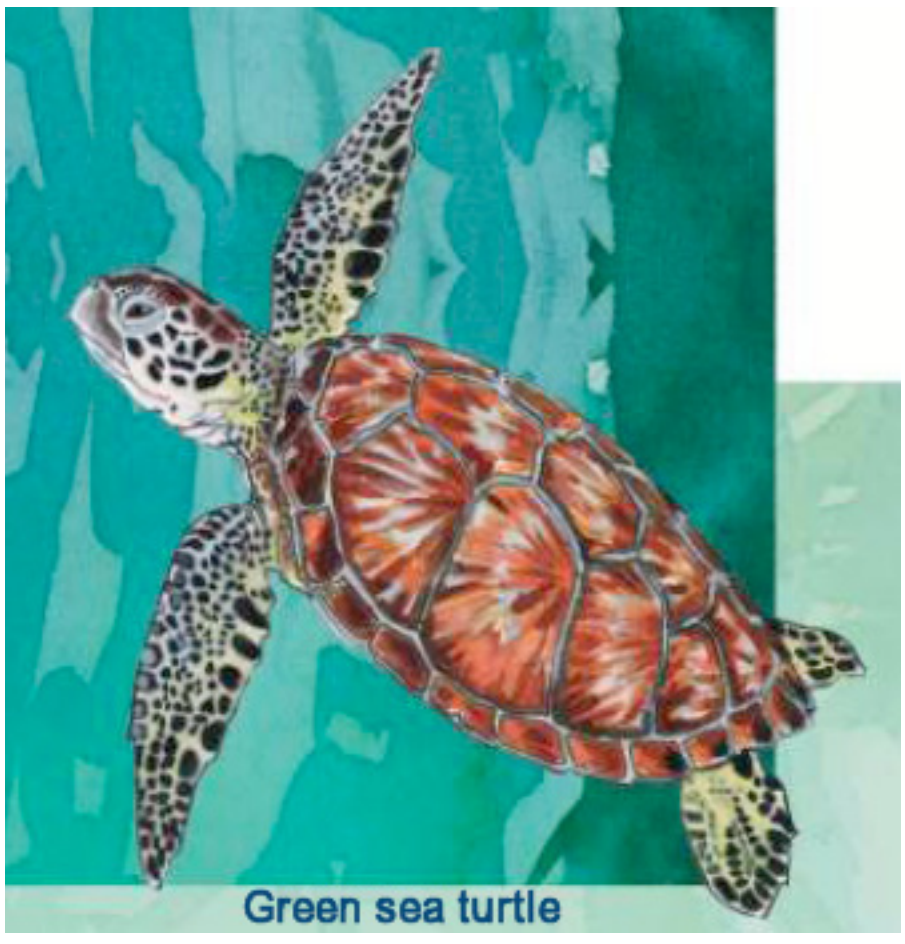
Gallery 3.8: Sea Turtle Species

Loggerhead (Photo: FAO, 2009)

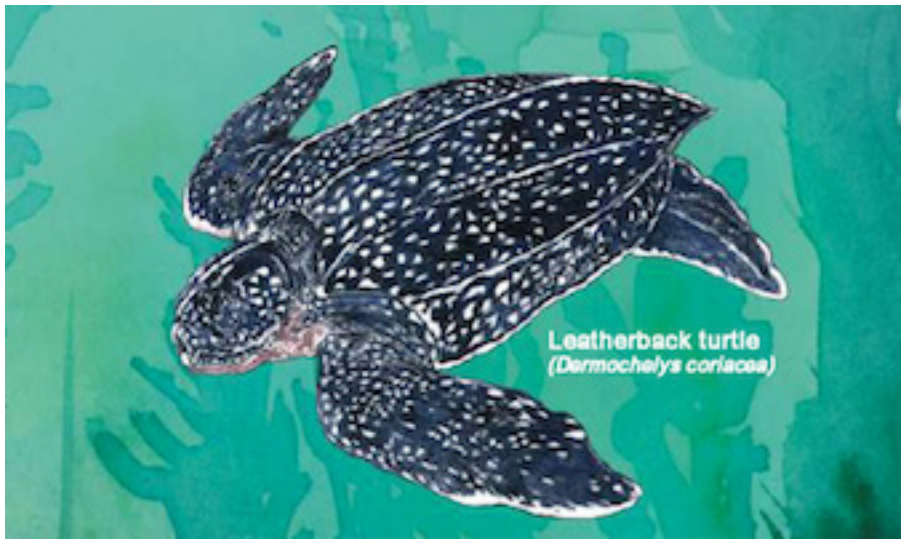


Olive Ridley (Photo: FAO, 2009)

Hawksbill (Photo: FAO, 2009)



Green (Photo: FAO, 2009)



Leatherback (Photo: FAO, 2009)

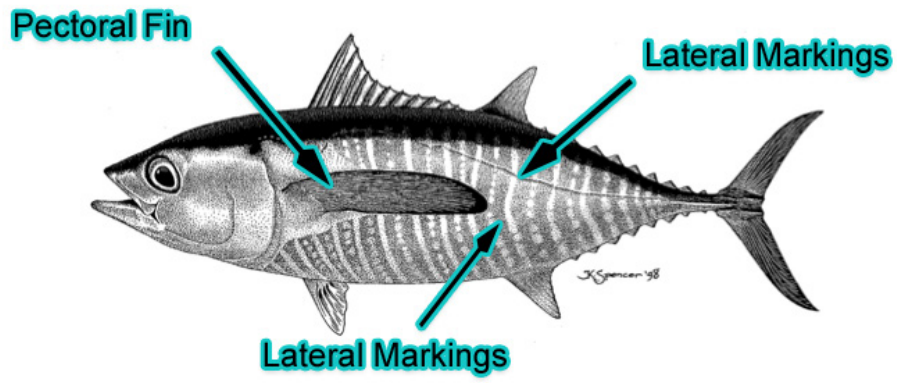
Small Tunas and Other Finfish

As noted earlier, the catch of small tunas and finfish can account for up to 25 percent of a FAD set. Reducing this number is a priority for ISSF. Ongoing bycatch research work is testing various options on board commercial purse seiners. As effective techniques become available, ISSF will update this section of the guidebook.

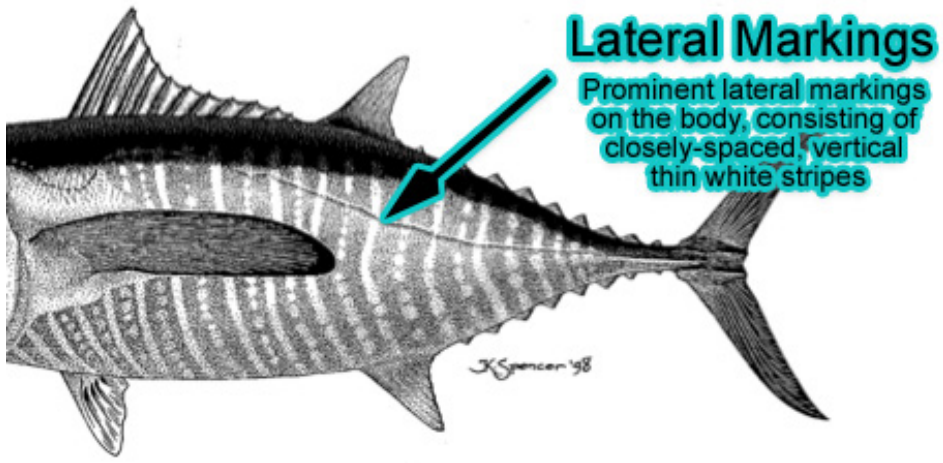
Experimental release panel in a purse seine net. Tested during ISSF bycatch research cruise in the western Pacific, June 2012

Another common challenge for skippers is distinguishing between small yellowfin and bigeye tunas. This is a useful skill, particularly as RFMOs consider management options that would require data (or catch limits) on the catch of small tunas. The following galleries highlight some of the characteristic features of small yellowfin and bigeye that can assist in their correct identification.

