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Illegal Commercial Fishing within the Exclusive Economic Zones of Coastal Countries

A PROBLEM SOLVING GUIDE



Wilderness Problems, Guide No. 3



Center for
Problem-Oriented
Policing

About the Wilderness Problem-Specific Guide Series

These guides summarize knowledge about how wildlife and fisheries authorities and managers can reduce the harm caused by specific wildlife crime problems. They are guides to preventing and improving the overall response to incidents, not to investigating offenses or handling specific incidents; neither do they cover technical details about how to implement specific responses. These guides are written for wildlife officers—of whatever rank or assignment—who must address the specific problem these guides cover. These guides will be most useful to wildlife officers who:

Understand basic problem-oriented policing principles and methods. The guides are designed to help wildlife officers decide how best to analyze and address a problem they have already identified. The guides are structured in the same way as the SARA process (right). This covers how to define your problem (Scan); questions you will need to answer to guide you to an effective intervention (Analysis); types of interventions you could use (Response); and ways to check if your intervention worked (Assessment).

For a primer on Problem-Oriented Wildlife Protection, we recommend first reading this:

Lemieux, A.M. and Pickles, R.S.A. (2020). *Problem-Oriented Wildlife Protection*. Phoenix, AZ: Center for Problem-Oriented Policing, Arizona State University. ([link](#))



Figure 1. The SARA process

Can look at a problem in depth. Depending on the complexity of the problem, you should be prepared to spend weeks, or even months, analyzing it. Carefully studying a problem before responding helps you design the strategy most likely to work in your community. You should not blindly adopt the responses others have used; you must decide whether they are appropriate to your local situation. What works in one place may not work everywhere.

Are willing to consider new ways of doing business. These guides describe responses other wildlife authorities and conservation practitioners have used or researchers have tested. Not all of these responses will be appropriate to your particular problem, but they should give a broader view of the kinds of things you, or other stakeholders in the problem, could do.

Understand the value and the limits of research knowledge. For some types of problems, a lot of useful research is available to wildlife officers; for other problems, little is available. Some guides in this series summarize existing research whereas others illustrate the need for more research on that particular problem. Regardless, research has not provided definitive answers to all the questions you might have about the problem. The research may help get you started in designing your own responses, but it cannot tell you exactly what to do. This will depend greatly on the particular nature of your local problem. In the interest of keeping the guides readable, not every piece of relevant research has been cited. Select further readings are highlighted for readers wanting more detail.

Are willing to work with others to find effective solutions to the problem. The wildlife authority alone cannot implement many of the responses discussed in these guides. They must frequently implement them in partnership with other responsible private and public bodies including other government agencies, nongovernmental organizations, private businesses, public utilities, community groups, and individual citizens. An effective problem solver must know how to forge genuine partnerships with others and be prepared to invest considerable effort in making these partnerships work. Each guide identifies particular individuals or groups in the community with whom wildlife authorities might work to improve the overall response to that problem. Thorough analysis of problems often reveals individuals and groups other than the wildlife authority are in a stronger position to address problems and that wildlife authorities ought to shift some greater responsibility to them to do.

About this Guide

This guide examines the problem of illegal commercial fishing within countries' exclusive economic zones (EEZs) and the factors associated with its occurrence. It begins with a general overview of the problem and subsequently provides guidance on how to analyze the local illegal commercial fishing problem, a review of the responses implemented globally to address the problem, and what is known about these responses from the perspective of evaluation research. Fisheries managers and policy makers may find this guide especially useful, as it covers approaches and responses to the problem of illegal commercial fishing that they can incorporate into their daily operational decision-making and strategic plans to improve legislation and regulation. Illegal commercial fishing is a complex crime encompassing various dimensions. This guide will focus on covering the geographic dimension of the problem.

This guide begins with the general description of the problem, broadly covering various analysis themes as they relate to the impacts of illegal commercial fishing, geographic scope, methods used to carry out the activity, among others. Each of these analysis themes is color coded consistently throughout the guide for the readers' convenience. The guide then outlines the scanning scenarios that would assist in defining your local illegal commercial fishing problem, followed by identifying fundamental analytical questions that you should consider and the nine core analysis themes related to the various phases involved in illegal commercial fishing. The guide concludes with the discussion of the examples of responses organized by four specific settings – at shore, at sea, at port, and at market- to help you identify the most relevant and useful response depending on the setting. The guide also discusses assessment questions that you should consider when evaluating the effectiveness of an intervention you have implemented to reduce the problem of illegal commercial fishing in your area. More detailed assessment tools are covered in a report by [Lemieux & Pickles \(2020\)](#).

Related problems not directly addressed in this guide include:

- Unreported fishing
- Overfishing
- Unregulated fishing
- Illegal commercial fishing in the high seas
- Illegal artisanal fishing
- Illegal fish farming
- Illegal recreational fishing
- Seafood fraud, which includes a whole array of illegal behaviors regarding fish processing after catching the fish and after its final consumption, such as species substitution, short weighting, or overtreatment of fish

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General Description of the Problem

Illegal commercial fishing is a serious environmental crime, affecting almost every coastal country across the globe. According to the United Nations Food and Agriculture Organization, over 70% of the world's commercial fish stocks are either fully exploited, exploited beyond their yield capacity (i.e. overexploited), or depleted, and this is attributed primarily to overfishing due to poor fisheries management practices, as well as illegal fishingⁱ. Since the second industrialization period, which began in 1950, remarkable progress has been made in the development of new technologies, gear, equipment, and methods, which allowed for the unprecedented growth and expansion of commercial fishing far beyond the coasts and into the high seas. Not soon thereafter, fish stock depletion, even complete collapse, followed. The trend of overexploitation of the global fisheries continues todayⁱⁱ. However, there are notable exceptions, such as in the case of tuna fisheries in the Western and Central Pacific, where resource management has shown significant successⁱⁱⁱ.

Direct harms: the problem of bycatch. Illegal commercial fishing represents a significant threat to the conservation of the targeted commercial species that are already under significant pressure from overexploitation^{iv}. Such species as orange roughy (*Hoplostethus atlanticus*), Atlantic Bluefin tuna (*Thunnus thynnus*), Atlantic cod (*Gadus morhua*), Yellowfin tuna (*Thunnus albacares*), Antarctic toothfish (*Dissostichus mawsoni*), have seen large drops in their populations from their pre-industrial estimates, and the unsustainable harvest of many of the species targeted by illegal commercial fishers is likely to lead to a complete collapse of their stocks if current harvesting rates are retained^v.

In addition to the species directly targeted by illegal commercial fishers, other marine and non-marine living species are also directly affected by this activity. Collectively known as “bycatch”, these non-target species are often entangled in the (sometimes illegal) gear to catch the commercial species, and die as a result. For example, in the Eastern Tropical Pacific Tuna fishery, dolphins have been found to suffer from the capture of the tuna. This is because they swim above the schools of tuna and the large nets used to haul tuna inadvertently capture dolphins as well. Long-line fishing vessels that set thousands of baited hooks to catch tuna and Patagonian Toothfish (*Dissostichus eleginoides*) (more commonly known as Chilean seabass), have entangled thousands of albatross and other seabird species^{vi}. These species dive into the waters to strike at these baited hooks, as a result of which they become entangled and drown^{vii}. Although some level of bycatch is a natural consequence of fishing, illegal commercial fishing exacerbates this issue due to the non-reporting of bycatch volumes and the lack of mitigation strategies.

Potential serial depletion. Illegal commercial fishers often target large predatory fish, such as cod, grouper, halibut, tuna, as well as such high-value invertebrates as lobster, shellfish, shrimp. Large predatory fish are generally slow-growing, and some researchers have suggested that the illegal capture of these species has led to the problem of serial depletion, or “fishing down the food web”^{viii}. This serial depletion can lead to many serious problems in the marine ecosystem. For example, due to the depletion of slow-growing large fish, small fast-growing fish gradually replace these predatory species, leading to the misbalance in the functioning of the marine

ecosystem^{ix}. For example, the drastic decline of great sharks (species known to be illegally harvested for their fins) in the Northwestern Atlantic has led to the collapse of a century-old scallop fishery^x. Importantly, the significant drop in the large predatory species will significantly affect the diversity of the food web resulting in fewer prey available to larger predatory species to depend on, and a continued pressure on their population fluctuations^{xi}.

A growing problem. Since the 1950s, which marked the beginning of the unprecedented growth in commercial exploitation of fisheries, especially by developed countries fishing beyond their waters and in the waters of developing nations, the demand for fish and fish products has only grown. The situation is exacerbated by the exponential growth of the human population and the increasing dependence of many developing coastal countries on fish as the main source of protein. This has only increased the pressures on fisheries and the need to fish more frequently and in significantly larger quantities despite the fact that the resources are not replenished at the same rate. As a result, the global oceans are exploited daily, leaving the marine ecosystems significantly vulnerable and depriving these ecosystems of the means to thrive at their own pace^{xii}.

Illegal Commercial Fishing Scenarios

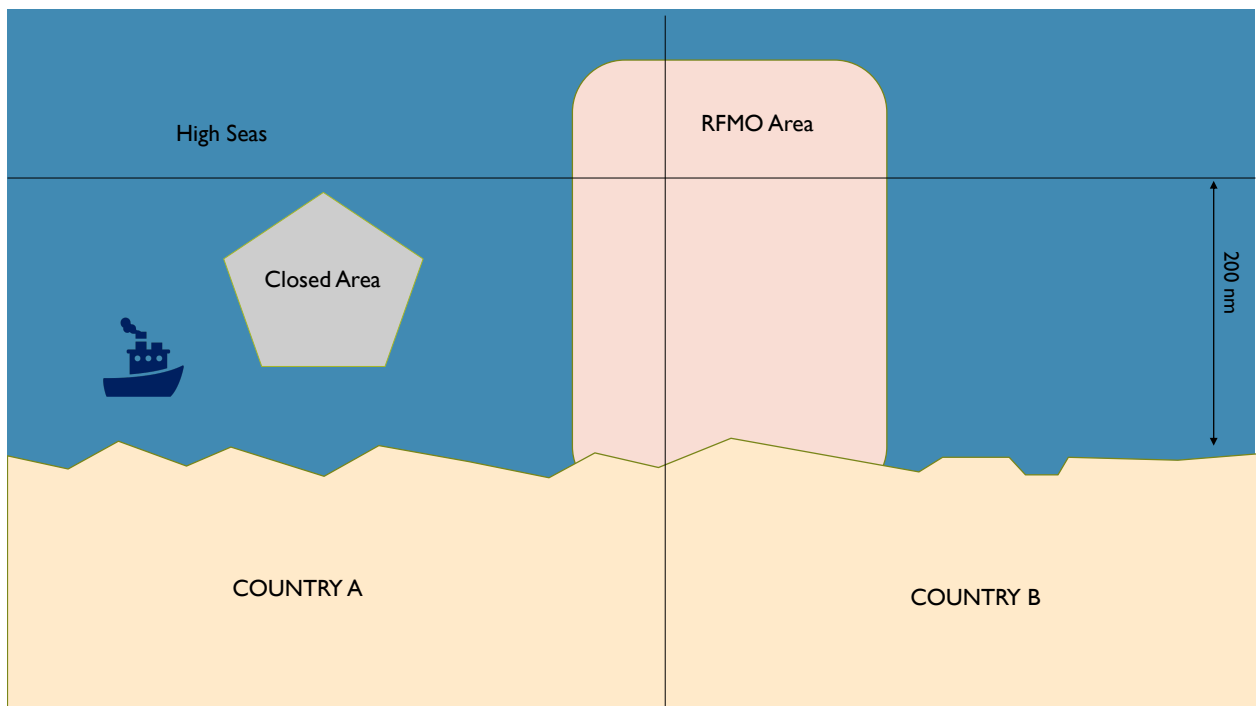
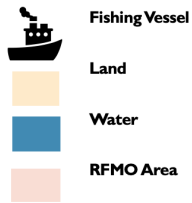
Illegal commercial fishing is a complex crime. It generally encompasses various activities, which can collectively be grouped into two general attributes: geography and methods/gear used. Illegal commercial fishing is also often referred to as illegal, unreported, and unregulated fishing, each of which encompasses the various aspects of the illegality or regulatory violations¹. The scenarios below broadly illustrate the various types of illegal commercial fishing as they relate to the two attributes: geography and methods/gear used. Separating the different types of illegal commercial fishing into specific categories is important, as they each require different sets of response/intervention methods.

