

FoodPrint.



The FoodPrint of Wild Seafood



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Introduction

Over millennia, people around the globe have relied on the ocean as a source of food. Fish, shellfish and other marine life are central in many cultures, supplying vital nutrients while being the center of countless unique, delicious dishes.

Unlike pork, beef and other animal foods that were domesticated thousands of years ago, seafood is one of the last wild-collected foods eaten by a large number of people. Harvesting wild foods requires a much closer observation of ecosystems than conventional agriculture does, and relies on nature's biodiversity by utilizing a vast array of species. This means that their environmental impact, nutritional value and cultural place in the human diet vary immensely, and makes it difficult to draw simple conclusions about the appropriate role of seafood in sustainable diets. On the one hand, seafood can be a great source of protein, heart-healthy fats and other nutrients in the diet, and many public health and nutrition professionals recommend it over other animal proteins. Fish and shellfish also provide a livelihood for more than 39 million people in coastal communities worldwide.¹

On the other hand, eating seafood poses serious sustainability concerns: throughout the nineteenth and twentieth centuries, many fish and shellfish went from being a seemingly limitless source of food to being vulnerable to extinction from overfishing. Overfishing isn't the only concern, either: other environmental impacts, along with issues of labor, trade and ownership can make seafood a fraught choice for a meal. Out of the hundreds of commercially available fish and shellfish, it's hard for conscientious consumers to keep track of what's good to eat or not.

Thankfully, finding more sustainable seafood can be guided by understanding more about the seafood industry rather than by knowing everything about various species of fish. Sustainable fishing does exist, and by understanding the way that fisheries in the United States operate, we can develop simple rules to guide the most sustainable seafood purchases. This report will identify the key characteristics of sustainable seafood, explain the environmental, economic and social problems facing the industry, and offer suggestions for navigating the complicated world of seafood available to American consumers.

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What Sustainable Wild Seafood Should Be

- Sustainable wild seafood choices:
- Prioritize local sources of wild-caught fish and shellfish
- Come from a diverse array of species
- Don't include fish that are harvested above sustainable levels or through methods that cause excessive disruption to ocean ecosystems
- Return value to fishing communities

Many people think sustainable fishing is about knowing what fish are good to eat and what fish should be left in the water. But avoiding overfishing is only a small part of what makes sustainable seafood sustainable. The entire supply chain — catching, processing and distributing — matters.

Sustainable fishing starts well before boats catch fish, with careful study of how fish fit into the wider ecosystem, and how many are appropriate to catch. Because sustainability extends to communities too, the story doesn't stop there. Processing fish and selling fish should be a source of income for communities that catch them. While the pressures of a global market mean that these tasks often leave coastal communities that catch the fish, a sustainable and equitable seafood system should compensate fishermen while supplying ordinary people with fish at an affordable price.

While fish can be harvested sustainably, that doesn't mean that good management can make them into an infinite resource. While they have some distinct advantages over other animal-derived foods, fish still shouldn't be at the center of every meal. Sourcing fish appropriately is a good first step, but for consumers who are interested in following a sustainable diet, it's important to keep overall consumption in line with scientifically based recommendations.

The Basics of Fishing

Globally, the harvest of wild seafood takes many different forms, ranging from very low-impact subsistence fisheries to the floating “factory ships” that capture entire schools of fish at once. While methods and impacts vary, however, all fishing revolves around a resource no one owns outright — the ocean — and it is essential that it be managed for the well-being of people and the environment.

THE COMMONS

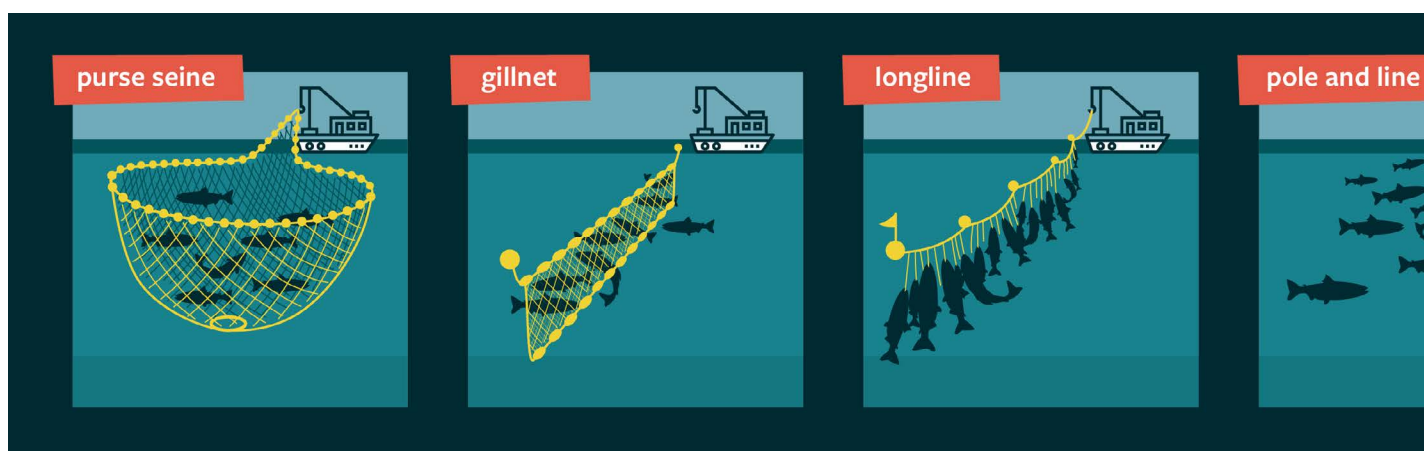
One of the most important concepts in fishing is what economists call “the commons,” which refers to limited resources that anyone can access. The ocean and its resources are one good example of the commons. Common-pool resources, like fish, are an opportunity to supply the needs of a community, but they aren’t limitless. Well-managed common-pool resources depend on cooperation between the people using those resources to use them appropriately and ensure their survival.

Without this cooperation, common pool resources are vulnerable to “the tragedy of the commons,” a situation in which individuals act in their own self-interest and take as much as they can, usually in a way that hurts the resource. For seafood, this usually means overfishing.

But as economists today point out, the tragedy of the commons is not inevitable, and fishing communities around the globe who sustainably manage their resources have proven this.² Avoiding the tragedy of the commons depends on effective coordination between people who use the resource, since those who rely on it care the most about its long-term survival. This idea forms the core of what sustainable fishing should be: that fishermen should have decision-making power over fisheries management. A well-managed fishery should therefore incorporate the well-being of the ecosystem and the well-being of the community, alike.

TYPES OF FISHING OPERATIONS

Fishing might seem simple, but it covers a huge range of different practices, all of which have different impacts on fish and the environment. The scale of fishing operations and the choice of fishing gear can impact the efficiency of harvesting, the amount of fuel used by fishing boats, bycatch risks and disruption to the surrounding environment. For consumers, understanding



a little about fishing scale and methods — particularly those that present the biggest environmental hazards — can be a helpful way to understand what choices are most sustainable when information about how fish were caught is available.