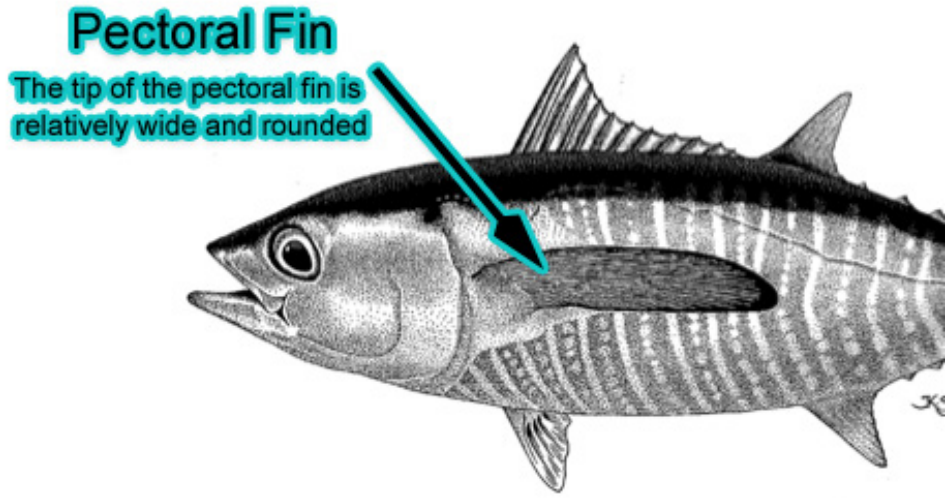
Gallery 3.9: Yellowfin (30-45 cm)



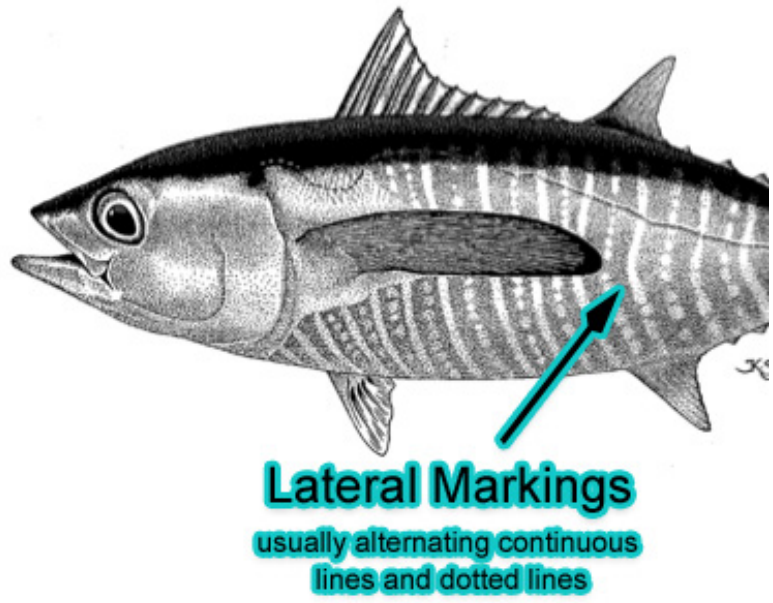
Small Yellowfin Tuna (Photo: Schafer, 1999)



Lateral Markings (Photo: Schafer, 1999)

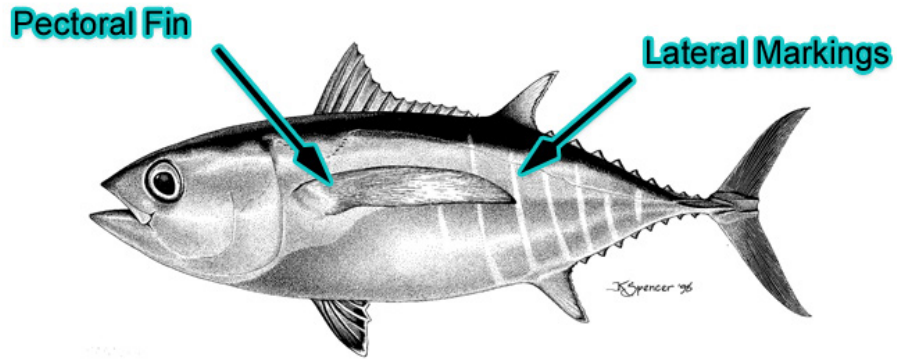


Pectoral Fin (Photo: Schafer, 1999)

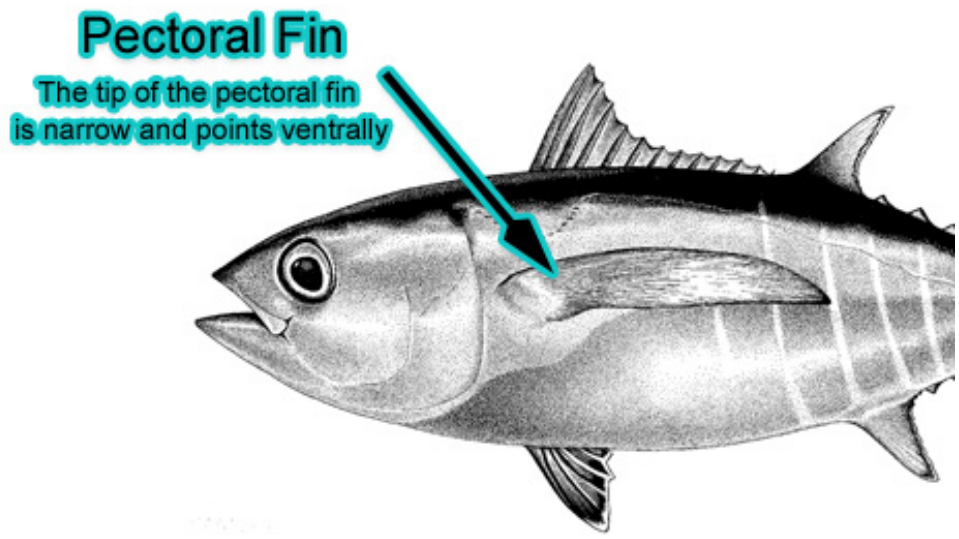


Lateral Markings (Photo: Schafer, 1999)

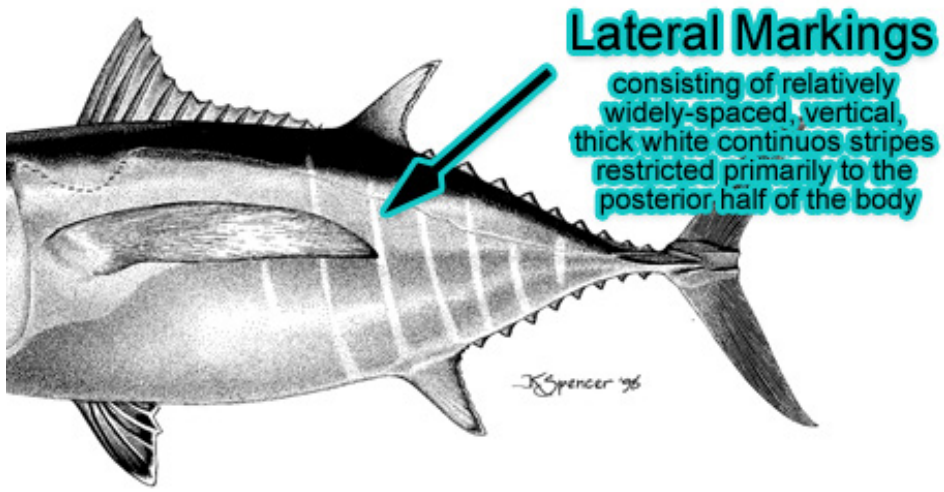
Gallery 3.10: Bigeye (30-45cm)



Small Bigeye Tuna (Photo: Schafer, 1999)