Illegal commercial fishing as it pertains to its geography. The United Nations Convention on the Law of the Sea (UNCLOS), or commonly referred to as the “Constitution for the Sea”, spells out the various rules on how to regulate the oceans. Among these was the establishment of the unilateral declaration of the exclusive economic zones (EEZs) by many countries in 1974 at the Third UNCLOS Conference in Caracas, Venezuela. According to this declaration, the coastal countries received exclusive jurisdiction over marine areas extending 200 nautical miles from the coast or baseline. Regulating and monitoring the fishing activity that takes place within these 200 nautical miles (or EEZ of a given country) is the responsibility of the given country^{xiii}. Areas beyond these 200 miles, or the high-seas, are governed by the so-called Regional Fisheries Management Organizations (RFMOs), which are intergovernmental organizations that work closely with member States to set different rules related to the extraction of marine resources

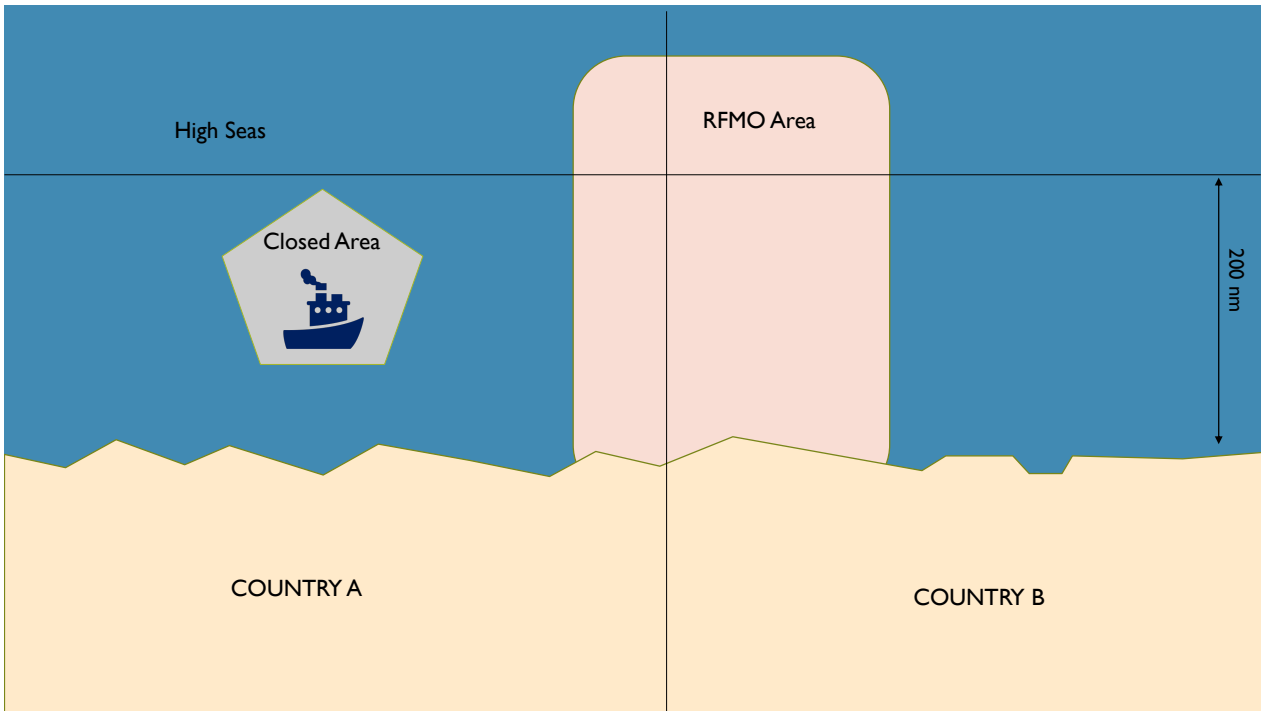
¹ *Illegal fishing* broadly refers to fishing activities that are conducted in violation of applicable national, regional, and international laws and regulations. *Unreported fishing* refers to misreported or unreported fishing activities to relevant authorities in violation of national laws or the reporting requirements and guidelines set forth by regional fisheries management organizations (RFMOs). *Unregulated fishing* activities take place in areas beyond countries’ or RFMOs’ managed areas or areas that lack management or conservation measures; or are activities that are carried out by non-party State vessels in a manner that is inconsistent with the conservation measures set forth by the RFMO where the fishing activity takes place.

beyond the national jurisdiction of the coastal countries. These RFMOs also set various rules and standards related to the stocks that also fall within the EEZs of the States that are party to the RFMO^{xiv}.

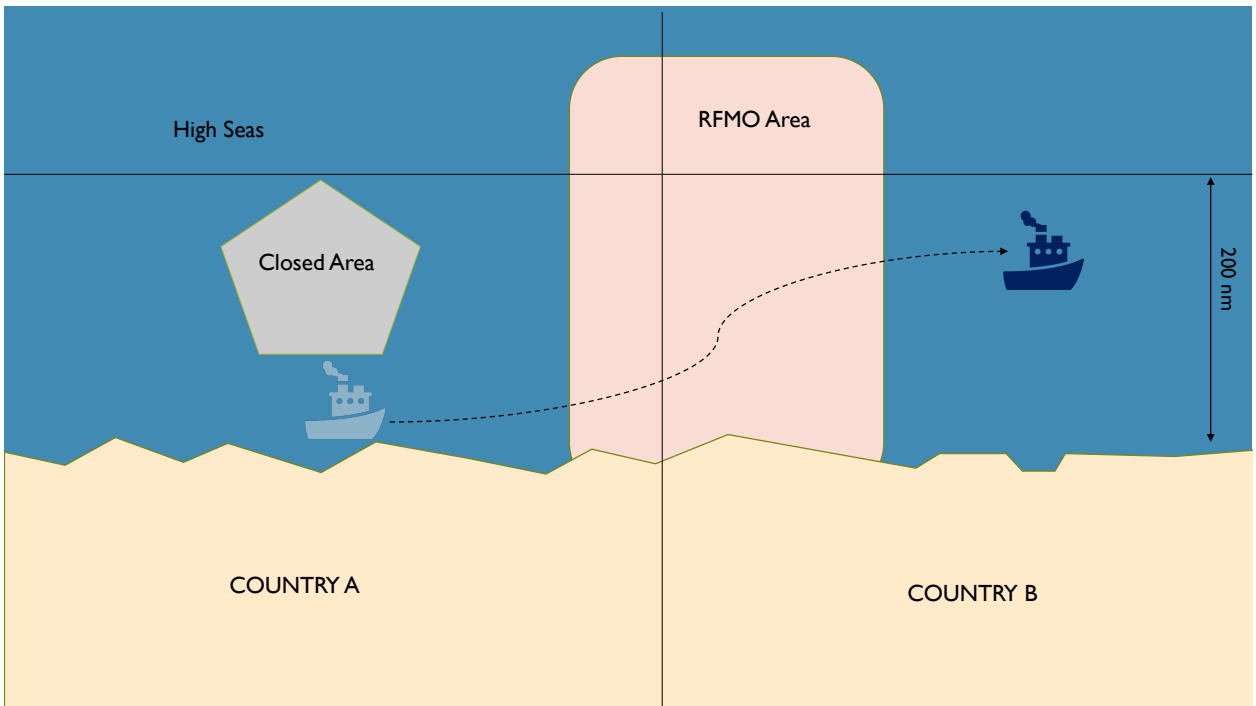
LEGEND



Unlicensed fishing. To fish within a country's EEZ, the vessel must comply with licensing requirements of both the flag and the coastal states. Fishing without a license is illegal. This could also pertain to fishing over allocated catch quotas (i.e. fishing over quota) for which the vessel has a license.



Fishing in a closed area. Areas can be closed for various reasons, and they can be closed either temporarily or permanently. Temporary closures take place during fish spawning seasons, at which time fishing is prohibited. These areas can also refer to marine protected areas, where every type of activity related to marine resource extraction is prohibited by law.



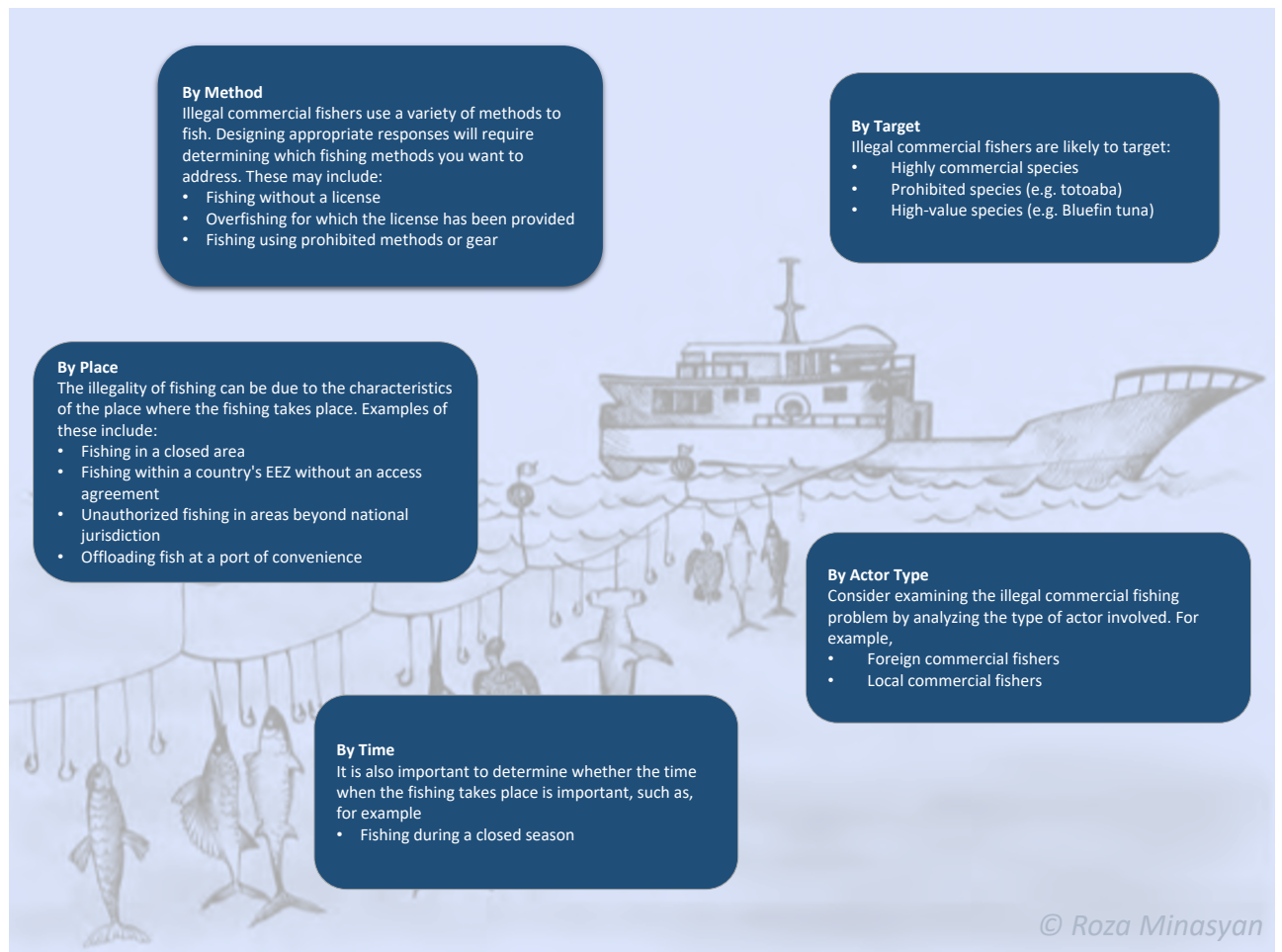
Border hopping. In order to fish in the waters of another country, a vessel must have an access agreement. Absent this, the vessel of one country fishing in the waters of another is fishing illegally.

Illegal commercial fishing as it pertains to methods/gear used. Certain fishing methods are banned/prohibited completely, or during certain periods, and are, thus, considered illegal. These bans are primarily based on the harms these methods cause to the marine ecosystem. For example:

- **Blast bombing**, exercised in over 30 countries around the world, is illegal^{xv}. The method involves detonating a bomb in the water that sends shock waves, as a result of which the swim bladder of the fish is ruptured. The swim bladder is the organ that controls the buoyancy of the fish. With the ruptured swim bladder, the fish float to the surface of the water and are collected by the fishers using nets. This activity is prohibited, as it damages juvenile fish and fish larvae and eggs. It also causes significant damage to the coral reefs, at times leading to their permanent loss.
- **Pulse fishing** is yet another method of stunning the fish to the surface, making it easier to collect them. These methods involve sending electric currents into the water which electrocute the fish and temporarily paralyze them, as a result of which the fish float to the surface of the water.
- **Drift netting**, which involves heavy synthetic gillnets that extend dozens of miles floating in the water to entangle mid-water species, such as salmon, swordfish, and tuna, is another harmful fishing method prohibited in many parts of the world^{xvi}.