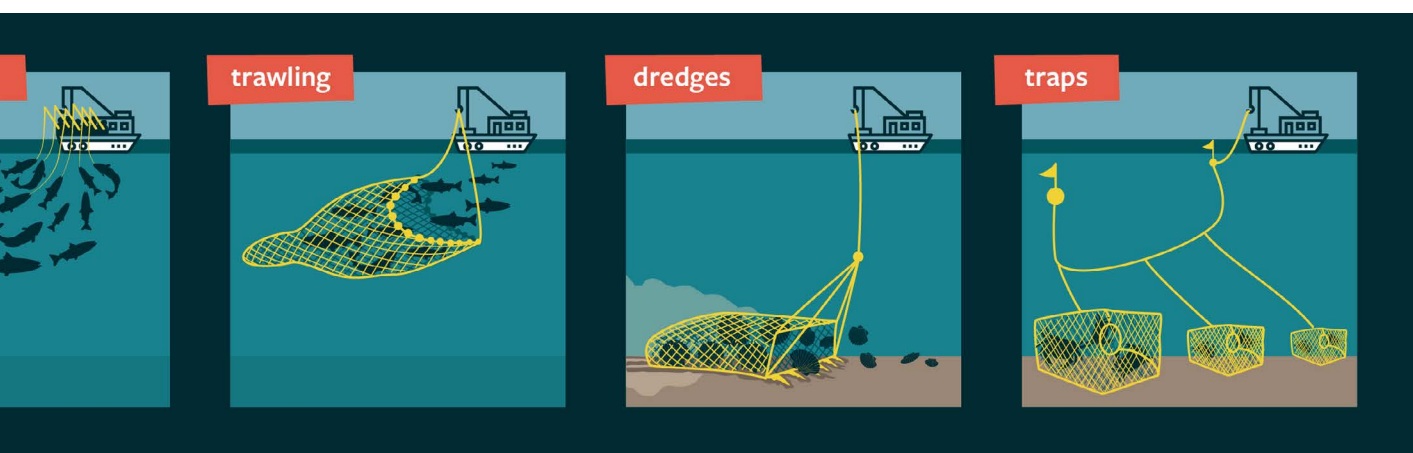
The size of a fishing operation, both in terms of boat size and fleet size, is often the main factor that determines how sustainable it is. Fishing ranges from the activities of lone pole-and line fishermen in recreational and subsistence fisheries to huge “factory ships” which catch and process thousands of pounds of fish at once. There isn’t a one-size-fits-all rule for what size boats are sustainable, but while some ecosystems can sustain large-scale operations from these giant boats, most can’t. The explosion of factory ships across global oceans fueled the twentieth century’s overfishing crisis. Many of the world’s best-managed fisheries are fished mainly by fishermen in small and mid-sized boats. For all of the fishing methods listed below, there are examples of small-scale and Indigenous harvesters who work within ecosystem boundaries to make sure catches are sustainable and that disruption to other species is minimal. Once those operations are scaled up by industrial harvesters, however, more problems begin to appear.

Purse Seine

Purse Seine nets are long walls of netting that fishing boats use to encircle large schools of fish. Once a school is in the net, the fishermen gradually gather the net and pull it out of the water to capture the entire school at once.³ Purse seine nets are commonly used to capture both small fish like sardines and large, schooling fish like tuna. Purse seine nets in the open ocean can be a sustainable way to harvest fish with minimal bycatch, but in areas where multiple species are present, the risk is much higher. Because they target schools of fish, they can also capture other marine animals that follow fish schools, particularly dolphins and seabirds, making them a poor choice in areas with vulnerable populations of non-target wildlife.⁴

Gillnets

Like purse seines, gillnets are large, vertical nets deployed into the water. Unlike a purse seine, however, a gillnet does not gather fish into a cluster. Instead, gillnets rely on animals being stuck by their head (often behind the gills) or other body parts, before the entire net is reeled in for collection.⁵ Gillnets do prevent smaller animals and immature fish from being caught accidentally, but larger animals can become entangled in the nets, which means they can present serious bycatch concerns when they aren’t carefully maintained by responsible harvesters.⁶ Because they can be spread out over many miles, broken gillnets aren’t uncommon, and present a serious risk to marine life as an entanglement-prone form of plastic pollution.



Longlines

Longlines are trailing fishing lines with multiple baited hooks that can be deployed at any level of the water, including the surface. Longlines can be an effective way to catch large fish like tuna. When they are floating on the surface, longlines can be dangerous to seabirds, which may be accidentally hooked.⁷

Pole and Line

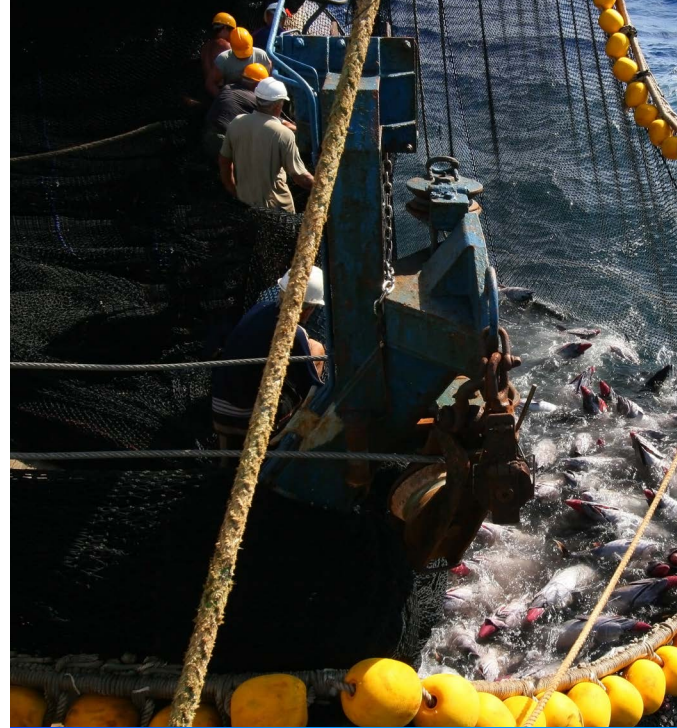
Pole and line fishing is perhaps the most familiar method, given its popularity with recreational fishers around the world. Pole and line fishing generally catches a single fish at once. On large boats with many crew members, this can be an efficient and sustainable way of catching larger fish like tuna, and has a relatively low risk of harming non-target species since bycatch can be released quickly. It is rarely used to capture very small fish, however.

Trawling

Trawlers drag nets through the water, catching fish in the water column or at the bottom. Large-scale bottom trawling, which is used to catch bottom-dwelling fish like cod, can be highly destructive to seafloor environments and scoop up a large quantity of bycatch. Mid-water trawling, commonly used for shrimp, has similar bycatch problems. Because heavy trawling equipment is quite heavy, trawling can be very fuel intensive, so fish and shellfish caught with trawlers can have a very high carbon footprint.⁸ On top of high fuel use, bottom trawling can disturb seafloor sediments and cause them to release large amounts of carbon dioxide, potentially emitting the same amount of carbon as the entire aviation industry annually.⁹ Not all trawlers have these problems, however: smaller boats that use small trawls make monitoring and preventing bycatch significantly easier.

Dredges

Dredges are used to capture sea life that lives within the seafloor itself, especially wild clams, scallops and oysters. Dredges sometimes use water jets to loosen sediments, scooping the seafloor into a net that filters out sediments and leaves shellfish behind.¹⁰ Like bottom trawlers, dredges can be destructive to the seafloor. However, shellfish fisheries in the United States operate in limited areas which are increasingly managed like offshore ranches rather than expanding into new territories, limiting the industry's impact.¹¹





Purse seine



Gillnet



Trawler

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Traps

Traps are most often used to catch crabs and lobsters, though fishermen around the world use them to catch a variety of species. Baited traps are left on the seafloor for a short time and generally marked by buoys. While traps can be a sustainable way to harvest species like lobsters, they can be lost at sea if they become separated from their buoys.¹² Buoy lines also represent an entanglement hazard for whales and other marine mammals, so traps must be located away from migration routes and feeding areas.¹³

The Problems of Wild-Caught Seafood

As the only part of the modern diet that comes from the wild rather than agriculture, wild-caught seafood has a unique foodprint, and the fishing industry faces a number of critical challenges to its environmental sustainability. Many of these problems can be addressed through effective fisheries management, but there aren't one-size-fits-all approaches that work for every fishery. In many cases, poor fisheries policy can contribute to other problems, especially corporate consolidation, which disempowers fishermen and removes control of fisheries from the people who are most invested in their long term survival.

In every case, the problems of wild-caught seafood boil down to simple problems: profit-maximizing behavior drives fishing that is inappropriately scaled or environmentally destructive.

OVERFISHING

Overfishing isn't a new concept, with archaeological evidence suggesting that Europeans were overexploiting some freshwater fish stocks as early as 1000 years ago, pushing people to rely more on marine fish stocks, which were initially so abundant that they were viewed as infinite.¹⁴ But as technological innovations shrank the oceans and allowed for more efficient harvesting of fish and other species, it quickly became apparent that the ocean's resources could also be depleted. Whales, oysters and other animals experienced rapid population declines throughout the nineteenth and early twentieth centuries as demand for them outpaced their ability to recover, setting the stage for the overfishing crisis of the twentieth century.