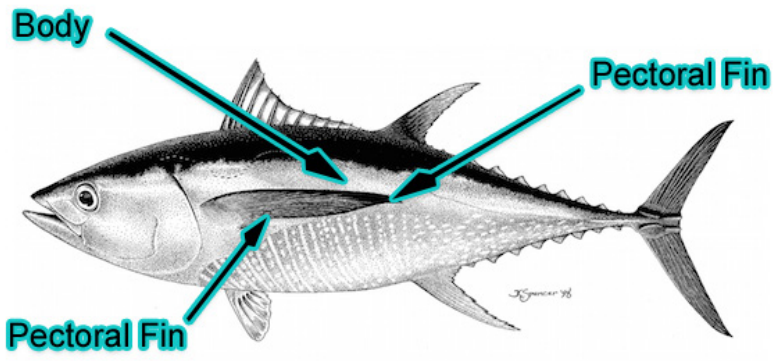


Pectoral fin (Photo: Schafer, 1999)

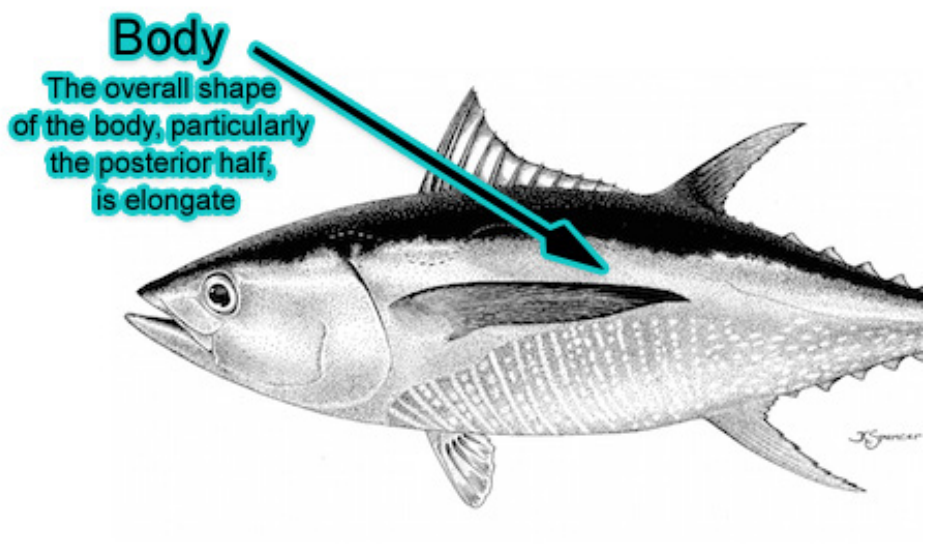


Lateral Markings (Photo: Schafer, 1999)

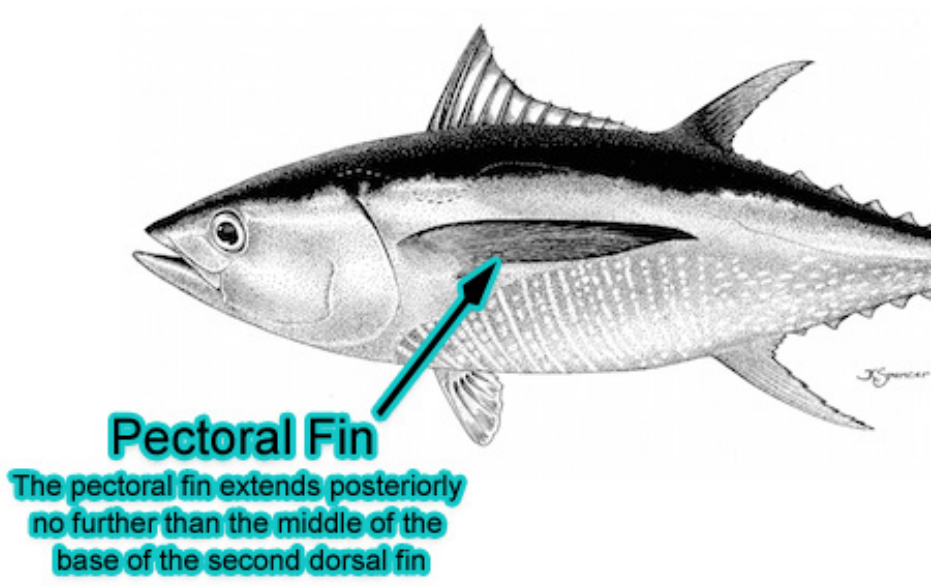
Gallery 3.11: Yellowfin (46-110cm)



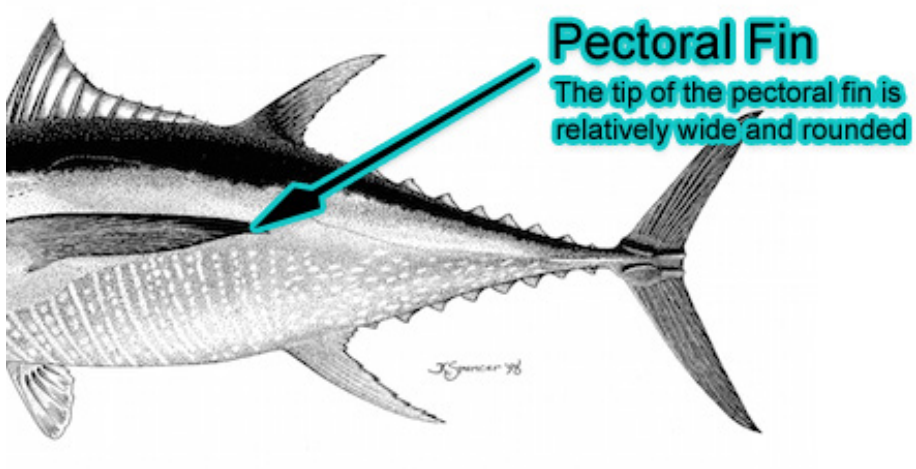
Medium Yellowfin tuna (Photo: Schafer, 1999)



Body (Photo: Schafer, 1999)

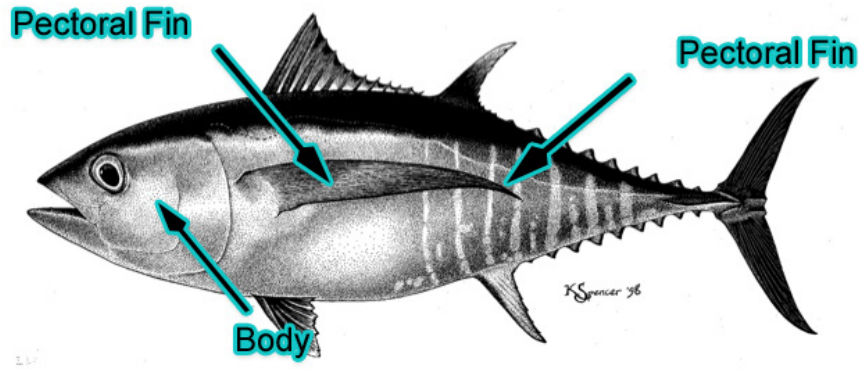


Pectoral Fin (Photo: Schafer, 1999)

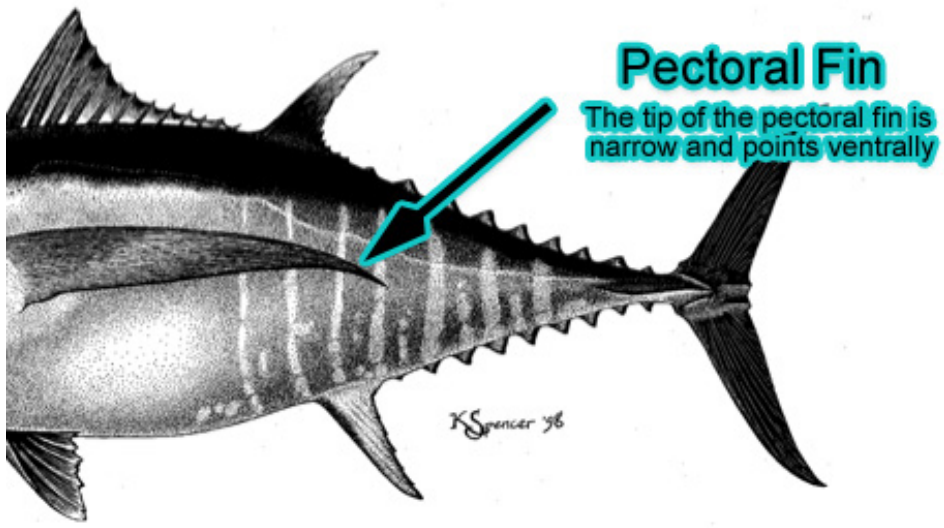


Pectoral Fin (Photo: Schafer, 1999)