SCANNING: Define your illegal commercial fishing problem

Ways to help define your illegal commercial fishing problem



Illegal commercial fishing will likely be too broad of a problem to prevent in your area. As you begin to understand the various components of the problem at the scanning phase, it is important that you identify the specific types of illegal commercial fishing that make up the larger component of the problem, so that these different types can be prioritized and the response strategies can be specifically honed to address the types that have been selected for more in-depth analyses. A generic overview on identifying, prioritizing, and selecting problems can be found on pages 8-9 in [Lemieux and Pickles \(2020\)](#).

Focusing on specific problems is more useful than attempting to solve a problem that is more general, unclear, and will require far more resources that are available to you. Importantly,

breaking the problem down to more specific components will help you to not only hone your responses to address that specific problem, but also make it easier to measure and evaluate the impact of the specific intervention strategies you design to address them. While there are no hard rules on how you can identify the ‘type’ of illegal commercial fishing problem, the guidelines provided below will give you some ideas about where you can start, as well as how you can make the scanning of the problem more specific as it relates to the type, time, place, method, and offender characteristics. For example,

Offender Target Place
A foreign commercial fishing vessel fishes for tuna in Country A’s EEZ
Method Method
without an access agreement, using drift nets (which are specifically prohibited
Time
by the country), and fishing during a closed season.

Organizational priorities as well as specific jurisdiction of your agency should guide the scanning process. Fishery managers may want to focus on issues pertaining to the fishing method, such as licensing, gear, quotas, etc. Other agencies may start the scanning process by analyzing where fishing is happening (i.e. Marine Protected Areas), or what type of species are being targeted.

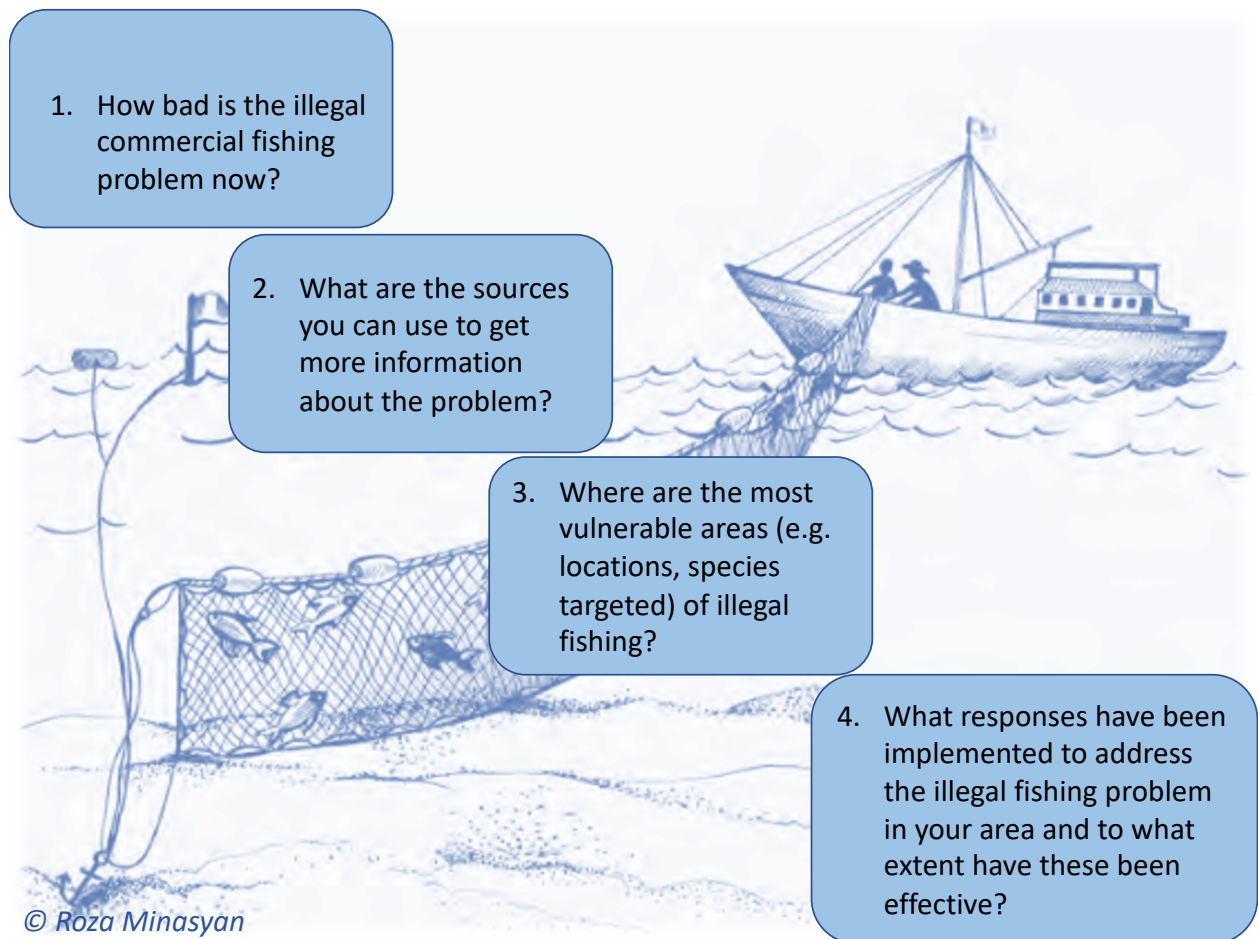
Read More:

For an example of how to use crime scripting to break down your illegal fishing problem, see: **Petrossian, G. & Pezzella, F. (2018).** IUU Fishing and Seafood Fraud: Using Crime Script Analysis to Inform Intervention. *The ANNALS of the American Academy of Political and Social Science*, 679(1), 121-139.

ANALYSIS: Who, What, Where, When, How, Why?

Below you will read a generalized analysis of illegal commercial fishing that can occur within the exclusive economic zone (EEZ) of any country. In this section, a series of suggested questions will be provided to guide you through your analysis of the specific illegal commercial fishing activities that occur in your country's EEZ. For additional information on how to analyze the information, develop hypotheses, and set indicators, check pages 9-12 in [Lemieux and Pickles \(2020\)](#).

Four fundamental questions to answer



How bad is the problem now?

Illegal commercial fishing is considered to be one of the most serious crimes due to its environmental, social, and economic impacts^{xvii}. It is also widespread, affecting almost every coastal country in the world^{xviii}. Estimates suggest that the global fisheries lose approximately 11-26 million tonnes of fish to illegal commercial fishing every year^{xix}. In some areas, such as the Western and Central Pacific, illegal fishing accounts for 8-9% of all fishing^{xx}. In other parts of the world, such as the Eastern-Central Atlantic, South-West Atlantic, Eastern Indian Oceans, between 20% and 37% of fish caught is illegal. In specific countries, the level of illegal fishing can reach to over 60%^{xxi}.

To better understand the extent of the illegal commercial fishing problem in your area, it is important to set some kind of baseline (that is, current measure of an indicator) which will allow you to better understand the problem and its extent in your country's waters. For example, if you are interested in the extent of the use of illegal gear, you would need to first collect data on how much gear is found onboard fishing vessels at landing. This baseline will allow you to then evaluate whether, over time, the problem has changed, and if so, whether it changed in the positive direction, i.e. improved, worsened, or remained relatively unchanged over time. Based on this assessment, you would then consider how to implement the intervention. It is important to keep in mind that you want to use the same indicator before and after an intervention is implemented. In the example of illegal gear, you would be able to measure the success of an intervention by measuring again how much gear is found onboard fishing vessels at landing. Be careful to not use "effort" indicators (i.e. how much money was spent in addressing the illegal gear issue), but rather to focus on "outcome" indicators (i.e. the actual reduction in the number of illegal gear). You can view examples of other indicators you can use as a starting point to measure different aspects of your illegal commercial fishing problem on page 35 of this guide (under Assessment).

By first identifying which indicators are already in place (possibly from various stakeholders and sources), you will be able to better assess where you can best invest your time and resources in order to gather more relevant data and further indicators.

What can you use to get more information about the problem?

The groups and various entities listed in the table below may have an interest in the illegal commercial fishing problem. Consider approaching them to gather more information about the problem.

On Shore	
Fisheries Ministries/Directorate of Fisheries	They are in charge of policy, science and MCS (monitoring, control and surveillance). They generally do population estimates, and evaluate the sustainability of the fishing. May maintain records of at-risk species that are targeted by illegal fishers.
Departments of Food and Agriculture	May keep records of diseases affecting communities that depend on fish as primary source of protein. They may also maintain records of the sustainability of food resource production and consumption, and the use of fisheries (and forestry) resources.
At Sea	
Fisheries Observers	May provide insight about the activities happening onboard fishing vessels, particularly those related to maintaining logbooks on the types and quantities of fish caught. In some jurisdictions they may also have a compliance role.
Coast Guard or Fisheries Patrols	May know about the general trends and activity patterns of illegal fishers in the waters they patrol, including their activity spaces (and possible concentrations).
At Port	
Fisheries Inspectors at Ports	May maintain records of illegal landings, species involved, types of vessels most involved in these landings, the illegal gear used/seized at landing.
Customs and Border Protection	This source can be used to gather more information about what species or species parts are smuggled the most and the possible routes taken by the fishers to transport the illegally caught fish.
Other	
Fishermen Organizations	They can have valuable insight about the local situation and impact of illegal commercial fishing, as well as the rights of fishermen and fishing communities. They can contribute useful strategies for sustainable long term commercial fishing.
International Conservation NGOs	In many cases, NGOs with a specific mission on protecting and preserving marine resources, may have important and relevant insight about the extent of the illegal commercial fishing problem you are dealing with. They can also be useful partners in dealing with the reduction of the problem in your area.
Local NGOs	These NGOs may have more detailed insight into the illegal commercial fishing problems specific to your area and be more aware about the local conditions that contribute to the problem.
Academic Researchers	Getting familiar with the research that relates to the illegal commercial fishing problem you are dealing with (or general illegal fishing-related issues) can give you significant insight into the trends, patterns, issues, challenges and various other aspects related to the problem. The information produced by these researches can be helpful as you start putting together your scanning, analysis, and monitoring phases of your evaluation of the problem.

Where are the most vulnerable areas (e.g. locations, species targeted) of illegal commercial fishing?

Research has shown that illegal commercial fishing is not randomly spread across species or geographic areas, but rather concentrates in space, and among targets. For example, in a study that examined illegal commercial fishing in Western Africa, researchers found that specific micro locations within the exclusive economic zones of the 23 Western African countries were more vulnerable to illegal commercial fishing than others, and these were due to the concentration of high probabilities of specific species within these areas, their proximity to ports with minimal regulatory oversight, and their close proximity to viable exit points^{xxiii}. Similarly, others examined the characteristics of species most vulnerable to illegal commercial species, creating a list of 58 such species that were globally the ‘hot products.’ This list includes, among others, Orange roughy, Atlantic Bluefin tuna, Swordfish, Atlantic cod, and Antarctic toothfish^{xxiii}.

In the following section, some critical questions are outlined that will require answering as you analyze your particular illegal commercial fishing problem. These questions are designed to identify the vulnerable points and help you think through the responses that can be applied to deal with them more effectively. It may be easy to identify vulnerabilities pertaining to some aspects of the problem and harder in others. The questions listed below are by no means exhaustive and are meant to help you begin thinking about the various components of the problem that would need to be addressed for you to be able to effectively deal with it. You may also not be able to find answers to all the questions listed below and may require the assistance of various stakeholders who are better equipped to answer them. It is, therefore, encouraged that you build a working relationship with various stakeholders who are knowledgeable about the various aspects of the problem, so that you can have a more complete understanding about the problem and the associated issues as you begin to untangle them.

In order to facilitate the analysis of a problem as complex as illegal commercial fishing, we have divided it into nine analysis themes: (1) Demand and consumers, (2) Illegal fishers, (3) Species targeted, (4) Gear and methods, (5) Seasonality and timing, (6) Locations and places, (7) Illegal fishing events, (8) Transport, and (9) Sale and sellers. The rest of this guide is structured around these themes, from the Analysis, to the Response and the Assessment of the problem.