Evolution in the fishing industry led to the development of more sophisticated boats that could catch, process and freeze huge numbers of fish. These vessels, called "factory ships," allowed for unprecedented overharvesting. While many fisheries biologists sounded the alarm that these catches were unsustainable, catch levels in many stocks stayed constant, which led some in the industry to claim the scientists were wrong. In reality, however, the improvements in fishing gear, and the fact that very low fish populations group together, were simply masking the fact that fish populations were in dramatic decline.¹⁵ In the



Above: Ships using purse seine nets fish off the California coast

late twentieth century, the collapse of several fisheries indicated that overfishing populations to extinction was not only possible, but quite likely without aggressive action.

Atlantic Cod is one of the most well-known examples of fishery collapse. When European colonists first arrived along the Northeastern coast of North America, cod were so plentiful that they provided one of the earliest profitable industries. But as factory ships harvested cod well above its replacement rate throughout the twentieth century, scientists warned that the population was headed for trouble.

Even after the United States and Canada both imposed restrictions designed to protect the fishery from international factory ships, they failed to assess their own policies and set appropriate catch limits, leading to the dramatic collapse of the fishery in 1992, when the number of cod abruptly plunged to just one percent of its historical highs.¹⁶

Cod populations still have yet to recover from their collapse: U.S. fishermen who landed more than 100 million pounds of the fish in the 1980s landed only 1.6 million pounds in 2020, a record low, which indicates that cod stocks in the Northwest Atlantic are far from recovered.¹⁷ This has serious implications for other wildlife, especially marine mammals that rely on cod for food. While scientists and regulators are working to restore cod stocks so they can once again sustain the ecosystem and New England fishing communities, the road to recovery after such a dramatic collapse is long, and underscores the importance of avoiding collapse through science-informed regulation.

Avoiding overfishing relies on effective stock assessments and knowing the life cycle of fish involved. Fish that are harvested above the rate they can reproduce and maintain a stable population are “experiencing overfishing.” Fish stocks that experience overfishing may maintain a healthy population for some time, meaning that they are not technically considered “overfished,” but this is a precarious position: if the overfishing continues, they will eventually be so reduced in number that their survival is jeopardized. At this point, the fish stock is marked as overfished. Even when regulators impose moratoriums on an overfished fishery (so that it is not experiencing overfishing), the stock may remain overfished for some time as it recovers.

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In the U.S., fisheries management has been fairly effective at rehabilitating overfished stocks in recent decades. Of the stocks that NOAA manages, 92 percent are not being subject to overfishing, and 80 percent are not currently overfished.¹⁸

Worldwide, the statistics are less encouraging. In 1974, only 10 percent of fish stocks were overfished. Today, that number has grown to 34 percent, tripling in only four decades.¹⁹ Because robust estimates for every fish stock are not available, overfishing in some areas may be even more serious. Still, researchers point out that while overfishing globally continues, it has slowed down in recent years.

BYCATCH

Bycatch is the accidental capture of species that fishermen were not targeting. Some fishing methods, like bottom trawling and purse seine nets, are more prone to bycatch than others.²⁰

Depending on the species, several things can happen to bycatch: if it is a commercially desirable species, fishermen will often sell it with the other fish. If it survives capture, bycatch can also be released back into the water, though many species, especially fish that experience a significant pressure change when they come up from deep water, don't survive being caught.

Bycatch isn't limited to fish: sea turtles, marine mammals and seabirds can all be unintentionally snagged in fishing gear. Because these species don't have gills, getting caught in fishing gear often means suffocation and death. Selecting appropriate fishing gear can minimize bycatch of these species, as well as avoiding fishing in areas that are along migration routes for species like whales and turtles.

Bycatch can also unintentionally contribute to overfishing of stocks that need time to recover, since some healthy fish stocks live in the same environments as those that are under stress: in the North Atlantic, for example, cod is common bycatch in the haddock fishery, since both are trawl-caught fish that live near the seafloor.²¹

Worldwide, bycatch is a serious problem, but it can be difficult to get a good gauge on its scope. Sometimes non-target species are caught and sold with the target species, while some bycatch is discarded outright. This difference in definition can lead to huge variation in bycatch estimates.²² Given that discards don't become food, however, they are the most wasteful form of bycatch, and a recent estimate suggests that around ten percent of all catches are discarded. The majority of these catches come from large scale, industrial fishing operations, particularly those that are bottom trawling.²³

HABITAT DESTRUCTION

While fish often travel large distances to feed, many species return to the same areas every year to breed. For species like salmon, which return to specific tributaries of rivers, any disruption along that migration route can seriously disrupt their ability to reproduce, leading to a rapid population decline. This impacts both the people that rely on the fishery and the ecosystem that depends on the annual return of the fish. Dams and other structures built on the water can block fish migration, while development along the waterfront can degrade water quality with soil and chemical runoff.^{24 25} These factors, in tandem with high fishing pressure, led to the near-extinction of wild Atlantic salmon in North America in the twentieth century. Currently, mining projects in Alaska threaten various salmon species that depend on the clean waters in the area.

It isn't just migratory fish that are negatively impacted by habitat destruction. Immobile species, like clams and oysters, and bottom-dwelling fish, like flounder and halibut, are also especially vulnerable to disruptions in their habitat. Dredges and trawlers can stir up sediment on the ocean floor, burying organisms or ruining water quality. Species that live on the bottom of the ocean are also particularly vulnerable to eutrophication, a phenomenon that occurs when water is too rich

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Ghost net tangled in a coral reef

in nutrients that run off from land-based farms. Excess fertilizers cause algal blooms, which quickly die and decompose, depleting water of oxygen and creating dead zones where fish and other animals suffocate. The Gulf of Mexico is home to one of the world's largest dead zones, an area larger than 6,000 square miles where shrimp, snapper and other species have a hard time surviving due to low-oxygen conditions.²⁶

CLIMATE CHANGE

As the concentrations of greenhouse gases in the atmosphere increase, the surface of the earth is warming. Ocean currents play a critical role in regulating earth's temperature, moving warm and cold water around the globe to help balance temperatures. But as water temperatures rise, these cycles become disrupted, changing the flow of nutrients and allowing some water bodies to warm dramatically faster than others. Every form of ocean life, from plankton to marine mammals, relies on water temperatures within a certain range, and as those ranges shift, animals must move or face extinction. Fish and shellfish stuck in areas where water is too warm may not be able to properly reproduce or find food, while other species that have moved to cooler areas may disrupt the local ecosystem and cause big imbalances in food chains. Many of the most biodiverse areas in the ocean, like kelp forests and coral reefs, are at particular risk, as these habitats can't adapt to warming temperatures quickly enough.

Warming itself isn't the only problem posed by climate change. As water becomes more saturated with carbon dioxide, it becomes more acidic. This presents serious challenges for all marine life, especially animals that build shells or calcium-rich skeletons. Corals, mollusks, crustaceans and more are experiencing lower survival rates as water bodies acidify, leaving the food webs that depend on them in trouble.²⁷

The environmental challenges presented by climate change also make fisheries management more difficult. Marine environments are harder to observe than terrestrial ones, and the food webs that sustain many fisheries are complicated, making it hard to predict which species will encounter difficulties in finding food or reproducing. Some populations — like king salmon in the Pacific Northwest — are experiencing declines that researchers primarily attribute to a warming climate.²⁸ Meanwhile, others, like Alaskan sockeye salmon, are experiencing unprecedented population booms.

Climate change may create winners and losers among individual fish stocks, but broadly speaking, fisheries scientists agree that without changes in management, climate change is already hurting fisheries around the world as food becomes less available and habitats become inhospitable. The latest comprehensive report from the Intergovernmental Panel on Climate Change estimates that the impacts of climate change have already reduced global fisheries yields by at least four percent. Without taking dramatic steps to reduce emissions, this decline will become more stark, with the most serious consequences affecting Indigenous people and others who rely on small fisheries worldwide.²⁹



Current and Historical Problems in Fisheries Management

The problems of wild-caught seafood aren't just ecological. Because seafood is a source of food and income for communities, disparities in access to it have social consequences. Historically, that access hasn't always been a given for everyone, and many of the equity problems associated with fishing — particularly for Indigenous and Black fishing communities — continue today.