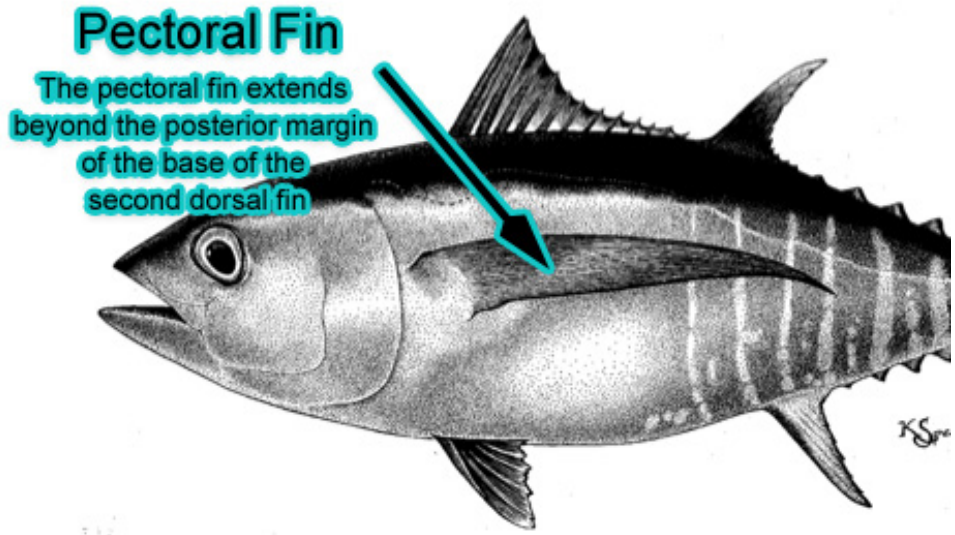
Gallery 3.12: Bigeye (46-110 cm)



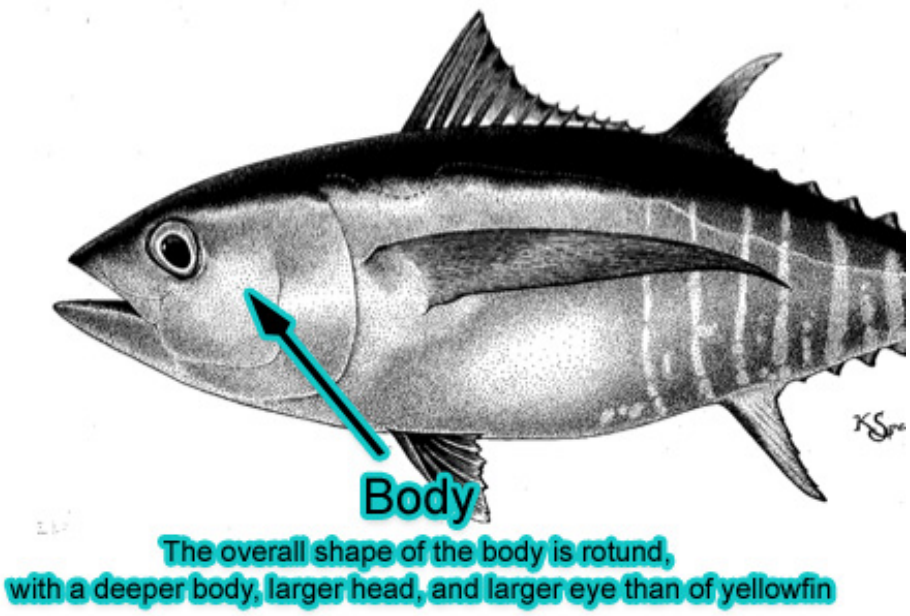
Medium Bigeye Tuna (Photo: Schafer, 1999)



Pectoral Fin (Photo: Schafer, 1999)

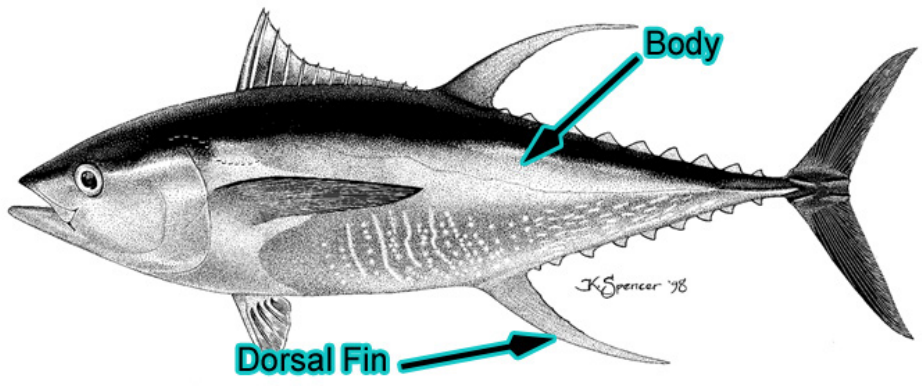


Pectoral Fin (Photo: Schafer, 1999)

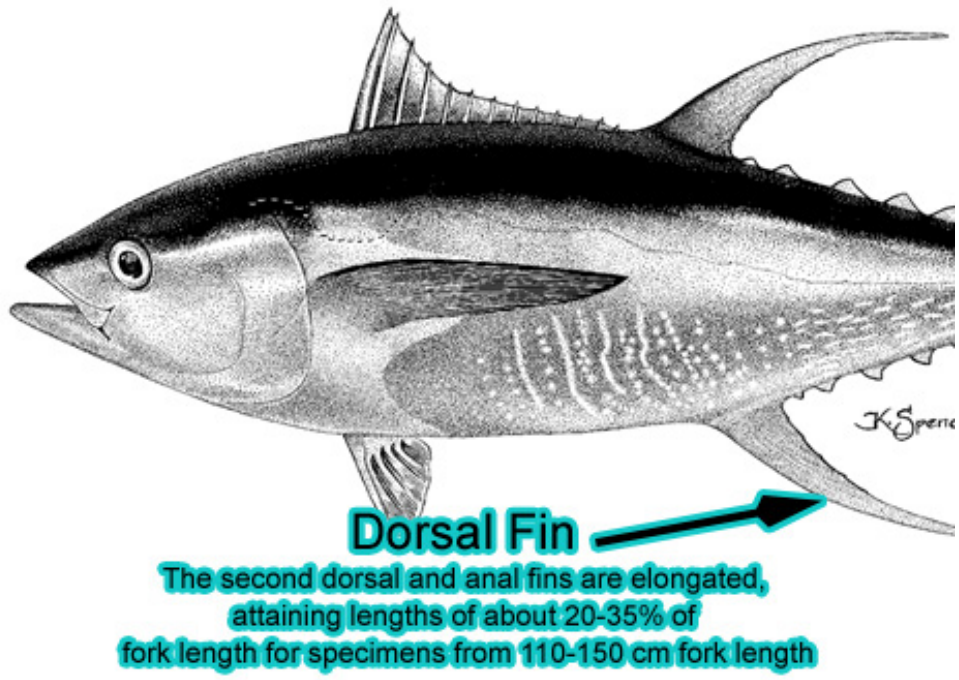


Body (Photo: Schafer, 1999)