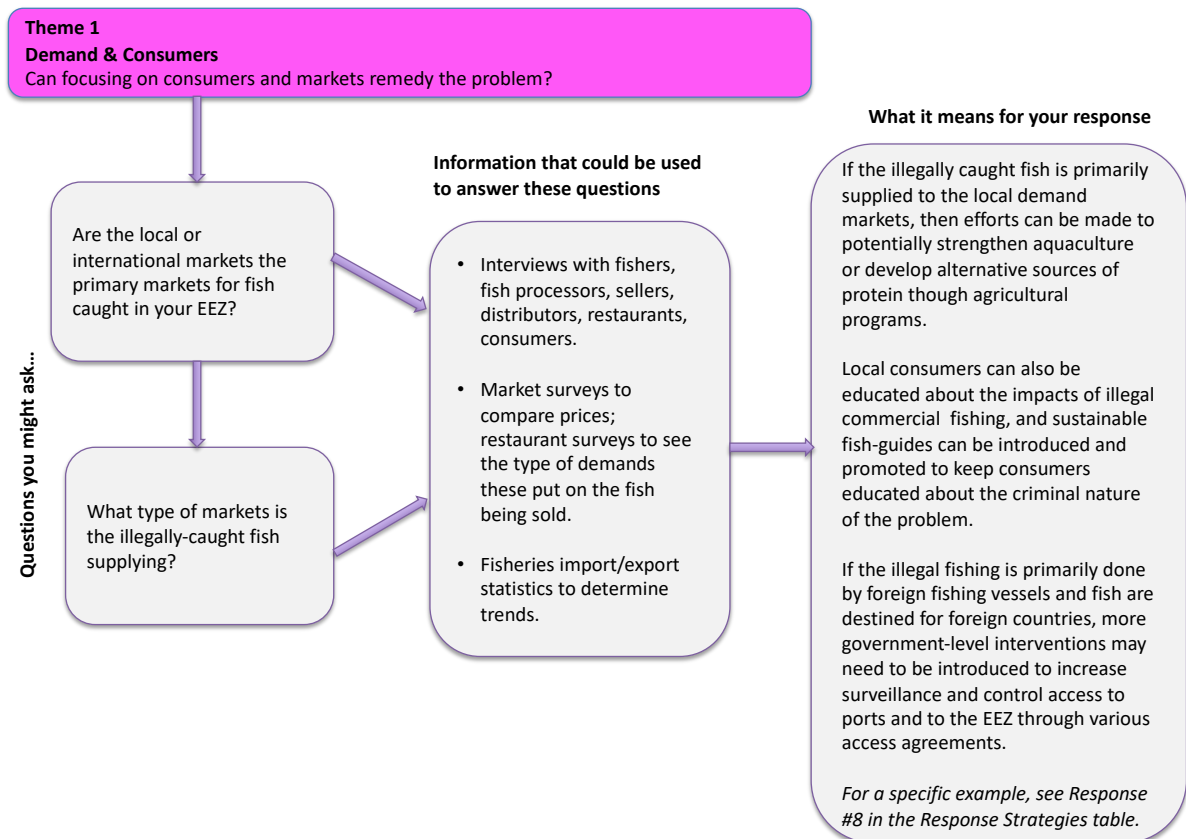


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Demand and Supply

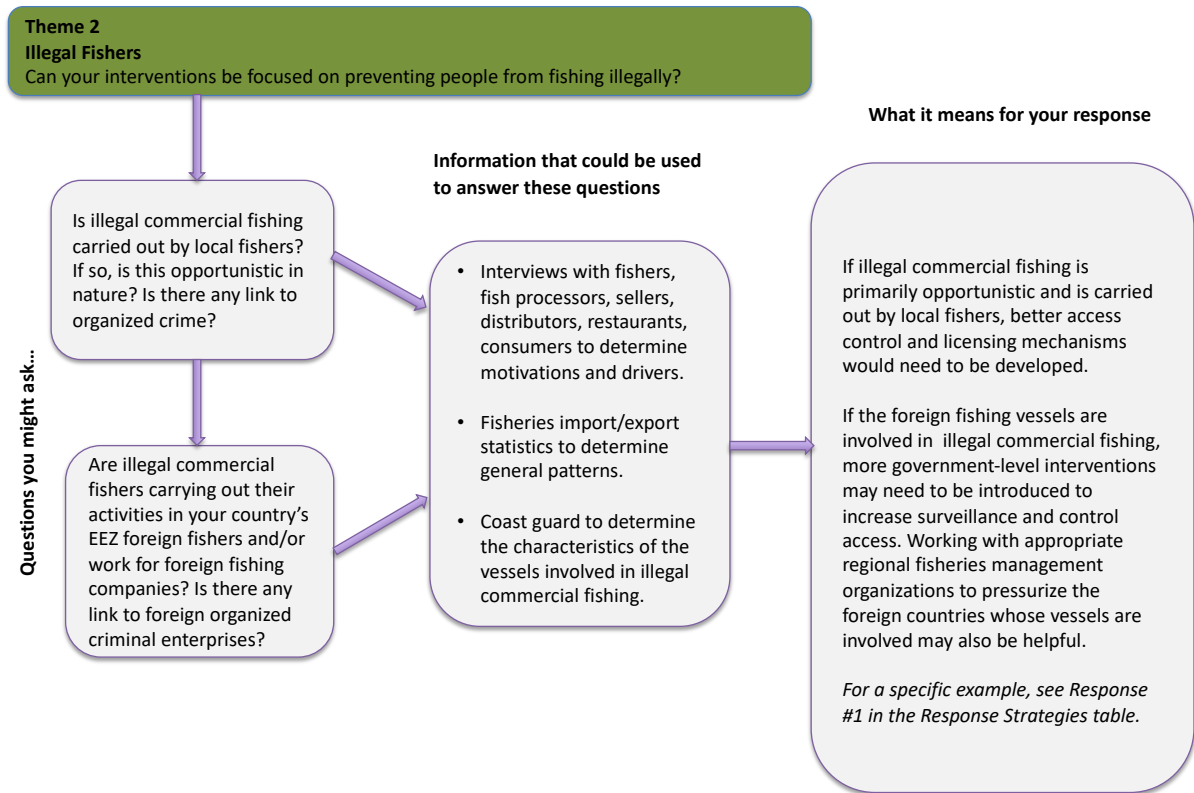
More than 2.5 billion people around the world depend on fish for food and nutrition. Developing countries are the primary suppliers of global seafood markets, and the developed nations are the major markets driving this supply. About 80% of fish trade flows from developing countries to developed countries. The European Union, United States, China, and Japan account for over 85% of global seafood imports, and over 60% of the global fisheries exports come from developing countries^{xxiv}. The supply and demand pressures generally drive fishers and often lead them to fish illegally, fish in expansive waters, or overfish. The dependence on fish as a primary source of protein has been well documented, and the significant human population growth has only been putting more pressures on the fishers to continue fishing and more often overfishing. In some developing countries, for example, over 20% of animal protein intake comprises fish. This percentage goes as high as 90% in Pacific Island states. Fish is the most traded food item in the world. In 2005 its trade value surpassed the one obtained from the trade of rice, tea and coffee combined in developing countries^{xxv}.

Understanding the general consumer demands, such as the types of wild-caught fish (and other marine life, such as sea cucumber, crustaceans, etc.) that are most desirable, will help you prioritize where the response strategies should be focused. Fish, and seafood in general, has become a staple of many cuisines around the world. Identifying the primary demand markets and crafting a demand-reducing intervention can be one way of addressing this. Identifying the key suppliers to large fish markets in your area, as well as identifying the possible pressures and opportunities, such as economic incentives, that trigger them to fish illegally, is yet another approach that can be adopted to address the problem of illegal commercial fishing in your area more effectively.



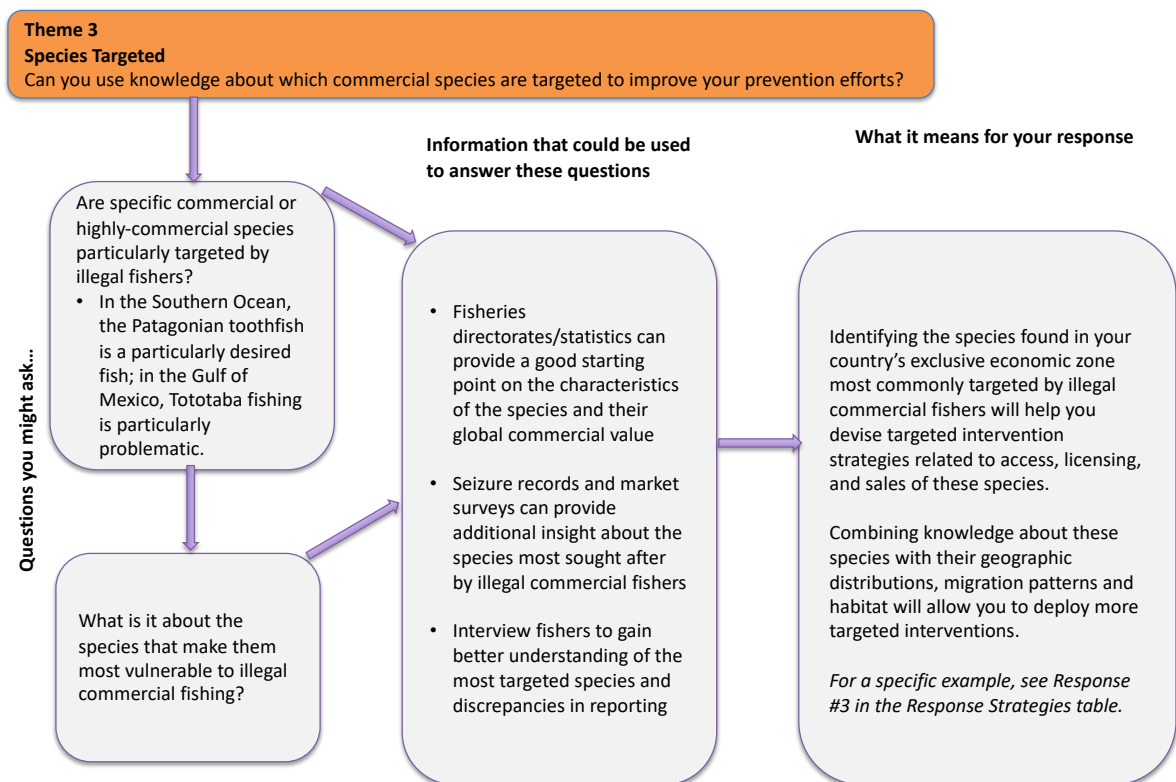
Illegal Fishers

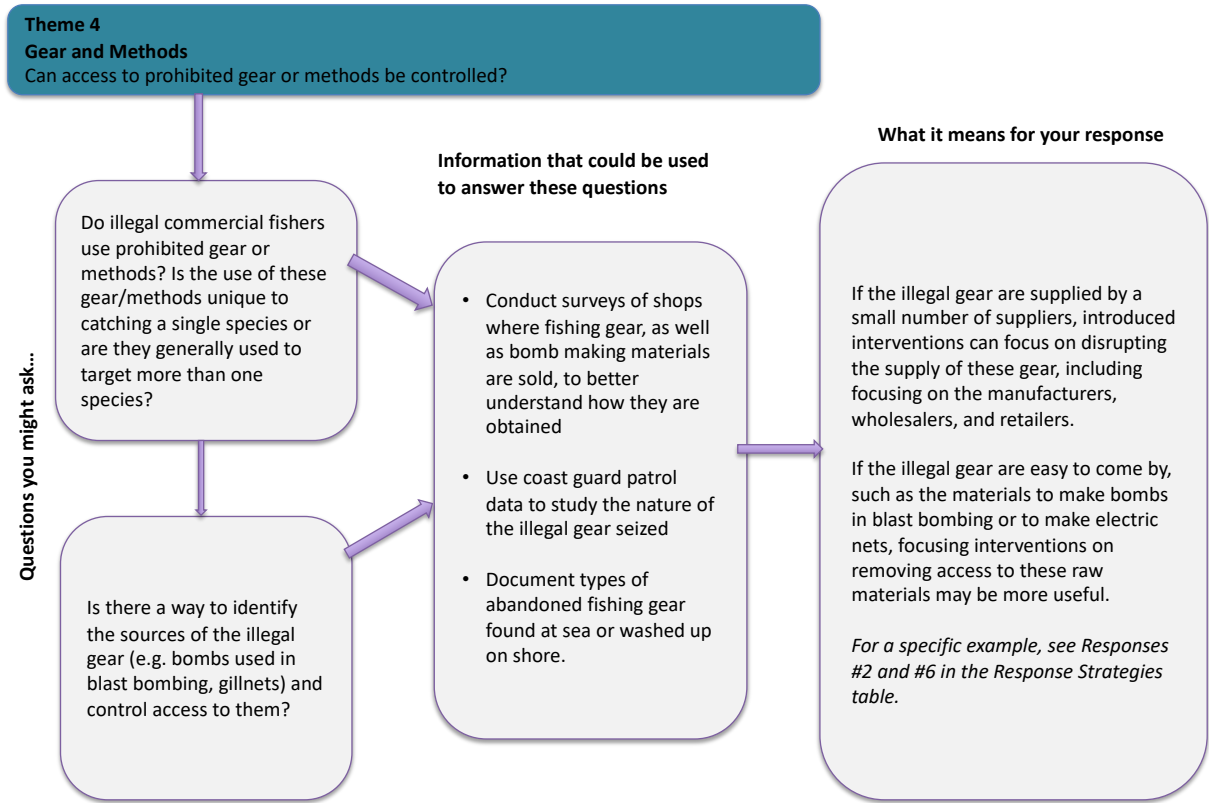
Whether illegal commercial fishing is an undertaking of opportunistic actors driven by profit or rather an organized criminal activity is a question that even international experts have a difficult time answering. Expert opinion on this varies, as the discussion often encompasses the definition of what is considered an organized criminal group and how organized a group needs to be in order to be distinct from a group of opportunistic actors. While the debate on that question does not have clear answers, there is general consensus that illegal commercial fishing is, in fact, a serious and well-organized activity carried out by serious criminals that violate the sovereignty of nations, systematically steal their resources, and engage in serious violations of national, regional, and international regulations. These actors also depend on a network of enablers (such as corrupt government officials) and a complex web of operators (e.g. transshipment and bunker vessels that allow them to stay in the open seas for extended periods of time, fish processors, wholesale buyers, etc..) that aid them in their criminal activity.