Fisheries management decisions today also have social impacts, and while effective regulation is critical for avoiding many of the environmental problems in the wild seafood industry, poorly implemented practices like catch shares can ultimately worsen social and environmental problems when fishermen aren't included in the decision-making process. These regulatory structures ultimately privatize access to the ocean and allow corporate interests to accumulate power and influence, taking income and development opportunities away from coastal communities.

While there are dangers to some forms of fisheries management, its absence is also a serious concern in many regions around the world. Because most fish populations don't exist solely within one country's territory, poor fisheries management in one area can impact populations of fish even in other areas with more complete regulatory structures. International waters, which sit outside the jurisdiction of any single country, present another problem, and protecting fish stocks worldwide requires closing these regulatory loopholes. On the international market, illegal and unreported catches, seafood fraud and other practices that take advantage of these loopholes often undermine both the efforts of sustainability-minded fishermen and also weaken consumer trust in the existence of sustainable fisheries.

DISPOSSESSION OF BLACK AND INDIGENOUS FISHING COMMUNITIES

While fishermen today are facing serious threats to their livelihoods, it is important to recognize that for some groups — especially Indigenous and Black fishermen — the history of fishing in the U.S. has always been one of displacement, deprivation and violation. The Indigenous people of North America were the first fisheries managers on the continent, and for millenia, tribes from coast to coast have sustainably harvested fish and shellfish, paying particular attention to the ecological roles that each species occupied. Fish have been so central to many groups' identities that they're featured heavily in art, culture and religion.

Unfortunately, the arrival of European colonists in the Americas would be devastating for Indigenous people, with white settlers violently pushing Indigenous people from their lands and separating them from the resources they had always depended on. While Indigenous fishing rights are theoretically protected both on and off reservations, the combined effects of overfishing, habitat destruction and more mean that Indigenous people's access to fish is often compromised, threatening food security in communities that still depend mainly on wild-caught fish for survival.³⁰

Likewise, Black Americans have been involved in fishing in the U.S. since their arrival as enslaved people. Enslaved people often worked on fishing boats, operating gear or working on the docks in port towns. For free Black people, the sea offered relative freedom compared to the land, and many Black people operated successful fishing and oystering businesses in the eighteenth and nineteenth centuries before white fishermen felt threatened and drove them out of the business.³¹ This pushed Black fishermen to new communities, where that cycle often took place again.



Above: A man fishes for salmon using Indigenous techniques in the Deschutes River, Oregon

Being pushed to the outskirts of land allowed for the evolution of unique cultures that depended on the water, like the Gullah people of the Southeast.³²

Sadly, the cultural legacy of Black fishing cultures is at risk of disappearing entirely. The once-un-desirable lands where people like the Gullah made their homes are now high-value waterfront property, and many Black fishing communities are facing displacement on account of development.³³ Much like Black farmers, who are often discriminated against for loans and aid programs, Black fishermen across the U.S. face similar struggles that make their financial survival much more tenuous than that of their white counterparts. Environmental disasters, like Hurricane Katrina or the 2010 Gulf oil spill, have pushed many multi-generation Black fishermen over the financial edge, threatening the survival of both their businesses and their cultural heritage.³⁴

CATCH SHARES AND CONSOLIDATION

While fisheries can be managed through several different practices that put catch limits on communally managed fisheries, one of the most concerning trends in U.S. fisheries management is the privatization of ocean resources through catch shares programs.

In the United States, several fisheries are managed through Individual Transferable Quotas, or ITQs. Sometimes called catch shares, ITQs are fishing quotas given to individual fishermen or fishing companies. For each of the 17 fisheries managed through catch shares, managers determine a total allowable catch, then spread this between quota holders, who can either catch the fish themselves or sell their portion of the quota to another holder.³⁵ Many economists and environmentalists are in favor of ITQs, since they set firm limits on fish catches that prevent overfishing and

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theoretically encourage fishermen to be active partners in conserving their own financial futures. They also help prevent some of the more dangerous practices that other management practices encourage, like the desperate race to fish in deadly weather conditions when fisheries managers simply close the fishing season for all but a few weeks.³⁶

But ultimately, catch sharing programs represent an attempt to privatize the commons, taking the public resources of the sea and allowing only a few people access to them.

In practice, the rollout of catch share programs has been damaging to many fishing communities, with regulators giving out a limited number of quotas and effectively buying many fishermen out of the business outright. By allocating quotas based on historical catches, the initial system disadvantaged small fishermen over larger companies who were able to start out with bigger quotas. Fishermen who received only small quotas stood little chance of making a profit with such a limited catch, effectively forcing many to sell their shares and leave the fishery.

This allows those remaining fishermen to quickly accumulate more and more catch shares for a fishery that becomes less and less competitive. This consolidation has big consequences for fishing communities, where jobs can dry up quickly even as overall catches stay steady: after the Alaskan Crab fishery adopted catch shares, more than 1,350 jobs disappeared from the industry, both on boats and in processing and support industries.³⁷ In Kodiak, Alaska, a hub for the industry, this rippled through the entire community as millions in lost wages no longer circulate through the local economy. This streamlining of supply chains pays off well for the companies who control the shares, who cut their own costs dramatically while claiming a larger share of the profits.

But catch shares aren't just bad for communities: they can end up being counterproductive to conservation goals too. As a few remaining fishermen accumulate quotas, their ability to control the market — and manipulate regulators — grows. When New England instituted catch shares, for example, many quotas were purchased by a powerful fisherman named Carlos Rafael, whose abuse of the catch share system earned him the nickname "the Codfather."³⁸ By buying up quotas and then using that capital to own an entire processing and distribution network, the Codfather's boats were able to falsify catch records, misrepresenting vulnerable, high-demand species to regulators as less vulnerable species like hake. So much of the Codfather's catch data was falsified that NOAA stock assessments had to be recalibrated to account for the illegal fishing that harmed populations of several species.³⁹

Even after the Codfather was sent to prison, his legacy continues: a highly consolidated seafood company, Blue Harvest, bought many of

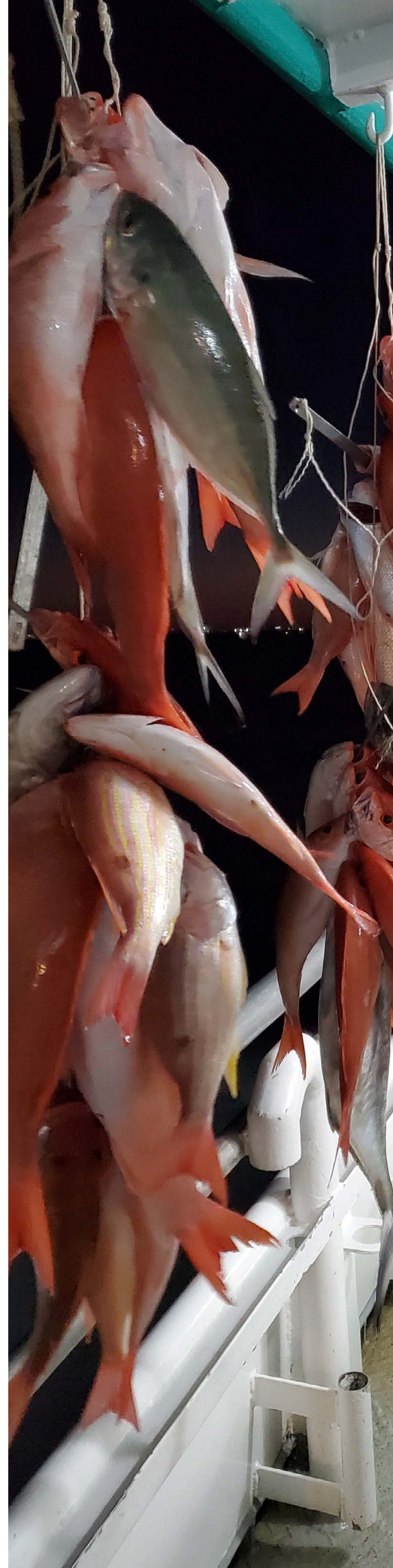




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his boats. Today, the company and its private equity backers control at least 12 percent of the groundfish quotas directly and may be leasing many more, buying up or leasing permits from fishermen who can't afford to fish their own shares while barely compensating their own fishermen.⁴⁰

The Harms of Catch Shares: The Red Snapper Fishery

Many fishermen have been hurt by the quota system. Ryan Bradley is a fifth-generation fisherman in Mississippi who catches Red Snapper. Popular with both recreational and commercial fishermen, red snapper suffered serious population declines over the course of the twentieth century, making it a prime target for catch share programs.