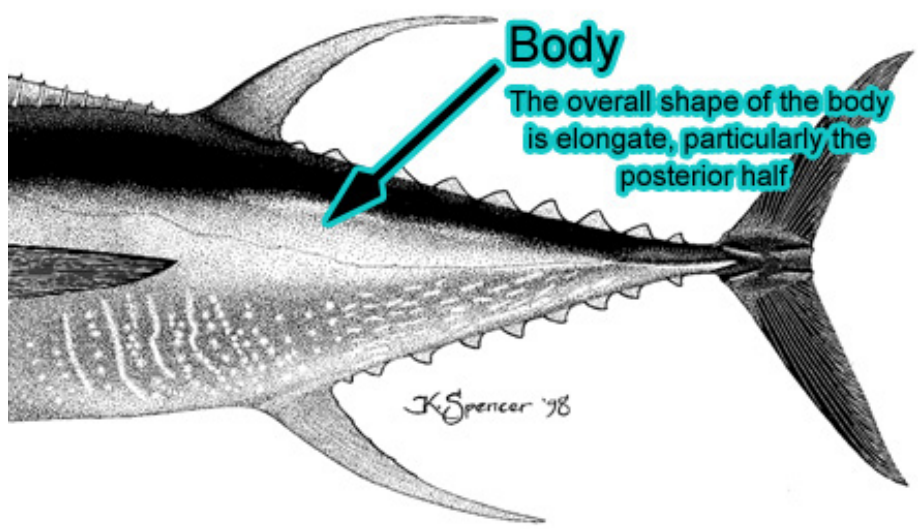
Gallery 3.13: Yellowfin (>110 cm)



Large Yellowfin Tuna (Photo: Schafer, 1999)

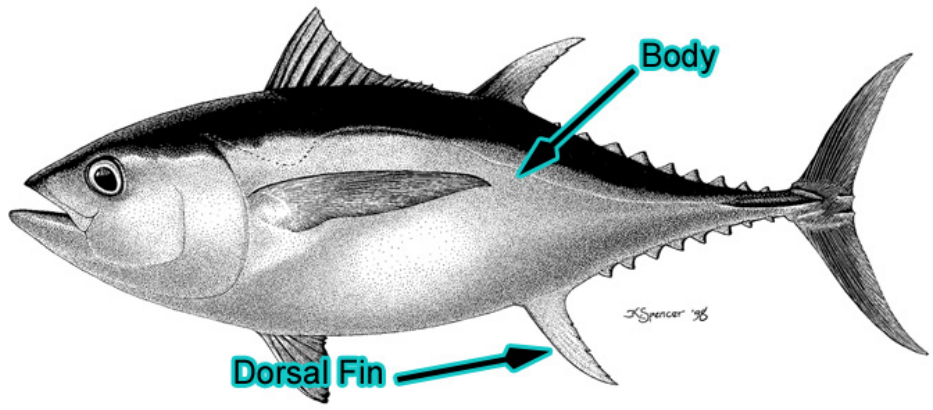


Dorsal Fin (Photo: Schafer, 1999)

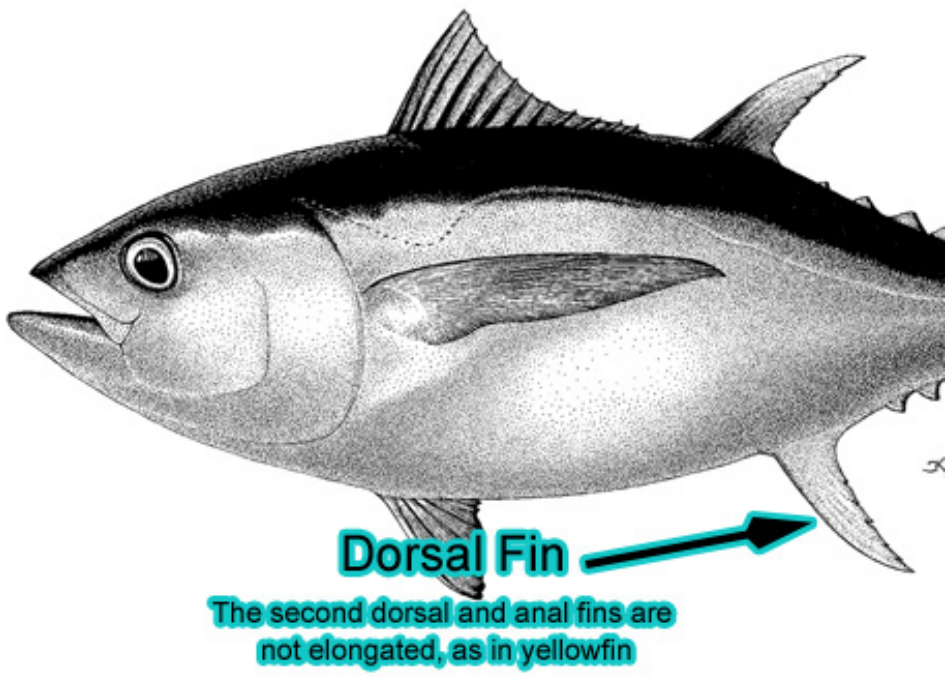


Body (Photo: Schafer, 1999)

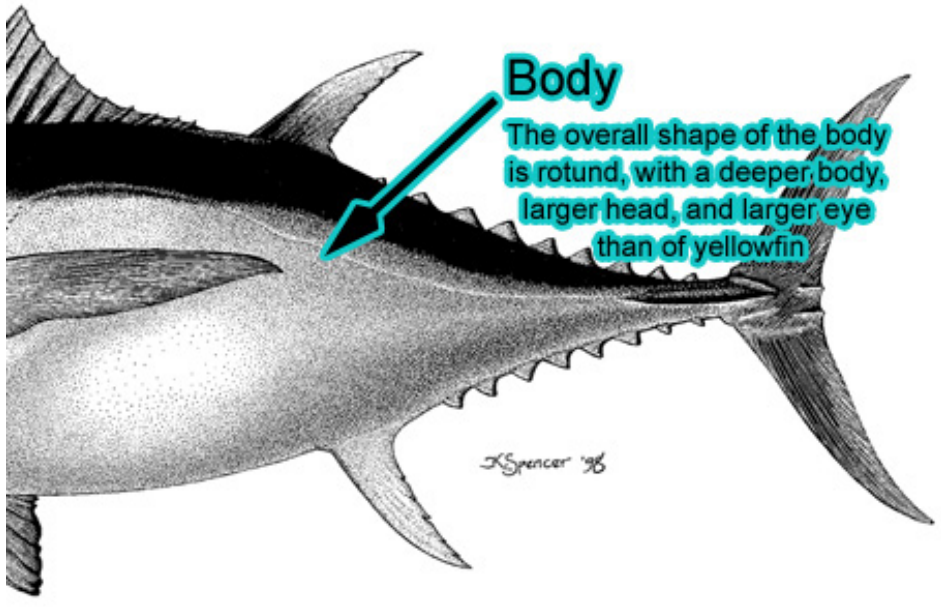
Gallery 3.14: Bigeye (>110 cm)



Large Bigeye Tuna (Photo: Schafer, 1999)



Dorsal Fin (Photo: Schafer, 1999)