Target and Method

Earlier in this guide we provided a general overview of the various methods that can be employed to engage in illegal commercial fishing, such as using prohibited gear or fishing without a license. Certain species, especially high-value and highly commercial ones, can be particularly vulnerable to illegal commercial fishing. Identifying the most widely used illegal methods, gear or vessels is important, as this can be the first step in defining the relevant control strategies that can be employed to address the issue. For example, if gillnetting is not allowed, it is important to understand how these gillnets are procured/obtained by the fishers. Similarly, fish targeted globally by illegal commercial fishers may or may not be endemic to your waters. Knowing which fish are highly commercial in global markets and determining the presence and abundance of these species in your country's waters may help you determine the licensing requirements, fishing restrictions, access controls, and relevant actions that can be taken to design relevant control strategies.



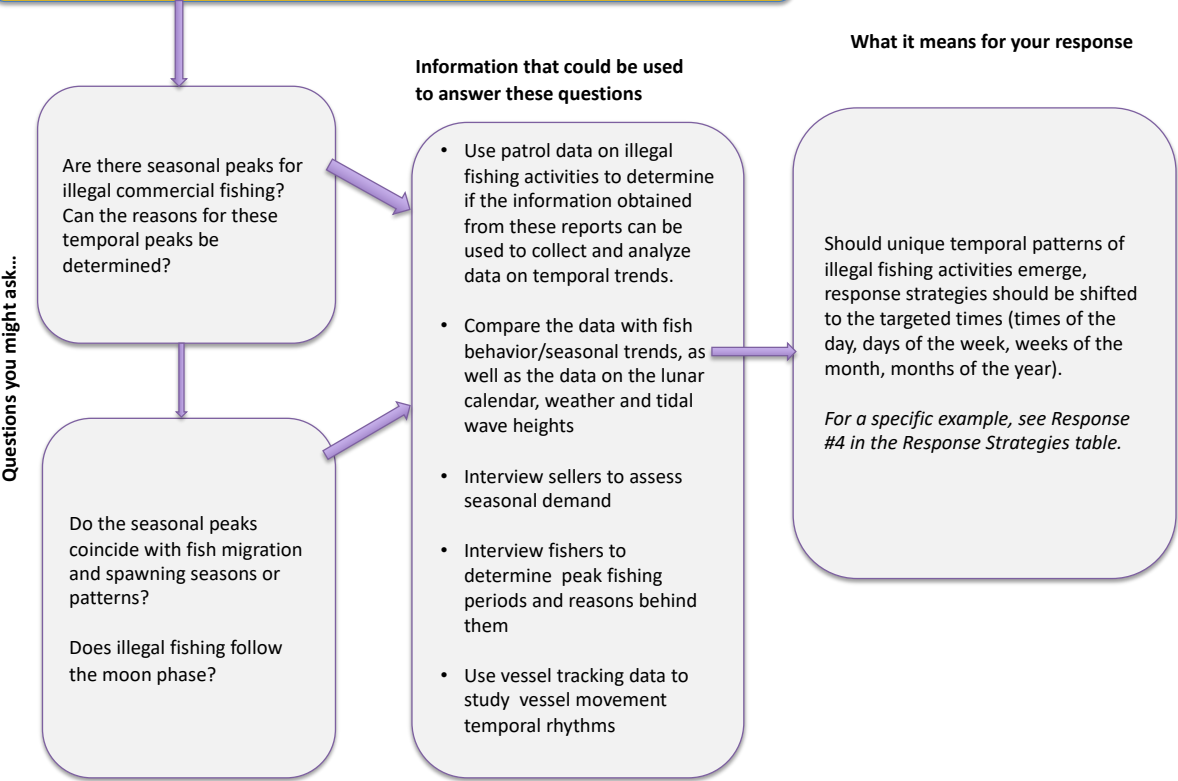


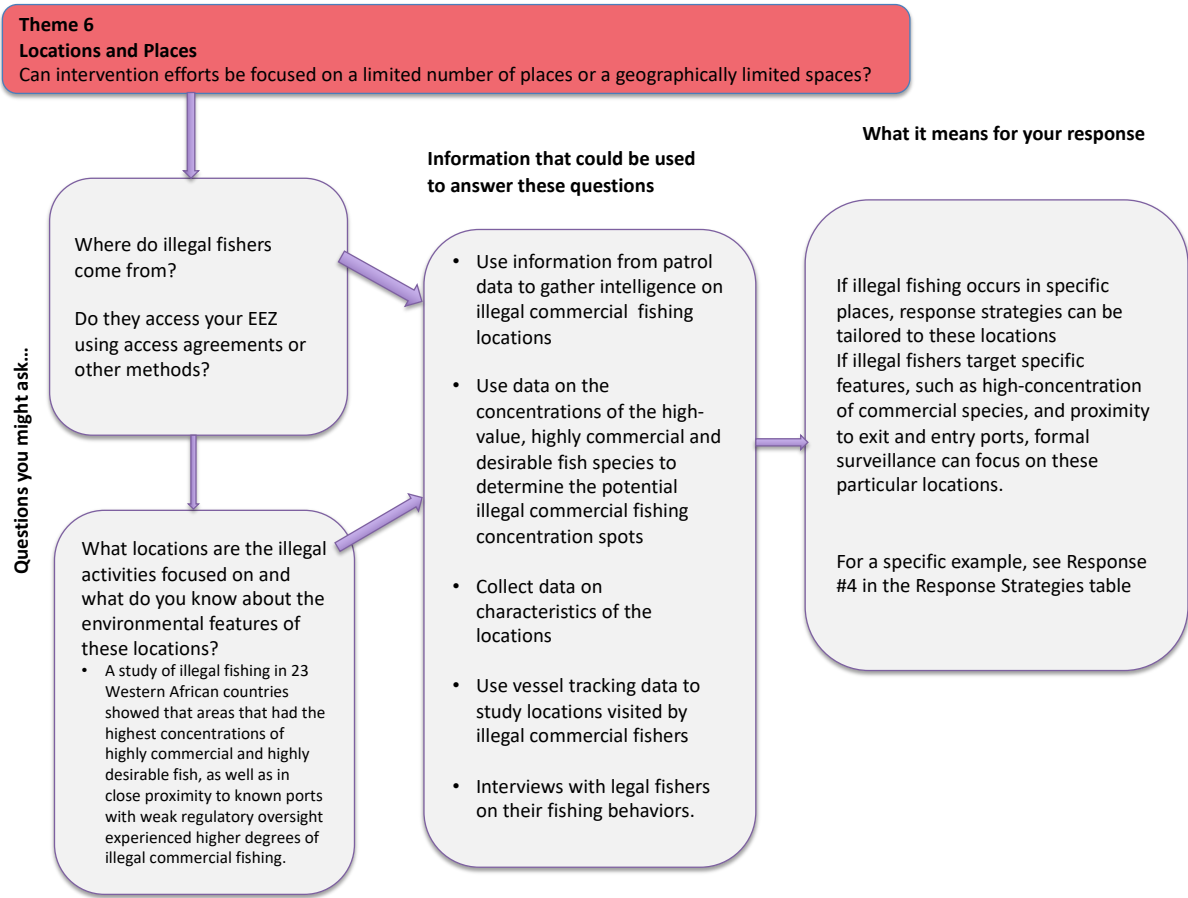
Time and Location

There are distinct temporal rhythms of illegal commercial fishing throughout the year, which generally align with the open fishing seasons whereas it is assumed that the annual reproductive output of the fish is high. However, the demand for fish and fish products does not follow any seasonal patterns and it can be high among consumers throughout the year. Importantly, illegal commercial fishing happens more often during the closed season, and during certain moon phases. For example, a study of illegal fishing of red snapper in the Gulf of Mexico revealed that the activity clustered around three moon phases during which the wave heights were the lowest. Also, the same study found that morning hours were the best time for fishing illegally.

Certain locations see significantly higher illegal commercial fishing activities than others, such as areas where spawning aggregates occur, locations that offer higher concentrations of highly-commercial or desirable fish, or those that are in close proximity to viable exit and entry points (e.g. ports with weak regulatory oversight). It is, therefore, important to see whether such temporal and spatial behavioral patterns are exhibited in your EEZ, as this information will help you devise tailored intervention methods to address the problem more effectively^{xxvi}.

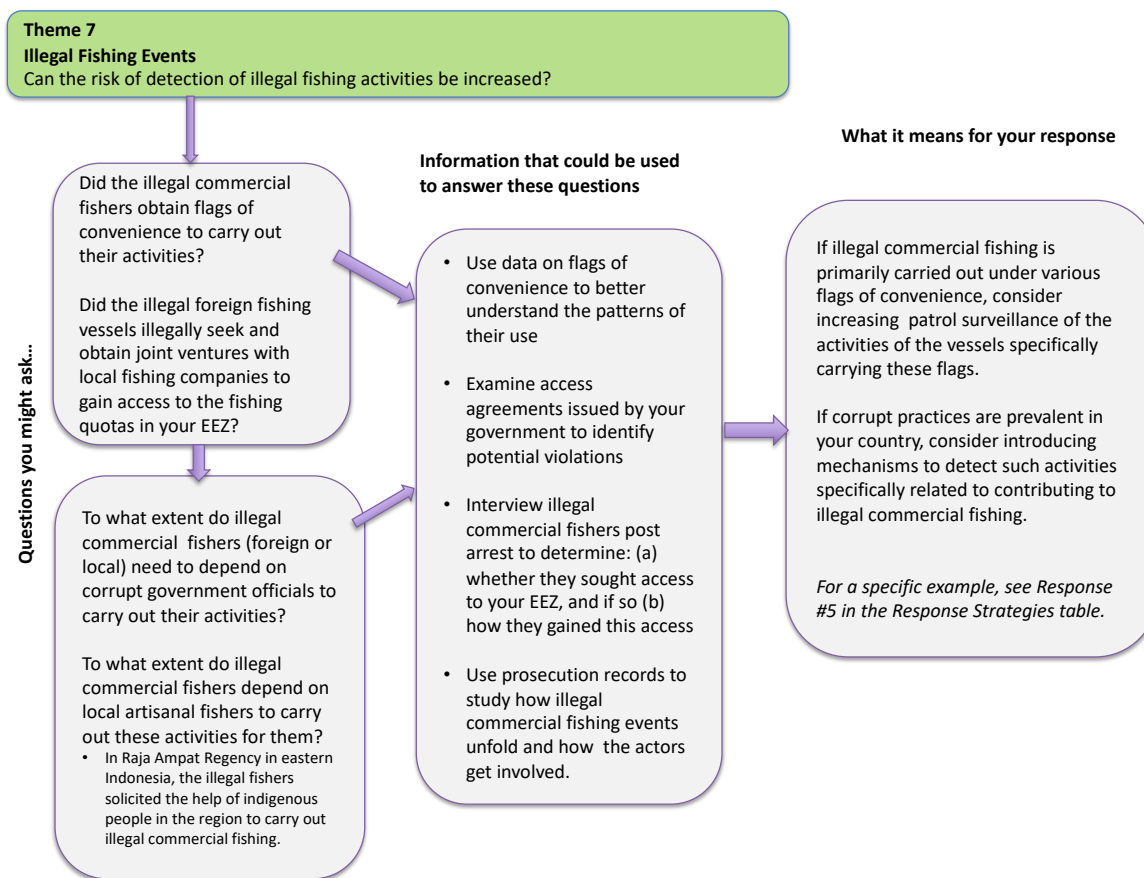
Theme 5
Seasonality and Timing
 Can interventions be focused at closed seasons or at predictable peak times for fishing?