When the catch share program was first implemented in 2007, quotas were allocated to existing fishermen. Faced with a more restricted market and an opportunity to sell their shares and equipment, many chose to leave the industry, allowing wealthier fishermen to expand their access to the shares. While non-fishermen weren't originally allowed to own shares, the fishery later opened to others, which turned the shares into an attractive investment for outsiders, further exacerbating the high prices.

Since then, quota prices have steadily increased, making them an obstacle for the remaining independent fishermen. Bradley estimates that 70-80 percent of his fishing revenues go to cover the cost of the quotas, leaving them with an even thinner profit margin than before the implementation of the system. This means that many fishermen have been pushed out of the system or no longer own their own shares.

Today, he estimates that 38 percent of red snapper shares aren't owned by fishermen, but by investors, restaurant groups and others. Fishermen who could no longer afford to buy their own quotas often work for these investors, who adopt no risk or liability related to keeping up the fishing operation, leaving the fishermen they work with to shoulder all the costs of the fishing operations while making very little money. Even when fishermen own their own quotas, they have few options for selling their fish, meaning that the system is increasingly dominated by a few buyers (often vertically integrated restaurant groups) who set prices for the industry.

While the implementation of catch shares has had enormous costs for fishing communities in the Gulf, it hasn't helped red snapper bounce back as quickly as hoped: recreational fishing permits remain a vulnerable loophole, and the relative lack of enforcement means that unreported catches (especially from consolidated operations) still occur. The most recent analysis shows that while the population has increased somewhat, it still lags below target levels, particularly for the large superspawners that can help bolster the fish's numbers.⁴¹

INTERNATIONAL WATERS: A HUGE LOOPHOLE

In the U.S., NOAA manages all fisheries within 200 miles of the coast, the area known as the Exclusive Economic Zone (EEZ). Outside of this, however, sit international waters, which have far fewer rules on who can fish, what they can harvest and how much they can take. Poor protections for fish in international waters mean that they are often subject to illegal, unreported and unregulated (IUU) fishing. Because fish don't pay attention to national boundaries and often migrate across huge stretches of ocean, this can even have serious consequences for stocks within a country's EEZ.

Much of the ocean is managed by coalitions of governments that come together to form a Regional Fisheries Management Organization (RFMO).⁴² In theory, RFMOs work like national fisheries management organizations to manage particular areas or particular stocks. In one form or another, RFMOs cover nearly 90 percent of the ocean, but they do little in practice to prevent overfishing: more than half the stocks managed by RFMOs are either overfished or experiencing overfishing.⁴³

Many of the enforcement duties for ships fall to the country where the ship is registered, called the flag state. But many flag states either fail to regulate boats registered in their name or opportunistically register boats that wish to fish illegally. Boats can also transfer their catches to other ships at sea, allowing them to avoid rules they might face when they go back to port. International fisheries observers, who board boats to monitor catches, often face bribery, intimidation and violence, with several observers dying in suspicious circumstances at sea.⁴⁴

This system mirrors the complex and opaque nature of seafood processing, and represents a serious challenge for both regulators and consumers who want to make more sustainable choices.

Fraud and Unregulated International Trade

International trade often compounds the problems of poor regulation on international fishing. Much of the seafood sold within the U.S. is processed abroad, even when it is caught domestically. This opens the door for a large amount of illegal and unreported seafood to enter the U.S. According to recent statistics, more than \$2 billion of U.S. seafood imports are made up of the products of illegal, unreported and unregulated (IUU) fishing.⁴⁵

Seafood fraud comes in many forms: vendors can misrepresent the type of fish being sold, where it comes from, and how it was processed.⁴⁶ The industry's lack of transparency is the root of the problem, but without more robust international regulations, it's unlikely that the prevalence of IUU fishing will decrease.





Above: Scallop shells collected after dredging and processing

This represents a challenge for sustainability, as it's hard to examine sustainability claims or avoid overfished stocks. It also represents a challenge for domestic seafood producers, whose prices are undercut by the constant inflow of illegally sourced fish. IUU also presents a serious human rights issue: underpaid and exploited workers often man boats after being lied to about the working conditions, time at sea and pay they can expect, a form of modern-day slavery that's particularly common in Southeast Asian fisheries.⁴⁷ There are some legislative actions in the works to combat this, but overall, the best way to avoid IUU seafood is to buy domestic seafood from local sources.⁴⁸

How Sustainable Fisheries Operate

THE ECOLOGY OF SUSTAINABLE FISHING

The sustainable harvesting of seafood requires carefully observing the environments that it comes from and managing them to ensure their long-term stability, not only as a source of food and income for communities, but also for the incredible biodiversity marine ecosystems foster. Aquatic ecosystems — which need healthy fish stocks to function properly — produce an immense amount of oxygen for the atmosphere and sequester huge amounts of carbon dioxide, acting as a reservoir that protects the planet from climate change.

For fishermen, this means taking an appropriate amount of fish using minimally destructive fishing gear, and doing so only in times and places that won't cause too much stress on individual fish stocks or the entire ecosystem.

Under good management, fish stocks are harvested at a rate that allows the population to remain stable over time, rather than declining or being vulnerable to shocks from climate change or other environmental factors. In an undisturbed ecosystem, populations of fish and other animals don't grow indefinitely: they eventually reach a stable population that matches the ecosystem's carrying capacity, the amount of food and other resources it can supply. Because their birth and death rates are the same, populations at the carrying capacity are not growing. If fishermen harvest some of the fish, they do lower the population, but they also give it room to grow. As long as fishermen don't harvest fish faster than the population can reproduce, the fish stock will remain stable.

Regulating Sustainable Fisheries for the Environment

A number of tools exist that can help ensure that fish aren't overharvested, but most involve some kind of catch limit. In the past, fisheries management assumed that the point where fish had the highest growth rate, called the maximum sustainable yield, was the best way to manage a fish stock since it maximized the amount of fish that fishermen could take without putting the population into decline.

In more recent years, that view has gotten more complex. Maximum sustainable yield might ensure the highest possible catches, but it doesn't always leave the most ecologically appropriate amount of fish in the water. Environmental changes mean that the ecosystem's carrying capacity could change, and other pressures on fish stocks (such as predators, habitat destruction and more) could abruptly put a fully-exploited fish stock over the edge.

Fish and other animals caught as wild seafood don't exist in vacuums: they are part of ever-changing ecosystems, and well-managed fisheries should reflect this by focusing on the integrity of the entire ecosystem rather than just looking at a single species. In community-based, scientifically informed management, this means setting catch limits for the entire fishery that are sensitive to the populations of other fish species, as many commercially-fished species are in complicated food webs together. If a small prey fish is overharvested, this can impact the populations of predator fish that depend on it, for example. This ecosystem-based approach means that catch limits in well managed fisheries are often lower than the maximum sustainable yield.

Aside from catch limits, other restrictions on fishing help protect fish and their ecosystems. Many fisheries ban the capture of young fish that haven't had the chance to reproduce. They may also protect the oldest, largest fish, known as megaspawners, because they can often reproduce at a much higher rate than other fish. Seasonal restrictions on fishing can protect fish during vulnerable spawning windows and allow them to reproduce unimpeded. Restrictions on fishing in specific places — marine protected areas — allows fish a chance to recover and increase their population within the protected zone and outside of it.⁴⁹

Minimizing ecosystem disruption also requires fishing in ways that don't destroy delicate habitat like reefs and the seafloor; so, choosing the right fishing gear and methods is important. Methods like bottom trawls are often inappropriate in areas that have a rich or delicate seafloor ecosystem, for example. Appropriate fishing gear also helps minimize bycatch.