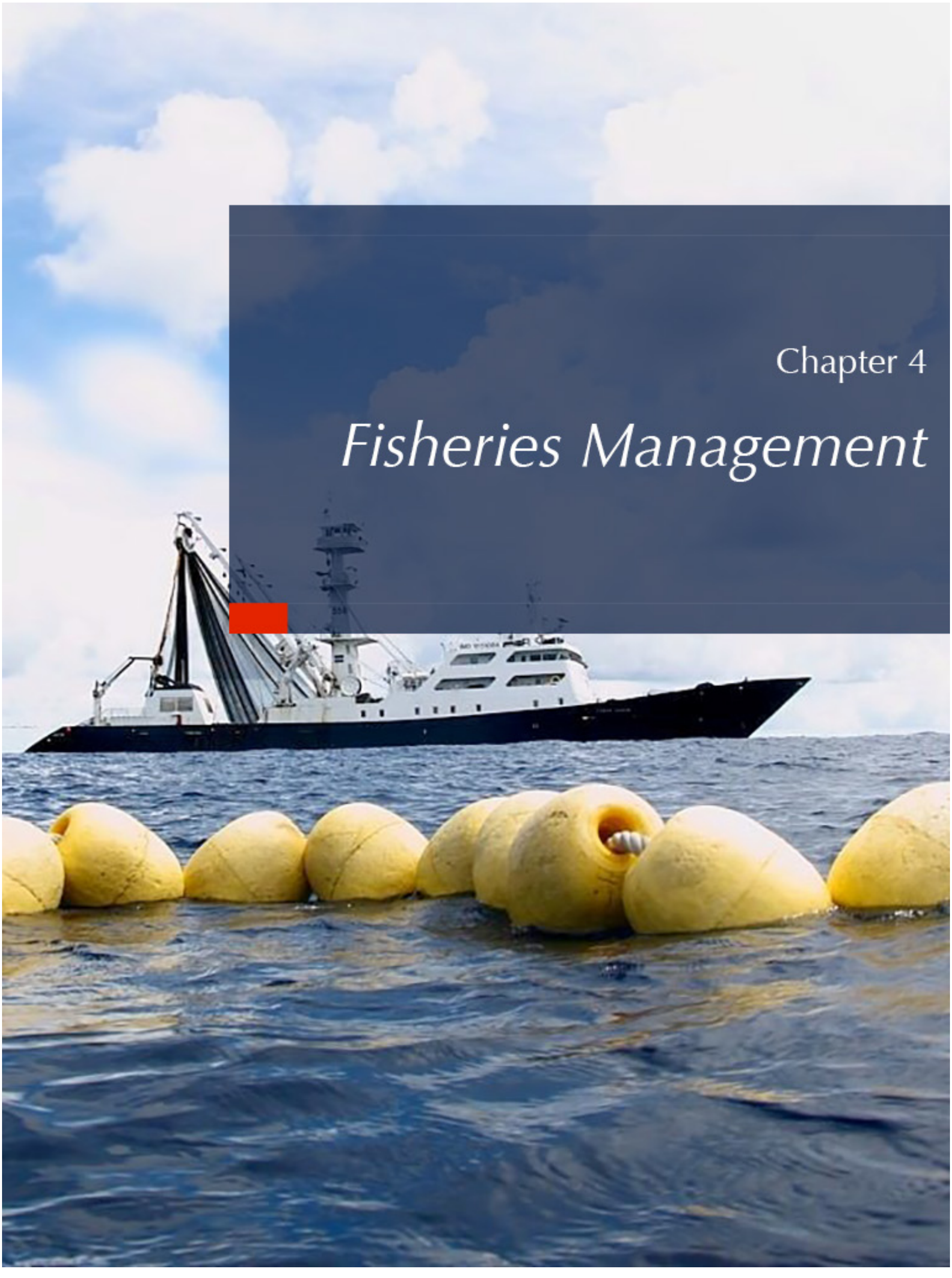


Body (Photo: Schafer, 1999)

Final Notes

If your vessel encounters a tagged fish, marine mammal, or sea turtle, please make an effort to recover the tag. In most cases, instructions on where to report recaptures appear on the tag. Generally, the date, location, animal's length (and sex when it is noticeable) and fishing conditions should be reported. This is valuable data used in fisheries management decisions, stock assessments, and other biological research.

These bycatch mitigation and handling guidelines were developed with the input of scientists, skippers, crew, and fisheries managers. However best practices are always evolving, and if new information becomes available, ISSF will update this guidance. Also, if your experience as a skipper suggests alternative methods of successful bycatch mitigation and handling, we are always eager to test such techniques during our research cruises. There will be a place to share such information at the end of this module, and ISSF encourages you to do so.



Chapter 4

Fisheries Management

Chapter 4: Fisheries Management

The ability of Regional Fisheries Management Organizations (RFMOs) to manage tuna stocks is only as good as the quality of compliance by its many members. When vessels do their part to meet the RFMO obligations, they make a vital, fundamental contribution to the success and sustainability of the fishery.

Chapter Objectives

1. Summarize the major organizations and instruments responsible for tuna fisheries management at the global, regional, and national levels.
2. Outline the vessel-level actions necessary for compliance with RFMO obligations, including:
    1. Fishing Measures
    2. Data Reporting
    3. Observers
    4. Tag Recovery
3. Identify the ISSF Commitments.

International Organizations and Instruments

Tuna is an international resource: it can be caught in one country by a vessel flagged to another, processed in a third country, and consumed in a fourth. As a result, there are a great variety of organizations that shape the fishing process, from global (the United Nations), to regional (RFMOs), subregional (the parties to the Nauru Agreement in the western Pacific), and national (coastal and flag state) levels.

The United Nations Convention on the Law of the Sea (UNCLOS) established rules for the use of, and operation on, the world's oceans. It governs all aspects of ocean space, such as demarcation, environmental control, marine research, commercial activities, and the settlement of disputes relating to ocean matters.

Here are the aspects of UNCLOS most relevant to tuna fishers:

- Coastal states have sovereign rights to their territorial sea (12 nautical miles), and to the resources in their exclusive economic zone or EEZ (200 nm).
- All states are allowed the traditional freedom of navigation, research, and fishing on the high seas, as well as "innocent passage" of their vessels through other Coastal states' waters.
- All states undertaking activities that affect living marine resources on the high seas are obligated to adopt, or cooperate with other states in adopting measures to manage and conserve those resources.

In order to implement this last point, the United Nations Fish Stocks Agreement (UNFSA) was conceived. Specifically, UNFSA does the following:

- Establishes principles for the conservation and management of highly migratory fish stocks that must be based on the precautionary approach and the best available scientific information
- Requires the management of those other species in the same ecosystem that are affected by fishing activities (i.e., bycatch)
- Requires both coastal and distant water fishing States to ensure compatible conservation measures between EEZs and the high seas
- Specifies the duties of flag States to exert control over their fishing vessels
- Contains rules on the establishment of RFMOs, including the obligation of fishing states to become members and comply with all measures

There is some variation among the RFMOs' conservation and management measures, but the primary mechanisms used are these:

- Catch and/or effort limits
- Catch and/or effort reporting
- Spatial and/or temporal closures, and gear restrictions
- Controls on at-sea transshipments
- Observer and Vessel Monitoring System (VMS) requirements
- Scientific data provisioning, reporting, and handling

Each RFMO has different ways of tackling these subjects, but in all cases, high levels of monitoring and compliance are key to successful management. Without compliance, excess catch drives down fish stocks, poor reporting and data provisioning prevents accurate assessment, and violating closures or observing requirements weakens necessary protections. Decisions about stock assessments, catch limits, and management strategies are only as good as the quality of data received by the RFMOs' scientists, and vessels play a critical role in this process.

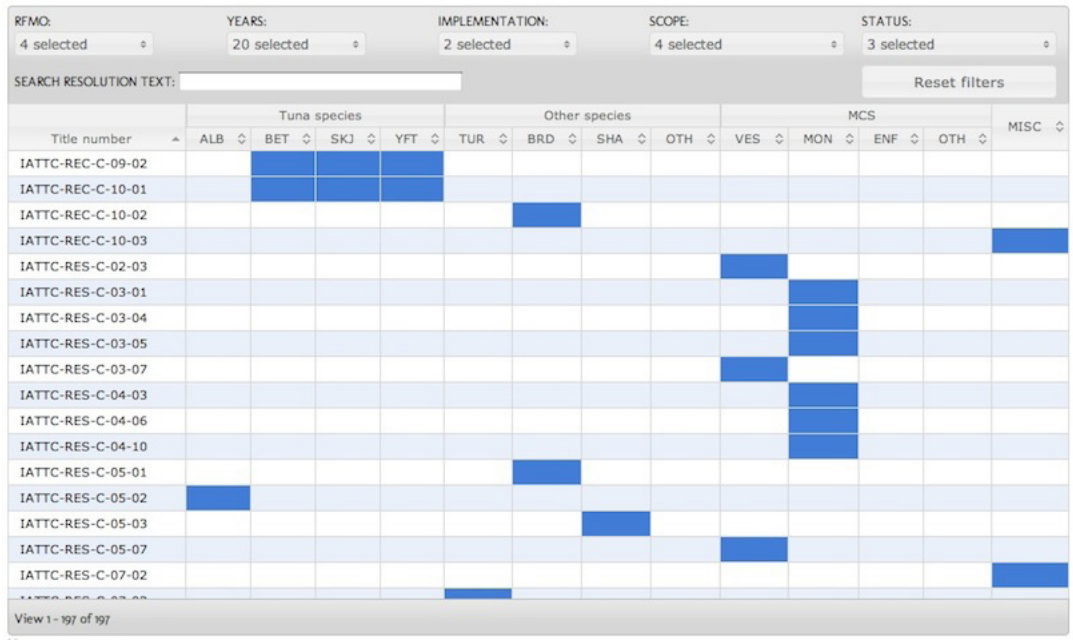
ISSF has compiled an online database that lists all measures for each tuna RFMO. Measures can be sorted by RFMO, keyword, year, or other parameters. Given the dozens of requirements active in any given region, this database is a useful tool for identifying those measures that apply to the vessel's gear type.