Illegal Fishing Events

Clearly understanding the how's and what's of illegal commercial fishing is vital, as given the complex nature of the activity, illegal commercial fishers heavily rely on various methods to ensure that they carry out their activities successfully. These methods may involve obtaining a flag of convenience whereas they register their flag under an open registry country in order to avoid prosecution and penalties (if caught)^{xxvii}. Illegal foreign fishers often obtain illegal joint ventures with local fishing companies or private access agreements through bribing country's officials, while local illegal fishers may take advantage of corrupt government officials to obtain licensing, high fishing quotas or other discretionary treatment^{xxviii}. Understanding each of these specific facilitators of illegal commercial fishing and taking measures to disrupt these activities will likely lead to significant reductions of illegal commercial fishing.

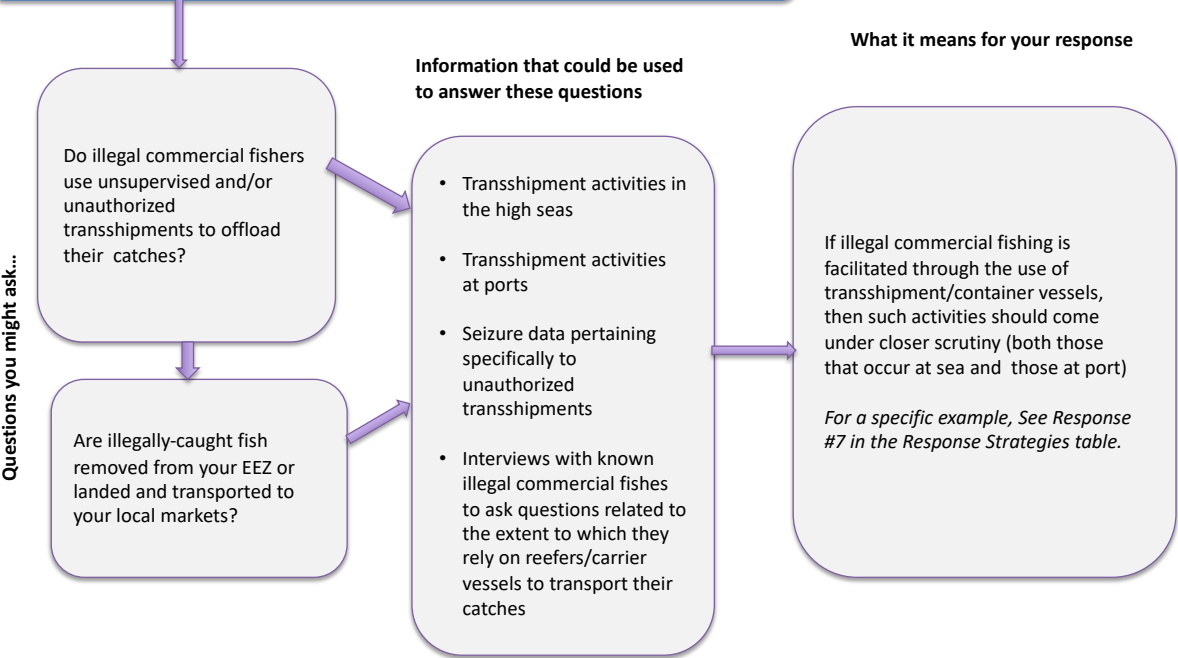


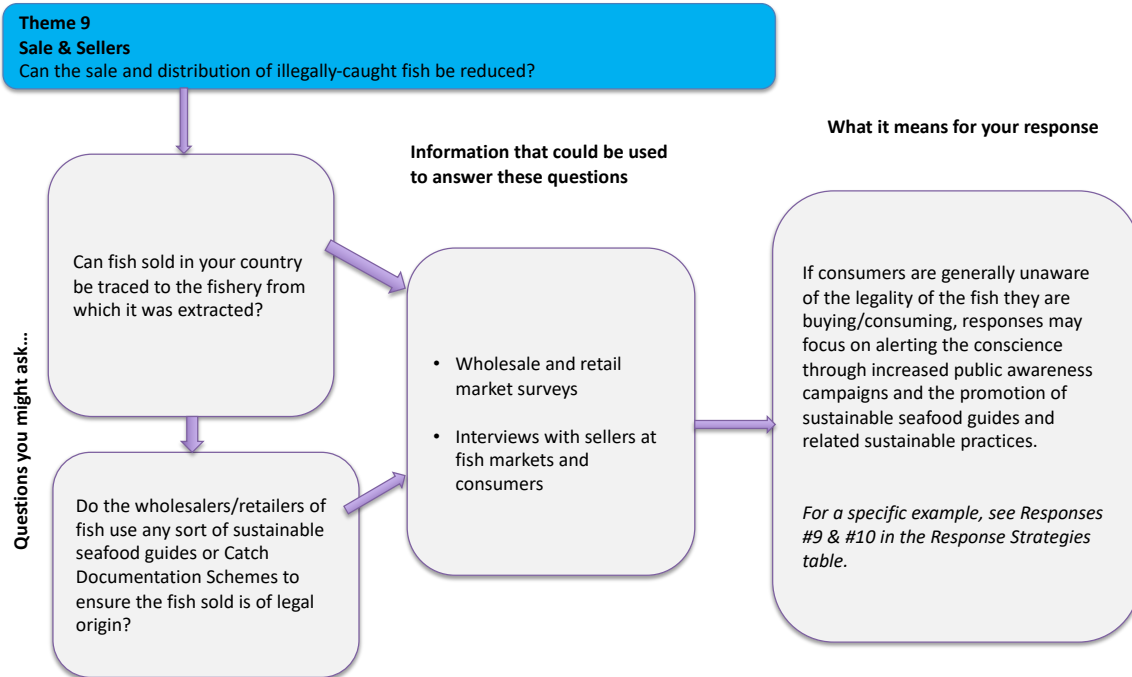
Transport and Sale

Illegal commercial fishers often take advantage of the practice known as transshipping, in which fishers transfer their catches in the high seas to refrigerated cargo vessels. Uncontrolled and/or unauthorized transshipment allows illegal fishers to mix their illegal catch with legally caught fish, and to offload it undetected at ports^{xxx}. This allows them to continue carrying out their activities in the open waters undetected and for long periods of time. Additionally, illegal commercial fishers often offload their catches at ports with lax inspection mechanisms in place that gives them the opportunity to conceal their illegal catches due to the low detection risk^{xxx}.

Unfortunately, by the time the fish reach wholesalers, and subsequently retailers, it is hardest to distinguish the illegality of the source they have been procured from. Unless the fishers have used tracing technologies (e.g. Blockchain) to trace and provide proof of the capture of the fish ‘form bait to plate’^{xxxi}, or the fish sold to wholesalers come from fisheries that implement Catch Documentation Schemes, it is especially difficult to determine the origin of the fish. Therefore, efforts undertaken to reduce the sale of illegally-caught fish should primarily be focused on awareness raising and encouraging the sellers to source fish from traceable sources (i.e. through the use of Catch Documentation Schemes).

Theme 8
Transport
Can the risk of detection of illegal shipping or transshipping be increased?





RESPONSE: Finding the right solution(s)

What responses have been tried and did they work?

Before embarking on a new project, determining why others have failed in the past will help you avoid the same pitfalls and mistakes that can be easily prevented. There may also be some progress made by these responses, which you can use to build on. Below are some questions you can explore before you set to begin your new intervention project.

1. What are the current response strategies being implemented to deal with the illegal commercial fishing problem in your country's EEZ? Do these responses account for time, place, species, methods?
2. What outcomes do the inspections lead to if the fisher is caught having been engaged in illegal activity (e.g. arrest, fine?)
3. What has been done in the countries in your region to deal with the illegal commercial fishing problems similar to yours? To what extent did their response strategies reduce the problem and/or are effective?
4. Have any demand-reduction methods been implemented in your country to deal with the problem?

5. If the current interventions designed to deal with the problem are ineffective, can you identify the reasons for these?

For a guide on how to consider and select responses for wildlife-related crime problems, check pages 12-15 in [Lemieux and Pickles \(2020\)^{xxxii}](#).

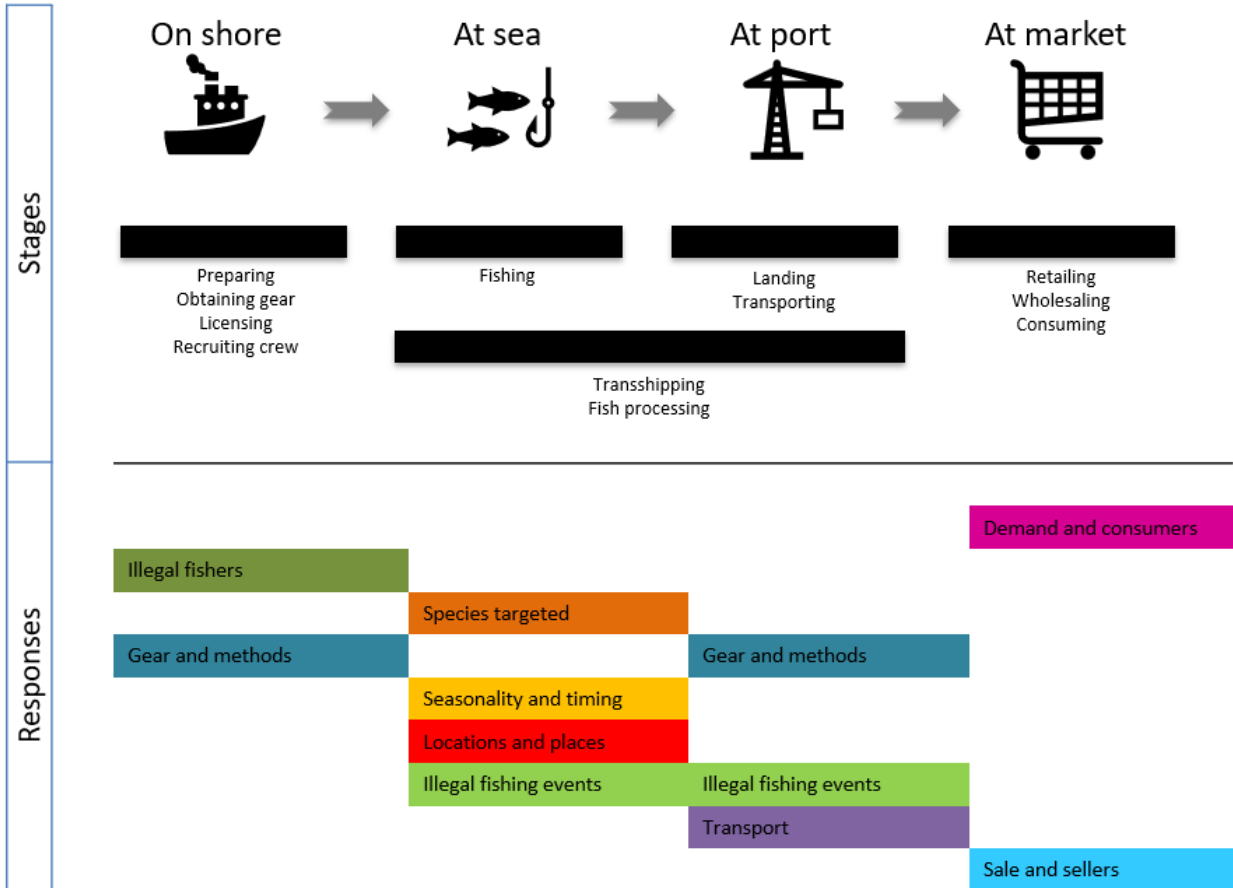
Illegal commercial fishing specific responses

This section presents an array of responses that have been used or could be used to address the issue of illegal commercial fishing. Each response includes a description of how it works, different ways of achieving the result, and some examples of how it has been implemented.

The responses have been organized according to the setting where and when they are implemented, depending on the type of activity they are related to:

1. ON SHORE refers to all preparatory activities that occur before a vessel departs on a fishing trip, including obtaining gear, recruiting the crew, and applying for permits and licenses.
2. AT SEA refers to the activities that occur on the vessel, after it has departed and before it returns to port. It includes catching the fish, onboard processing, and transshipping.
3. AT PORT refers to any activities that occur after a vessel has returned to port to offload the catch. It includes landing, on land fish processing, and transportation, among others. Unsupervised and/or unauthorized transshipping can also be included in this category, as a way to offload and transport illegal catch.
4. AT MARKET refers to the actual sale of the fish to the wholesalers and consumers.