SUSTAINABLE SEAFOOD'S ROLE IN COMMUNITIES AND CULTURES

Seafood is more than just a source of nutrition: for coastal communities around the world, fishing is a source of income, tradition and cultural pride. More than 39 million people depend directly on wild fisheries for employment, with more than 100 million involved in jobs that help support

the industry.⁵⁰ Fishing — and the long-term viability of fisheries — is most important to subsistence fishers in the developing world, who use most of their catches to feed their families and communities. On a global scale, over 22 million fishermen are involved in small-scale fishing.⁵¹ These subsistence and small scale fisheries are critical to the economic well-being of their communities, especially for women who are involved in fishing and fish processing. Many Indigenous communities also rely on functioning fisheries for their livelihoods, and preserving their traditional fishing practices is integral to preserving their cultural heritage.

Globally, small-scale fisheries provide critical protein and micronutrients. Often, these nutrients — including iron, vitamin B-12, and omega-3 fatty acids — are difficult to find in plant-based foods and prohibitively expensive for many people to get from other animal proteins.⁵² Researchers estimate that in the world's most food-insecure countries, seafood could sustainably provide enough of these often-missing nutrients for everyone living within 100 kilometers of the coast, supplying millions of people with nutrients that are critical to development and functioning.⁵³

While small-scale fisheries are vital to so many people's livelihoods, they are often overshadowed by larger vessels, which make up the world's industrial fishing fleet. Many of these vessels operate in less-regulated international waters, taking unsustainable amounts of fish and processing them for use in aquaculture feed and other non-food products, as well as harvesting high-value food species like tuna at unsustainable rates.





Regulating Sustainable Fisheries for People

Maintaining productive fisheries that will last multiple generations requires effective fishery management, and while policies like catch limits are informed by science, they also have a big impact on fishing communities. It's important that the people who use and depend on these resources have autonomy over the rules of the fishery and how those rules are enforced. While some, like the Maine lobster fishery, have an extensive history of good governance and self-enforcement among fishermen, this isn't always the case. In recent years, catch share programs and other management strategies have failed to protect fishermen, gutting fishing communities and allowing large consolidated fishing interests to have too much say on the rules of a fishery, usually to the detriment of the environment.

To balance these interests, fisheries management should rest on both scientific data and community input. Scientific input is also critical to the effective governance of fisheries, since catch limits and other regulations high-quality assessments of fish stocks. This data can be gathered directly by scientists, or calculated based on the reported catches of fishermen. This collaborative approach is key to ensuring that the most current, high-quality data guides decision making.

This means that there isn't a one-size-fits-all approach to management that's effective. Limitations that are imposed with community input (such as controls on the length of a fishing season, catch limits for certain species and more) can still be effective tools that don't rely on privatizing the ocean.

Because most fish populations don't exist solely within one country's territory, poor fisheries management in one area can impact populations of fish even in other areas with more complete regulatory structures. International waters, which sit outside the jurisdiction of any single country, present another problem, and protecting fish stocks worldwide requires closing these regulatory loopholes. The creation of tighter international regulations and more extensive marine protected areas (MPAs) could have enormous benefits for both fish and fishermen.

SEAFOOD SUPPLY CHAINS

Seafood supply chains today can be convoluted: fish often make multiple trips across international borders for processing, packaging and sale, in a network that makes tracing any single fish back to its origin nearly impossible. This enables fraud and illegal sales while expending valuable resources and diminishing the amount of money fishermen and their communities receive.

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This is a far cry from how seafood supply chains should operate.

Ideally, seafood supply chains should be as short as possible, getting fish from the dock to consumers quickly, minimizing costs for buyers and returning as much of the value to fishing communities without losing too much to middlemen. When processing and other steps are involved, they should prioritize transparency, making the fish traceable back to its original source. While it's often cheaper to process fish overseas, fishing communities traditionally processed fish themselves in industries that kept value in the communities.

Buying locally caught fish directly from fishermen is the easiest way to accomplish this, but it isn't always possible. Thankfully, fishermen-owned cooperatives and other business models allow for direct sales of high-quality, flash-frozen or canned seafood over longer distances, making it possible for people to enjoy fish that come from a traceable supply chain.



THE ROLE OF SEAFOOD IN SUSTAINABLE DIETS

Among food system experts, there's debate over the appropriate role of seafood in sustainable diets. Given the variable state of fish stocks worldwide and mounting concern over the state of the oceans, some activists have called for a moratorium on all fish consumption, arguing that humans have enough other food sources, making fish and other seafood an unnecessary indulgence. It's true that seafood — like any animal product — isn't essential to the human diet. While it does supply protein and micronutrients, these can be sourced from other foods. But other foods aren't universally available or affordable, so seafood currently provides critical nutrition to millions of people in the developing world at a relatively low cost.

But what about seafood consumption among people in higher-income countries? Should they abstain from eating fish if they can afford to? Balancing seafood's nutritional benefits, cultural significance and economic importance against environmental concerns means that the answer isn't so black and white.

Sustainability is multidimensional, and incorporates factors ranging from greenhouse gas emissions to impacts on biodiversity. As a wild-sourced food, seafood is often assessed mainly by how it impacts fish populations and the surrounding food web. By these measures, fish are variable, and appropriate selection of fish can make a big difference. Fish that sit lower in the food web — generally smaller species, such as anchovies, sardines and mackerel — have higher populations that are often more resilient than predatory fish that sit higher up on the food chain, such as salmon or tuna. Unfortunately, those predatory species that are most at risk for overharvesting are also some of the most popular. Sustainably consuming seafood means not only limiting choices to fish from well-managed fisheries, but also broadening choices away from just the most popular species to include fish from other stocks that experience less pressure.

But even if catches are well-sourced, is there a limit on how much fish that people should eat? Currently, the world's fisheries produce about 84 million tonnes of fish.⁵⁴ Many of these stocks

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are poorly regulated, and researchers estimate that the current catch levels are probably at their upper limit under current management. At today's levels, this translates to about 10.6 kilograms of wild seafood per person annually, or 204 grams a week, just shy of the 226 grams (8 oz) recommended by the U.S. dietary guidelines.⁵⁵ However, not all of the fish caught globally can be so equally distributed, and given that 20 million tonnes of that 84 million go to non-food uses, this doesn't perfectly represent fish availability.⁵⁶

But there's potential for the world's fish catch to feed more people. Up to 90 percent of non-food fish could be used to feed people directly rather than becoming fish oil and fish meal for aquaculture feed. Redirecting these incredibly productive fisheries — including the world's most-caught fish, the Peruvian anchoveta, at over 7 million tonnes annually — would add a substantial amount of potential food to the table.⁵⁷

Effective management could also make a big difference. Only 22 percent of fisheries today are under effective management systems.⁵⁸ But these fisheries are more productive than those that are left unmanaged, with intensively managed fisheries averaging about twice the abundance of fish as those without management.⁵⁹ Researchers estimate that under optimal management, wild fisheries globally could provide up to 14 percent more food than they do today while allowing overstressed stocks to recover.⁶⁰

All of this data suggests that there's still potential for seafood to be a significant source of nutrition worldwide without causing ecosystem collapse, as some activists have warned, and that there may even be room for growth that helps foster more resilient marine ecosystems. And while it's true that most consumers in high-income countries could eat other foods, the fact that fisheries are geographically tethered means that people's abstaining from fish in one area doesn't bolster struggling fisheries elsewhere, or give more fish to people who need it.

If there's room for the average person to eat a serving or two of wild seafood a week, it's worth stacking wild seafood up against other foods to examine its other benefits. Among other animal foods, wild-caught seafood has several advantages. Unlike livestock and even farmed fish, which are fed crop-based diets, wild-caught seafood has no land footprint, limiting its impacts on land-based biodiversity and eliminating the negative impacts on soil, freshwater quality and water availability associated with industrial crop and livestock production.⁶¹ Synthetic pesticides and fertilizers, which both damage surrounding ecosystems and add to the overall carbon footprint of land-based foods, are also missing from wild seafood's footprint.

Wild-caught seafood can also offer a smaller carbon footprint than land-based livestock, though this varies significantly based on species and fishing method. Energy-intensive fishing methods, like bottom trawling, use a lot of fuel for relatively few fish, making species caught this way (such as shrimp and bottom-dwelling fish like cod) carbon intensive. On the other hand, small fish that live in open water are among the most carbon-efficient foods in terms of overall nutrient density, providing more critical nutrients for fewer emissions than many other plant and animal foods.