For example, longline at-sea transshipment is generally permitted only for large-scale longliners with carrier vessels that participate in a regional observer program. To determine the particular requirements of the RFMO in which the vessel fishes, you can search for the term "transshipment" in the ISSF RFMO database to find the applicable measure. An example for purse seine fishing would be to search the database for RFMO data collection requirements for FADs (fish aggregating devices), which now exist in

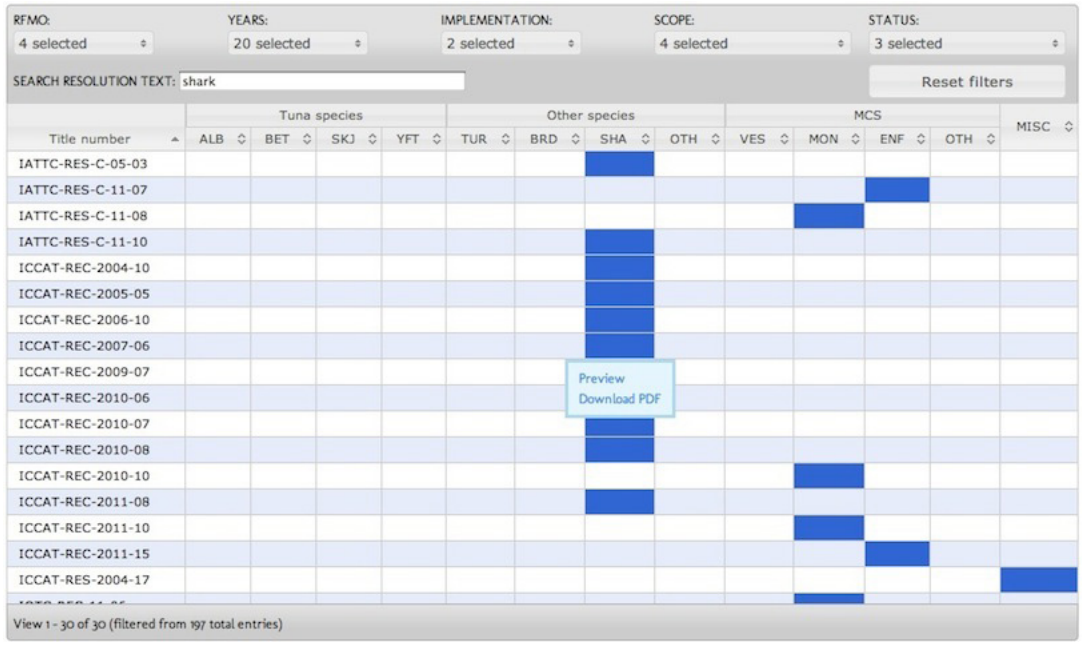
the IOTC, IATTC and ICCAT.

These conservation and management measures are then implemented in the various flag and coastal states' laws and regulations. Fishers must be familiar with both the vessel's flag state's laws and the laws of the coastal state in which they are fishing. Each tuna RFMO's major conservation and managements measures relevant to both purse seine and longlining are noted below. However, the descriptions below are not exhaustive and should be used only as supplemental summary information to the detailed requirements contained in the RFMO conservation and management measures. For instance, some RFMOs require the completion of statistical or catch documentation forms, transshipment declarations, or other kinds of certificates for landing, import and/or re-export of certain tuna species. Fishers are encouraged to contact their flag state for more information on the applicable requirements for the RFMO in which they are fishing, and consult the ISSF RFMO database for the full text of the measures.

ISSF RFMO database



ISSF has compiled a database that lists all measures for each tuna RFMO. http://iss-foundation.org/knowledge-tools/databases/rfmo-management-database/.



In this example, shark is in the search field. http://iss-foundation.org/knowledge-tools/databases/rfmo-management-database/.

Inter-American Tropical Tuna Commission (iattc.org)

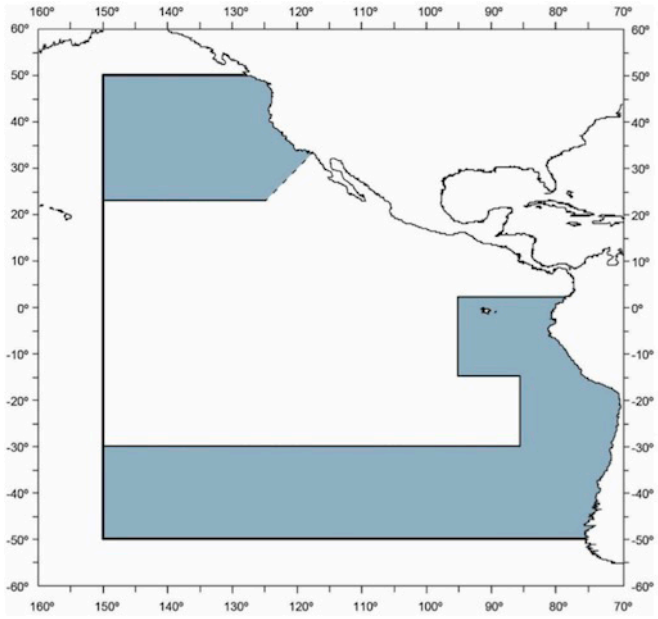
There is one main binding, multiyear conservation measure covering tropical tuna stocks (bigeye, skipjack, and yellowfin) that currently includes, among other things, provisions for a 62-day full closure for purse seine fishing, a two-month closure in a specific area of the Convention Area for purse seine fishing, and bigeye catch limits for longline vessels.

The IATTC has also adopted conservation measures for specific tuna species, including North Pacific albacore and Pacific bluefin tuna. The requirements of these measures vary from limits on increasing fishing effort from current levels to limits on total commercial catches for a set period. If fishing for these species, fishers must become aware of the specific requirements.

Regarding seabirds, IATTC requires the use of two different seabird bycatch mitigation measures, and fishers should also make efforts to ensure that any birds captured are

released alive and in the best condition possible. This applies to longline vessels in the shaded area in the following map.

For sea turtles, longline skippers must ensure that their vessel has on board the right equipment to promptly release any incidentally caught animals (e.g., dehookers, line cutters, and scoop nets). Fishermen must also bring aboard, if practicable, any comatose or inactive turtle as soon as possible and foster recovery, including resuscitation, before returning it to the water.



Area Requiring Seabird Bycatch Mitigation Measures. When fishing in the shaded area, IATTC requires vessels to use two different seabird bycatch mitigation measures.

IATTC also discourages shark retention (oceanic whitetip retention is prohibited), while requiring "full utilization" of those sharks that are retained (keeping onboard all parts except the head, guts, and skins to the point of first landing). In addition, no more than 5 percent of total landed shark weight can be composed of fins.

IATTC also requires full retention of bigeye, yellowfin, and skipjack tunas caught by purse seine vessels.

Western and Central Pacific Fisheries Commission (wcpfc.int)

There is one main binding conservation measure covering tropical tuna stocks (bigeye, yellowfin, and skipjack) that currently includes, among other things, provisions for FAD closures and FAD set limits, purse seine effort limits, longline catch limits for bigeye tuna, capacity limits for developed nations' large-scale purse seine and longline vessels, and the prospect of a FAD set prohibition on the high seas in 2017 unless the Commission agrees to alternative measures.

The WCPFC has also adopted conservation measures for specific tuna species, including North Pacific albacore, South Pacific Albacore and Pacific bluefin tuna. The requirements of these measures vary from limits on increasing fishing effort from current levels, limits on the number of vessels targeting the species, or a combination of limits on total effort and catches of juveniles. If fishing for these species, fishers must become aware of the specific requirements.