The figure below includes a visual summary of the illegal commercial fishing prevention strategies presented in this section, by setting and analysis theme.



Setting: ON SHORE

1. Involving fishermen in the conservation of fish stocks

Analysis theme: Illegal fishers

How it works...	Ways to do it...	Highlighted example/s
<p>Establishing incentive programs that encourage the involvement of local fishermen in conservation efforts helps assist compliance with regulations.</p>	<ul style="list-style-type: none"> • Incentivizing local fishermen to comply through self-regulation and management of their fisheries • Encouraging responsible fishing through the implementation of the Sustainable Livelihoods Approach • Creating education campaigns targeting local fishermen • Licensing artisanal fisheries 	<p><u>TURF (Territorial Use of Rights for Fishing)</u> In the late 1980s the goose barnacles' fishery in Galicia (Spain) was near collapse due to increasing demand and the cofradías' (traditional fishing guilds) inability to prevent outsiders from fishing within their territories. In 1992, the Galician government established a TURF program by which the cofradías received exclusive fishing access to their traditional fishing grounds, as well as the responsibility to manage these grounds. Their responsibilities include developing annual management plans and maintaining appropriate controls on fishing mortality. This approach of co-management between communities and the regional government was very successful, and led to the recovery of goose barnacle stocks and to a significant drop in illegal fishing.</p> <p>https://fisherysolutionscenter.edf.org/design-stories/spanish-galicia-goose-barnacle-cofrad%C3%ADa-system</p>

2. Controlling fishing vessels and gear

Analysis theme: Gear and methods

How it works...	Ways to do it...	Highlighted example/s
<p>Ensuring that vessels and fishing gear are compliant with existing laws (and seizing those that are not) increases the effort to secure necessary tools to be able to fish. At the same time, clear identification of vessels makes it more difficult to operate anonymously,</p>	<ul style="list-style-type: none"> • Clearly marking licensed vessels • International blacklisting of illegal commercial fishing vessels • Seizing vessels not in compliance with registration and licensing laws 	<p><u>Destroying or sinking non-compliant ships</u> Several southeast Asian nations (Indonesia, China) are fighting against Illegal commercial fishing by destroying vessels found guilty of illegally fishing in the country's waters. Going one step further, Thailand has a program to buy trawlers equipped with push nets with the purpose of sinking the</p>

<p>which, in turn, increases the risk of being caught.</p>	<ul style="list-style-type: none"> • Denying insurance to blacklisted vessels • Prohibiting the use of certain fishing techniques and seizing illegal commercial fishing gear and equipment 	<p>vessels and turning them into ecologically friendly artificial coral reefs.</p> <p>Indonesia: https://stopillegalfishing.com/press-links/indonesian-government-destroys-20-foreign-vessels-due-illegal-fishing/ China: https://www.seafoodsource.com/news/environment-sustainability/china-smashes-up-illegal-fishing-vessels-for-not-being-registered Thailand: https://www.bangkokpost.com/thailand/general/1136281/8-trawlers-sunk-to-create-artificial-reef</p>
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Setting: AT SEA

3. Establishing and enforcing limits on the types of fish being caught

Analysis theme: Species targeted

How it works...	Ways to do it...	Highlighted example/s
<p>Establishing and enforcing clear regulations regarding what species cannot be fished, how much they can be fished, or the minimum size of fish that can be caught, is instrumental for the targeted protection of some species.</p>	<ul style="list-style-type: none"> • Banning the fishing of certain species • Establishing minimum size-limits for certain species • Establishing restrictive catch quotas for highly commercial species • Establishing restrictive catch quotas for species known to be caught illegally • Implementing species-specific monitoring and protection initiatives 	<p><u>Petrossian List</u> In a 2014 publication, Gohar Petrossian and Ronald Clarke created a risk score list based on the frequency at which fish species were mentioned as targeted species in Illegal, Unreported, and Unregulated (IUU) fishing research reports and seafood guides. OCEANA, the largest international advocacy organization focused on ocean conservation, has proposed the use of the Petrossian List as one of the factors to take into consideration when conducting risk assessments of IUU fishing by the marine insurance industry. The goal is to reduce the risk of inadvertently insuring IUU activities.</p> <p>https://eu.oceana.org/sites/default/files/oceana-psi_insurance_industry_guidelines_for_iuu_fishing_final_with_doi.pdf</p>

4. Establishing and enforcing limits on where and when fish can be caught

Analysis theme: Seasonality and timing / Locations and places

How it works...	Ways to do it...	Highlighted example/s
<p>Establishing and enforcing prohibitions to fish in certain areas and during some seasons, such as during the spawning season, contributes to the long-term sustainability of some species populations. Installing clear instructions and signage reminding of the prohibition helps remove excuses.</p>	<ul style="list-style-type: none"> • Establishing seasonal fishing bans • Creating fishing bans and no-take zones in certain locations • Creating Marine Protected Areas • Creating and regularly updating the list of endangered species that can be found within the country's EEZ • Creating better tools to control and monitor the fishing activities during^{xxxiii} closed seasons • Creating stronger mechanisms to monitor and control the activities in known illegal commercial fishing locations 	<p><u>FAO's Ecosystem Approach to Fisheries (EAF) and the Code of Conduct for Responsible Fisheries</u></p> <p>The Reykjavik FAO Expert Consultation (FAO, 2003) stated that the “purpose of an ecosystem approach to fisheries is to plan, develop and manage fisheries in a manner that addresses the multiplicity of societal needs and desires, without jeopardizing the options for future generations to benefit from a full range of goods and services provided by marine ecosystems”. A key instrument to do so are the principles outlines in the Code of Conduct for Responsible Fisheries (FAO, 1995), where principles and international standards of behavior for responsible practices are set in order to ensure the effective conservation, management and development of living aquatic resources, with due respect for the ecosystem and biodiversity.</p>
<p>https://www.fao.org/3/y4773e/y4773e.pdf https://www.fao.org/fishery/en/code</p>		

5. Monitoring, Control and Surveillance

Analysis theme: Illegal fishing events

How it works...	Ways to do it...	Highlighted example/s
<p>The risk of apprehension of those involved in illegal commercial fishing can be increased by conducting surveillance operations and vessel inspections. Surveillance capabilities can be increased by enlisting the help of the local community.</p>	<ul style="list-style-type: none"> • Conducting vessel and port inspections and surveillance operations • Utilizing technologies such as cameras and GPS devices in commercial fishing vessels, and satellite and aerial surveillance • Providing information and training to law enforcement and customs officials 	<p><u>Global Fishing Watch (GFW)</u></p> <p>GFW's mission is “advancing ocean governance through increased transparency of human activity at sea.” They combine data from a variety of sources (vessel monitoring systems, automatic identification systems, vessel registries, satellite imagery, etc.) with the goal of creating and publicly sharing map visualizations, data and analysis tools that enable ocean monitoring and scientific research.</p>
<p>https://globalfishingwatch.org/</p>		

	<p>in how to identify prohibited species and how to combat illegal practices in the fishing industry</p> <ul style="list-style-type: none"> • Using innovative approaches, such as ShotSpotter, to detect blast fishing from a distance, or the Ocean Sentinel program to track fishing activity • Empowering local fishing communities and the local community to act as informal guardians • Creating anonymous hotlines and whistleblower programs 	<p><u>Ocean Sentinel Program</u> This program installs tiny beacons on albatrosses to detect radar signals put out by ships they meet at sea, even if their automatic identification system (AIS) is off. This information can be used to track the activities of fishing boats operating in international waters. https://phys.org/news/2018-10-albatrosses-spy-illegal-fishing.html</p> <p><u>Global Wildlife Whistleblower Program</u> This secure web-based platform educates potential whistleblowers and incentivizes the reporting of all types of crimes against wildlife, including illegal commercial fishing, through financial rewards. https://www.whistleblowers.org/wildlife/</p>
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Setting: AT PORT

6. Controlling port entry and activities

Analysis theme: Illegal fishing events / Gear and methods

How it works...	Ways to do it...	Highlighted example/s
<p>Offloading the catch at port is an essential step in order to be able to benefit from illegal commercial fishing activities. Inspections of vessels landing at port increase the risk of being caught with illegal catch. Refusing port entry to vessels engaged in illegal commercial fishing denies the financial rewards of this activity, while at the same time increases the effort to successfully offload the catch.</p>	<ul style="list-style-type: none"> • Increasing and improving ports' monitoring and inspection efforts • Increasing inspections of fishing vessels offloading their catch at free ports • Requiring pre-entry notifications at port • Confirming and certifying complete and accurate information on vessel monitoring systems (VMS) before port entry and/or fish offload • Refusing port entry and/or fish landings to vessels suspected of illegal 	<p><u>UN Agreement on Port State Measures (PSMA)</u> The Agreement on Port State Measures (PSMA) is the first binding international agreement to specifically target IUU fishing. Its main goal is to prevent vessels engaged in IUU fishing from using ports and landing their catches. By doing so, illegally caught fish can't reach its intended market, which disincentivizes illegal commercial fishing operations. At the same time, banned vessels can't access port services for refueling and other essential services. Apart from refusing port entry to vessels carrying illegally harvested fish, the PSMA also requires action against vessels that engage in supportive activities, such as refueling or transshipping fish from IUU fishing vessels at sea. http://www.fao.org/port-state-measures/en/</p>

	activity (use of illegal gear, catch of protected species, overfishing, etc.) <ul style="list-style-type: none"> • Establishing restrictions to fish discharge • Denying port services to illegal commercial fishing vessels 	
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7. Eliminate transportation options for illegal catch

Analysis theme: Transport

How it works...	Ways to do it...	Highlighted example/s
<p>Illegally caught fish need to be transported from the original vessel to port, and from the landing port to the processing facilities and the final market. Eliminating transportation options for shipments involving illegally caught species hinders the opportunities for these fish to reach the market, thereby reducing the rewards of engaging in illegal commercial fishing and making it more arduous.</p>	<ul style="list-style-type: none"> • Establishing restrictions to and monitoring of fish transshipment at sea and at port • Enlisting the collaboration of the transportation industry • Monitoring the activities of reefers engaged in transshipping fish • Monitoring the activities of cargo vessels engaged in transshipping fish 	<p><u>EU CATCH Certification Scheme</u> This certification system “requires that all imports of fishery products are accompanied by a catch certificate validated by the flag States of the catching vessels in order ensure the legality and traceability of the fish”. Although still voluntary, it is expected that the use of CATCH will become mandatory in the next few years. https://webgate.ec.europa.eu/cfcas3/tracesnt-webhelp/Content/Q_CATCH/0.Intro.htm</p> <p><u>Banning Shark Fin Shipments</u> In 2016 COSCO Shipping Corporation Ltd., China’s biggest shipping and logistics company, pledged a total ban on transporting shark fins and shark fin-related products. This announcement followed similar initiatives in 2015 by other cargo carriers in other parts of the world, such as UPS and American Airlines in the United States and Maersk and Hapag-Lloyd in Europe.</p> <p>https://wildaid.org/chinese-conglomerate-cosco-shipping-bans-shark-fin-shipments/ https://awionline.org/content/international-shark-finning-bans-and-policies</p>

Setting: AT MARKET

8. Educate consumers

Analysis theme: Demand and consumers

How it works...	Ways to do it...	Highlighted example/s
<p>Raising awareness among consumers about the illegal commercial fishing industry, its dangers and consequences, aims to reduce demand for illegally caught fish, thereby reducing the benefits of engaging in illegal commercial fishing.</p>	<ul style="list-style-type: none"> • Implementing education campaigns through a variety of means (films, documentaries, etc.) about the illegal commercial fishing industry and the role consumers can play in reducing demand for illegally caught fish • Creating sustainable seafood advisory lists that can guide consumers' seafood choices • Creating apps for consumers to inform them about 'fish to eat' and 'fish to avoid' to assist compliance 	<p><u>Billboards Warning of Illegal Fishing in Costa Rica</u> In San Jose (Costa Rica) billboards alerting about the existence of illegal fishing in the country's waters have been placed along the roads from the airport and the city. The billboards direct the readers to the website of the Fishing Federation of Costa Rica, where they can learn about the problem as well as sign a petition to curb illegal fishing. https://www.sportfishingmag.com/billboards-warn-illegal-fishing-in-costa-rica/</p> <p><u>Seafood Watch: Consumer Guides</u> The Monterey Bay Aquarium's Seafood Watch national and regional guides classify seafood items on the U.S. market into four categories, from most to least sustainable: (1) best choice, (2) certified, (3) good alternative, and (4) avoid. https://www.seafoodwatch.org/recommendations/download-consumer-guides</p> <p><u>Ocean Warriors</u> Ocean Warriors is an Animal's Planet documentary series (released in 2016) that focuses on poachers and illegal fishing networks. https://www.imdb.com/title/tt6317542/?ref=ttpl_pl_tt</p> <p><u>The Pacific Success Story</u> The Pacific Islands Forum Fisheries Agency has recorded one of the most impressive success stories on combatting IUU fishing, which was due to regional and national collaboration, cooperation, and subsequent action. https://youtu.be/TGMKgL1aFXw</p>