As a growing world population places further demand on the planet's resources, seafood resources can't grow enough to completely supply the recommended intake for most people on the planet. And industry-driven solutions to change that, like corporatized fish farming, present many more challenges than they do solutions. Between the large amount of wild fish and other feed needed to supply them and their detrimental impact on surrounding ecosystems, industrially scaled fish farms bring the worst mistakes of land-based factory farms to the ocean, an issue we explore in depth in the *Foodprint of Farmed Seafood* report.

Ultimately, these limitations mean that there is a finite cap on global seafood supplies. But given wild seafood's nutrient density and availability worldwide, it will still play an important role in many people's diets. Among people in higher income countries, well-sourced seafood — coming from a diversity of well-managed stocks — still represents a good choice among animal foods, but like all other animal sourced foods, shouldn't be consumed more than a few times a week.

Making Seafood More Sustainable

Despite its potential problems, wild-caught seafood is full of success stories that demonstrate that fisheries can be managed sustainably. When regulators work closely with fishermen, overfishing can be avoided and overfished stocks can recover, often more quickly than expected. At the same time, these well-managed fisheries can provide sustainable long-term income for communities. Community-based management has a proven track record for avoiding fisheries' collapse and the need for recovery in the first place. The effectiveness of community management has been demonstrated by the Indigenous managers of fisheries around the world for millennia, and several more industrialized fisheries have successfully adopted similar models.

These success stories have helped inform fishermen and activists as they push for reform that would make fishing fairer. With opportunities for change at both local and federal levels, it's a pivotal time for the survival of fishing communities around the U.S.

COMMUNITY-BASED FISHERY REGULATION: MAINE LOBSTER

Fisheries can self-regulate, and there are several examples of fishing communities averting the tragedy of the commons by setting their own environmental and social rules around a fishery. One of the most notable examples is the Maine lobster fishery.

Lobsters have a long life cycle, and the oldest lobsters produce far more eggs than the youngest. As a result, the state has restrictions on catching lobsters that are both too old and too young in an effort to keep breeding populations healthy. But outside of these formal restrictions, lobstermen are also self-organized to prevent overharvesting. Self-organized "lobster gangs" set rules within their own communities about who can place traps, where those traps are allowed and how many each lobsterman can set.⁶² They enforce these rules themselves, either by patrolling territory and removing traps that are in violation of the rules, or by socially isolating rulebreakers back on land.

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With rare exceptions, the lobster gangs are able to enforce their rules without trouble, and the lobster fishery has benefitted from the stability and high adherence to conservation regulations. Social scientists point to the fishery as a successful example of how other common-pool resources could be managed, as lobstermen have balanced self-interest and the long-term survival of the resource.^{63 64} It's worth noting that this system of governance does rely on some preconditions: social



enforcement of community rules only works when fishermen actually live in the community and have a personal stake in both their own economic and social standing there. This underscores the importance of localized control for fisheries and limiting the outside and corporate access that's incentivized through catch share systems.

This doesn't mean that the lobster industry in Maine doesn't face struggles: climate change and the rapidly changing habitat are forcing scientists and fishermen to reevaluate what the future of the fishery looks like.⁶⁵ More recently, concerns about vulnerable whale populations have put industry leaders in dialogue with scientists and regulators over what role that lobster traps play in whale entanglements and how to reduce them. While the issue is ongoing, the industry's track record of good outcomes for people and the environment suggests that self-governance among Maine's lobstermen can provide solutions to these complicated issues while maintaining the fishery's important role in the local economy. With more than 35,000 people employed directly or indirectly by the fishery, it's an important source of revenue for coastal communities, who not only profit from lobster fishing directly, but make additional revenue off of processing, restaurants and tourism, all linked to the industry.⁶⁶

FEDERAL POLICY: THE MAGNUSON-STEVENS REAUTHORIZATION

Fisheries management policy in the U.S. stems largely from the Magnuson-Stevens Act, which first passed in 1976. By setting up the exclusive economic zone 200 miles around the U.S. coast and establishing regional fisheries management councils, the earliest iteration of the Magnuson-Stevens act was pivotal in ending unregulated international factory fishing in U.S. waters and establishing NOAA's authority as a fisheries regulator. Like several other important packages of legislation (such as the Farm Bill), the Magnuson-Stevens Act requires periodic reauthorization.

Reauthorization and other amendments have brought important changes to fisheries policy, like 1996's Sustainable Fisheries Act, which strengthened the environmental standards for regional fisheries councils to help avoid overfishing. The MSA's 2007 reauthorization established catch limits, catch shares and several other provisions, many of which have been vehicles for the increasing consolidation of our working waterfronts while not delivering on the promises of fisheries health.



Fish aggregate under a loose ghost net

In 2022, the Magnuson-Stevens act is up for another periodic reauthorization. For fishing communities and activists, the reauthorization is an opportunity to correct some of the failures brought on by catch shares programs and other policies. Specific provisions in the latest version of the bill include better management of bycatch and an audit of catch share programs by the Commerce Department's Inspector General, but much more will be needed to truly address the impacts of fishery privatization and consolidation.

Outside of the MSA reauthorization, advocates for sustainable fisheries have gained some traction on limiting the impacts of privatization on fishermen. Working closely with fishermen and advocates, several senators from coastal states recently called for a justice department investigation into excessive consolidation of quotas, which could form the beginning of new rules at a federal level.⁶⁷

LOCAL REFORM

Fishermen are at the forefront of fighting for change on the local fisheries management councils. While some management structures (particularly catch shares) have pushed fishermen out of the industry and limited the sway they have on decision making, those that remain are vocal advocates for their communities, speaking against catch shares and other exploitative practices in council meetings and in public forums.⁶⁸ These efforts often focus on avoiding replicating the failures of earlier programs or changing the limits on how many quotas businesses and private equity firms can own. While this work needs the support of federal policymakers, fishermen are invaluable reporters of the daily on-the-water realities imposed by ineffective management policies.

Supporting Sustainable Seafood

Ethical consumerism alone won't save fishing communities or the ocean, but taking time to learn about sustainable fishing and how to support it can make you a better advocate for the people helping to keep the ocean healthy. And while knowing everything about every fish you encounter is an impossible task, there are a few rules of thumb that can help guide sustainable seafood purchasing.

GUIDING PRINCIPLES

Having a few simple rules of thumb can guide sustainable seafood choices and prevent one from falling for deceptive advertising or dubious claims.