Regarding bycatch, the WCPFC:

- Requires implementation of the FAO guidelines for reducing sea turtle mortality and to disentangle/release them when caught alive
- Caps (by country) the catch of striped marlin
- Requires specified seabird bycatch mitigation measures depending on gear and location (like ICCAT and IOTC, south of 30° S fishers must use two of the following three measures: night setting, weighted branchlines, and tori lines)
- Mandates reporting of shark catches and discards by gear type and species
- Prohibits retention of oceanic white tip sharks and silky sharks
- Prohibits intentional purse seine setting on whale sharks and cetaceans
- Enforces a 5 percent limit on the ratio of shark fins to total shark weight that can be retained onboard fishing vessels, and encourages the release of live sharks

The WCPFC also requires full retention of bigeye, yellowfin, and skipjack tunas caught by purse seine vessels.

International Commission for the Conservation of Atlantic Tunas (iccat.int)

There is one main binding conservation measure covering tropical tuna stocks (bigeye, yellowfin) that amends previous recommendations, and sets out a multiyear management plan. The main provisions are summarized below.

Bigeye:

- Total allowable catch (TAC) with catch limits given to members. The measure includes detailed provisions for countries to be penalized with lower quotas if their limits are exceeded
- A capacity limitation (country-specific) for the number of longline and purse seine vessels over 20 m in length
- The establishment of a record of vessels actively fishing for bigeye

Yellowfin:

- An overall yellowfin TAC (not allocated by country)
- The establishment of a record of vessels actively fishing for yellowfin

ICCAT has also adopted conservation measures for specific albacore tuna species, including North Atlantic, South Atlantic, and Mediterranean. The requirements of the measures for the northern and southern stocks include an established TAC, catch reporting, and placing a cap on vessel numbers by country. There are also applicable fishing capacity limits for some of these stocks. If fishing for these species, fishers must become aware of the specific requirements.

The Atlantic bluefin tuna is found in the north Atlantic and the Mediterranean Sea, and is composed of two stocks: western Atlantic, and eastern Atlantic and Mediterranean (these stocks do mix as well). Because of past overexploitation, the stocks—particularly the eastern stock—are highly managed, with many regulations in place. For the western stock, the primary conservation measures are a TAC, a minimum size requirement, and a prohibition on directed fishing in the Gulf of Mexico and transshipment at sea.

The eastern stock has a TAC and other measures to ensure that this rebuilding stock continues to improve, such as:

- Management of fishing fleet capacity
- Seasonal closures (6 months for longliners)
- Minimum sizes (8 and 30 kg, depending on the fishery)
- A record of authorized fishing vessels
- Weekly catch reporting by ICCAT members
- Vessel Monitoring Systems (VMS) for all vessels over 15 m
- Required catch documents
- Boarding and inspection activities

Bycatch Measures:

- No more than 5 percent of total shark weight can be shark fins
- Encourages the release of live sharks in fisheries that do not target sharks
- Limits mortality on porbeagle and North Atlantic shortfin mako
- Prohibits the retention of bigeye thresher, oceanic whitetip, several species of hammerhead sharks, and silky sharks. All of these measures have a reporting requirement associated with them
- Prohibits the retention of shortfin mako on board vessels flagged to countries that do not report catches for this species
- Requires the use of safe-handling practices, such as the use of line cutters and dehooking devices for sea turtles
- Specific reporting requirements for sharks, sea turtles and seabirds
- Catch limits (by country) on blue and white marlin
- Requires longline vessels fishing south of 25° S to use two measures from a choice of bird-scaring line, night setting, and line weighting. Between 20°– 25° S, vessels are required to use a bird-scaring line.

ICCAT has also established penalties for Members that do not report annual catch data (including zero catches) by prohibiting them from retaining such species in the following year.

Indian Ocean Tuna Commission (iotc.org)

For tropical tunas, there is one main binding conservation measure that covers vessels greater than 24 m as well as smaller vessels fishing on the high seas. This measure calls for a one-month closure for longliners and purse seiners in a specified area.

IOTC has also adopted conservation measures for albacore tuna. The requirements include limiting fishing vessel capacity to the amount that existed in 2007 for all vessels greater than 24 m, and those under 24 m that fish outside their EEZ. If fishing for this species, fishers must become aware of the specific requirements.

IOTC also requires full retention of bigeye, yellowfin, and skipjack tunas caught by purse seine vessels.

Bycatch Measures:

- No more than 5 percent of total shark weight can be shark fin
- Encourages the release of live sharks in fisheries that do not target sharks

- Prohibits retention of all species of thresher sharks and oceanic whitetip sharks
- Requires shark data reporting, especially in fisheries that target sharks
- Requires longline vessels fishing south of 25° S to use two seabird bycatch mitigation measures from a choice of bird-scaring lines, night setting, and line weighting
- Requires members to mitigate sea turtle mortality and to provide data on turtle bycatch to the IOTC
- Prohibits intentional purse seine setting on whale sharks and cetaceans

Further Notes on Data Reporting and Compliance

Observers and Port Samplers

Longline Observer Requirements:

For longline vessels, though the details of the programs vary, most tuna RFMOs require an observer coverage level of at least 5 percent for longline vessels over 24 meters, and, in some cases, for smaller vessels operating in the high seas or in EEZs other than their flag state EEZ.

Purse Seine Observer Requirements:

For purse seine vessels, though the details of the programs vary, in the WCPFC, IATTC, and ICCAT there are a 100 percent coverage requirements (at least for certain geographical areas and/or times of the year and certain vessel sizes). In the IOTC, there is a 5 percent observer coverage requirement for vessels 24 m and greater in length overall operating on the high seas and for vessel less than 24 m if they fish in EEZs and on the high seas. Fishers operating purse seine vessels in these RFMO Convention Areas must become aware of the specific applicable observer requirements.

Observers collect and report data on tuna catch, bycatch, and discards, among other things, through observer program worksheets and/or logbooks. In addition, some regions have port samplers that collect catch data as well. These data are an essential part of the scientific evaluation of the tuna fisheries and the ecosystem in which they live. Skippers should ensure that observers and port samplers are given the access necessary to carry out these important duties.

Please note these are brief summaries. For full text of the gear-specific observer requirements in force in each RFMO, visit ISSF's RFMO database.

Tag Recovery and Reporting

Tuna (and other fish) tagging programs have a number of uses, but almost all tagging programs share a common goal: gathering data about fish. Most tagging programs seek information on fish movements, growth, behavior, and mortality. This data is critical to our understanding of fish biology and for the creation of accurate models for stock assessments. You might also encounter tagged seabirds, with small bands on their legs.

Simple tags have printed information and instructions on how to return the tag. These tags remain attached to the fish until it is landed. Some high-tech tags monitor and record data. Some fish tags even pop off the fish at an appointed time, float to the surface, and transmit information via satellite. If the vessel's crew lands a tagged animal, please take the time to remove the tag, note the time and location of the landing and ensure that the tag is returned to its owner. Often there are rewards for the return of tags—another reason to help contribute to the good management of your fishery. Fishermen must not remove the tags from live birds.

In Conclusion

By completing this online module, you are ensuring that the vessels you skipper are compliant with the skipper training measure. The ISSF Skipper Training Conservation Measure requires that ISSF Participating Companies transact business only with vessels whose skippers have completed this online module or attended one of the in-person ISSF Skipper Workshops.

This guidebook to best practices in sustainable tuna fishing is a living document that will continue to be updated to reflect the state of the art. ISSF welcomes suggestions to improve the guidebook or ideas for further fisheries research.

Feedback Form

You have now completed review of the *ISSF Sustainable Tuna Fishing Guidebook*. In order for ISSF to record this activity and ensure that the vessel(s) you skipper are credited as meeting the related ISSF Conservation Measure, you MUST complete this short online form. If you do not currently have Internet (wi-fi) access, please return to this page and follow this link once wi-fi becomes available.

Feedback Form Link - Click Here

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Citations:

Dagorn, L., Filmalter, JD., Forget, F., Amandè, M.J., Hall, M., Williams, P. Murua, H., Ariz, J., Chavance, P., Bez, N. (2012) Targeting bigger schools can reduce ecosystem impacts of fisheries. Canadian Journal of Fisheries and Aquatic Sciences. doi: 10.1139/f2012-089

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