9. Improve traceability of fish

Analysis theme: Sale & Sellers

How it works...	Ways to do it...	Highlighted example/s
<p>Establishing mechanisms to trace the origin of fish reduces the rewards of engaging in illegal commercial fishing as this allows for the detection of illegally caught fish.</p>	<ul style="list-style-type: none"> • Only allowing fishery products that carry catch certificates (i.e. EU IUU Regulations) • Establishing Catch Documentation Schemes • Establishing DNA testing databases to check for mislabeling or species substitutions • Encouraging retailers to purchase fish that can be traceable to its fishery/origin 	<p><u>FishCoin</u> FishCoin is a crypto currency created to provide incentives to fishermen and fish farmers to collect key data on the fish they catch for the purpose of traceability. Fishermen can earn tokens by capturing and communicating data on the seafood they catch, and then they can use that currency to pay bills or buy cellphone minutes. This allows seafood buyers to have better information about the fish they purchase.</p> <p>https://fishcoin.co/</p>

10. Encourage retailers to buy sustainable seafood

Analysis theme: Sale & Sellers

How it works...	Ways to do it...	Highlighted example/s
<p>The market for illegally caught fish can be disrupted by working with retailers to ensure that they carry sustainably caught fish.</p>	<ul style="list-style-type: none"> • Working with the seafood industry toward greater sustainability • Imposing fines and penalties to retailers who sell illegally harvested seafood to the consumer • Encouraging retailers to stop carrying products from brands known to fish unsustainably • Informing sellers about the high-risk species and encourage them to take extra precautions when sourcing these fish 	<p><u>The Sustainable Seafood Coalition (SSC)</u> The Sustainable Seafood Coalition is a partnership of UK businesses that aims to ensure that all fish and seafood sold in the UK comes from sustainable sources. The focus of the Coalition is to work with supply chain buyers (restaurants, supermarkets, small suppliers, etc.) to change their practices, and to that end the SSC asks their members to commit to two codes: the Responsible Sourcing Code and the Environmental Labelling code, which set a benchmark for industry's best practices.</p> <p>https://www.sustainableseafoodcoalition.org/</p>

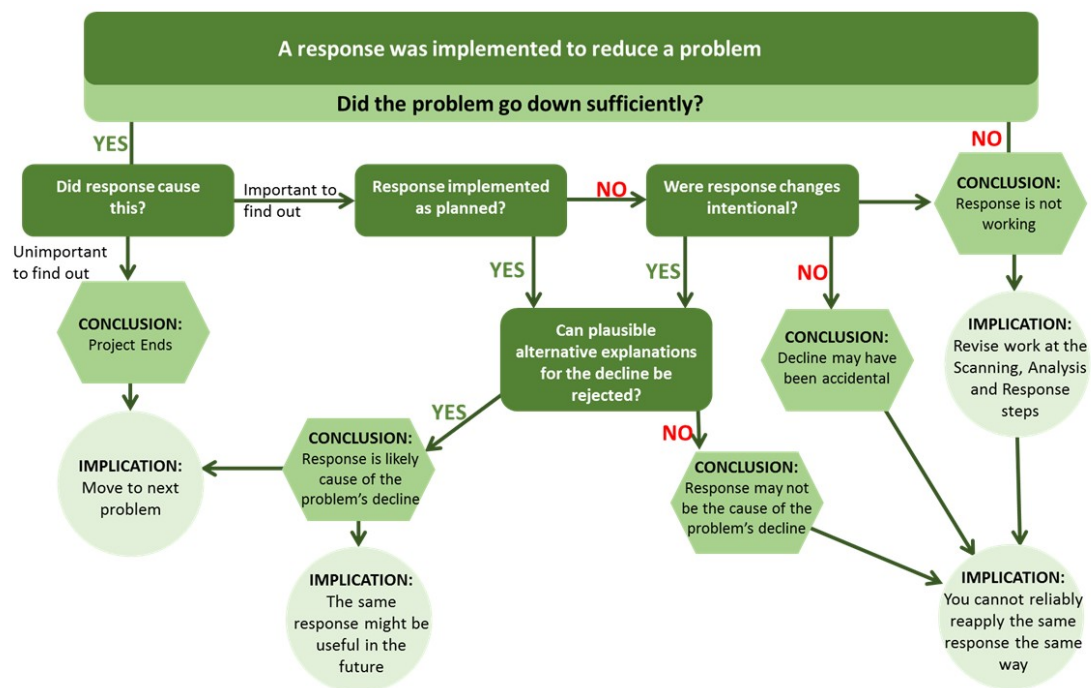
Read More:

For a detailed framework and an example of how to conduct a thorough analysis of your illegal commercial fishing problem and identify suitable interventions, see: **Oyanedel, R., Gelcich, S., and Milner-Gulland, E.J. (2021)**. A framework for assessing and intervening in markets driving unsustainable wildlife use. *Science of the Total Environment*, 792, <https://doi.org/10.1016/j.scitotenv.2021.148328>.

ASSESSMENT: Did the responses work?

Although often overlooked, assessment is crucial to determine the success of prevention strategies. Illegal commercial fishing is perhaps one of the most difficult activities to assess intervention success on. There are various reasons for this. Illegal commercial fishing is not just one activity. By the very nature of it, illegal, unreported, and unregulated fishing encompasses a whole host of activities that, depending on the actors involved (e.g. foreign actors fishing in your EEZ without an access agreement), target species (e.g. a fisher has a license to fish one species but not another), locations (e.g. within closed areas), or times (e.g. during closed seasons), may or may not always involve an illegal activity. It is also the type of activity that is often difficult to quantify. The illegal commercial fishing component alone encompasses a whole host of prohibited activities, and assessing these activities within the illegal component may already prove challenging. Similarly, fishing itself is not a prohibited act in and of itself and determining to what extent the threshold of illegality is crossed requires careful thought.

Assessing your success of illegal commercial fishing reduction in your area, therefore, must first begin by first establishing what exactly about this activity you will set out to assess (e.g. the reduction of illegal gear available to catch fish; the reduction of the number of unlicensed fishing), then use the flowchart below (adopted from in page 16 in [Lemieux and Pickles 2020](#)) to move systematically along the decision-making chain to carry out this assessment. As such, if your goal is to evaluate several aspects of illegal commercial fishing, you may require to carry out separate assessments that will require separate (similar or different) mechanisms to understand the indicators of success.

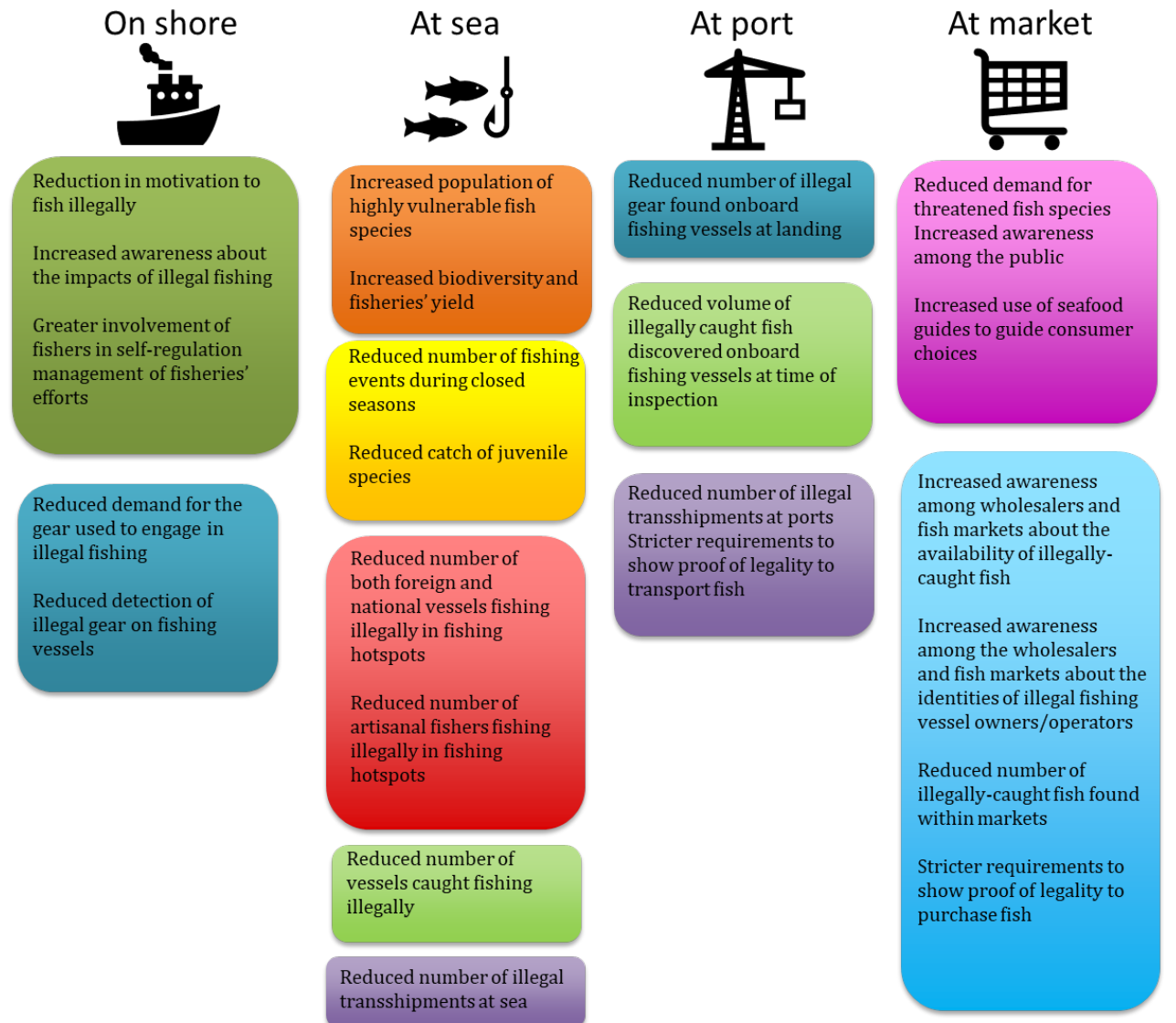


In order to conduct a thorough assessment, it is important to consider the following questions:

1. Was the response implemented as planned? Did it have to be modified? Were all parts of the response implemented in the timeframe intended?
2. After implementing the prevention strategy (or the package of measures), did the illegal commercial fishing problem that you were targeting decline? How will you measure that?

To address the second question, you will need a series of indicators tailored to the specific aspect of illegal commercial fishing you were aiming to address. The figure below provides examples of indicators that can be used to measure preventative success, by setting and analysis theme.

Indicators to measure success in preventing illegal commercial fishing, by setting and analysis theme



1. Demand and consumers	4. Gear and methods	7. Illegal fishing events
2. Illegal fishers	5. Seasonality and timing	8. Transport
3. Species targeted	6. Locations & places	9. Sale and sellers

Endnotes

- i Petrossian (2019)
- ii Pitcher & Lam (2015); Watson et al (2013)
- iii <https://fame1.spc.int/en/component/content/article/251>
- iv Andreu-Cazanave et al (2017)
- v Agnew et al (2009); Global Ocean Commission (2014)
- vi Michael et al (2017)
- vii Paul (1994)
- viii Pauly et al (1998)
- ix Long et al (2020)
- x Ferretti et al (2008)
- xi Jackson et al (2001)
- xii Pitcher & Lam (2015)
- xiii Taconet et al (2019)
- xiv Petrossian (2019)
- xv Chevallier (2017)
- xvi EJJ (2007)
- xvii Konar et al (2019), Galic & Cox (2006)
- xviii Tinch et al, 2008; Sumaila (2018)
- xix Macfadyen, et al (2016)
- xx FFA IUU quantification study 2020 update
- xxi HSTF (2006)
- xxii Petrossian (2018)
- xxiii Petrossian & Clarke (2014)
- xxiv HSTF (2006)
- xxv FAO SOFIA 2020
- xxvi Petrossian (2018)
- xxvii Petrossian et al (2020)
- xxviii Standing (2008)
- xxix Park & Stamato (2020)
- xxx Petrossian et al (2015)
- xxxi Visser & Hanich (2017)
- xxxii Lemieux & Pickles (2020)

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