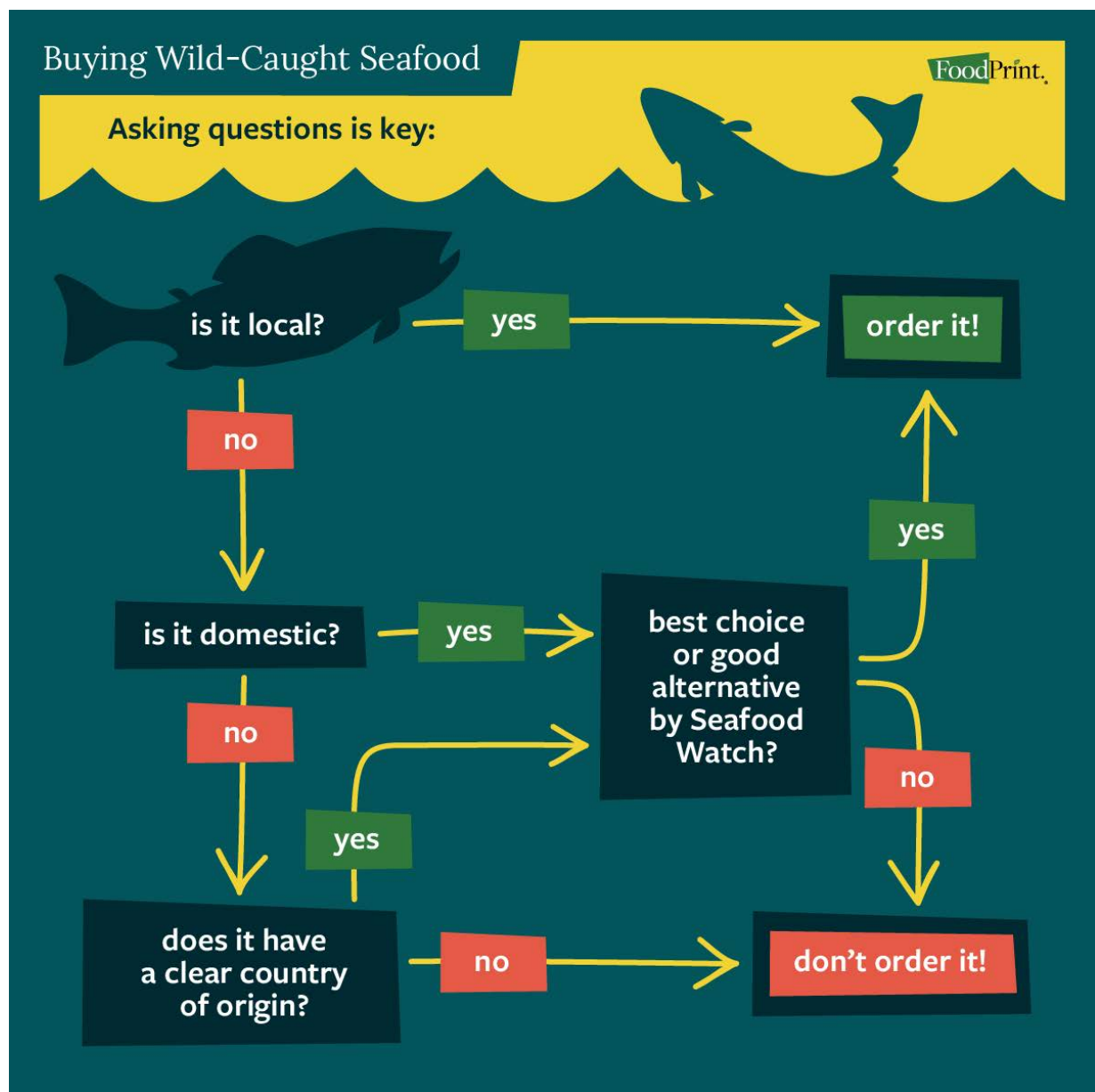
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Buy Local When Possible

Eating local seafood means fishermen get a better return on less catch, which in turn means the ocean gets a break. Money spent locally tends to stay in the community, which for those of you who live in coastal communities means you'll be supporting your own local economy.

If you don't live near a coast, try to buy directly sourced seafood. Increasingly, values-based seafood businesses are able to ship directly to eaters while providing transparency and accountability to those who caught the fish. Use the [Local Catch Seafood Finder](#) to find a harvester near you or one that can ship to you.

Outside of local and direct-to-consumer marketing, it becomes more difficult to establish whether fish was caught sustainably. While domestic seafood may still have been processed



elsewhere, it is often a better option than seafood with no information or that originated in another country. As information about what you're eating becomes more scarce, the chance of it being the product of IUU fishing or tied to serious human rights abuses increases.

Ask How, When and Where Your Fish Was Caught

Asking your fishmonger, waiter, or chef questions about how, when and where your seafood was caught lets them know that you care about their buying choices. If whoever is selling or serving you the fish doesn't have the answer, or the answers you wanted, choose something else.

Avoid Overfished Populations

U.S. restaurants and grocery stores most often reflect what fish people are demanding, not what fish are sustainable. And while getting your fish locally from a trusted source is still the best safeguard, it's a good idea to become familiar with the fish that are most likely to be sourced from overexploited fisheries when you don't have reliable information about where fish come from. Without detailed and reliable information about sourcing, it's a good idea to avoid high-demand fish like tuna or cod. The Monterey Bay Aquarium's Seafood Watch program is a good way to check whether an unfamiliar fish is best left unordered.

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WHAT WILD SEAFOOD LABELS CAN TELL US

When it comes to understanding what seafood has been produced in a way that protects marine habitats, and respects wild fish populations without negatively impacting fishing communities or relying on enslaved labor for fishing or processing, labels can help. However, when you base your seafood purchases solely on the label, you are deferring to the corporations trying to sell their fish, and they do not always tell the whole story. Often, seafood is not labeled and has no information except country of origin. Some seafood has words or claims on the packaging that cannot be (or isn't) required to be backed up, like "sustainable" or "pole-caught." The purpose of this report is to provide a high-level overview of the seafood landscape to help inform your seafood purchasing decisions, so that you can look beyond and beneath the labels, where they exist.

SPECIFIC LABEL RECOMMENDATIONS AND CONSIDERATIONS

Although it isn't a seafood label that appears on food itself, our top pick is the grading system put out by the Monterey Bay Aquarium's Seafood Watch program. The Seafood Watch program examines a number of different factors — overfishing, bycatch, impact on food webs, habitat disturbance and more — to put fish into one of three categories: "Best Choice," "Good Alternative" and "Avoid." Because the environmental impact of a fish depends on where and how it was caught or raised, Seafood Watch advisories don't apply to entire species. Instead, they focus on fish from specific regions and catch methods. Check out the Seafood Watch website or app for the clearest and most up-to-date recommendations to guide your restaurant or grocery purchases.

To date, all third-party certifications have at least some issues of legitimacy and transparency. Some labels have proven themselves to be completely unreliable, vouching for certain aspects of sustainability while ignoring others, such as social impacts that are intricately connected to ecological ones. Labels requiring third-party certification can add cost to seafood; they can also limit market access only to producers that have paid for the label. Because certification often ends up being paid for by producers (not consumers), third-party certifiers become gatekeepers to markets.

For a review of seafood labels, see FoodPrint's Seafood Label Guide.

Conclusion

Seafood is a treasured part of many cuisines for a reason: it's healthy, delicious and gives coastal communities a critical source of income. For many of us, wild-caught fish is the only food we eat that's directly sourced from nature. While this means that wild-caught seafood avoids many problems we associate with other animal-based foods, it also carries unique risks and opportunities.

Overfishing, habitat destruction and other consequences of poor fisheries management have tipped many ocean ecosystems into precarious positions of imbalance. But by learning from the many well-managed fisheries worldwide, it's clear that seafood can still be a sustainable part of the human diet moving into the future. However, this rests on empowering the people who depend most on the long-term health of the ocean — fishing communities — and giving them a controlling stake in management decisions. Privatization of ocean resources through catch share programs and other measures might seem like an appealing way to reign in overfishing, but by turning control of fisheries over to corporate interests, they put the ocean even more at risk. While policymakers hold many of the keys that can guarantee the survival of small and mid-sized fisheries, consumers also have a significant role to play.

Endnotes

- ¹ "Towards Blue Transformation." FAO.org, Food and Agriculture Organization of the United Nations, 2022. Retrieved from <https://www.fao.org/documents/card/en/c/cc0461en>.
- ² Cayuela, Sergio Ruiz. "The Commons." *Uneven Earth*, 16 Apr. 2021, <https://unevenearth.org/2021/04/the-commons/>.
- ³ "Fishing Gear Type: Purse Seines." Fao Fisheries & Aquaculture, Food and Agriculture Organization of the United Nations, 2022, <https://www.fao.org/fishery/en/geartype/249/en>.
- ⁴ "Purse Seine." Bycatch Management Information System (BMIS), Eastern and Central Pacific Fisheries Commission, 2021, <https://www.bmis-bycatch.org/fishing-gear/purse-seine>.
- ⁵ "Fishing Gear Type: Drift Gillnets." Fao Fisheries & Aquaculture, Food and Agriculture Organization of the United Nations, 2022, <https://www.fao.org/fishery/en/geartype/220/en>.
- ⁶ "Fishing Gear: Gillnets." NOAA Fisheries, National Oceanic and Atmospheric Administration, 22 Feb. 2021, <https://www.fisheries.noaa.gov/national/bycatch/fishing-gear-gillnets>.
- ⁷ Williams, Ted. "Will the World Adopt Sustainable Longline Fishing Practices?" *Audubon*, National Audubon Society, 13 Apr. 2013, <https://www.audubon.org/magazine/september-october-2013/will-world-adopt-sustainable-longline>.
- ⁸ Suuronen, Petri, et al. "Low Impact and Fuel Efficient Fishing—Looking beyond the Horizon." *Fisheries Research*, vol. 119-120, May 2012, pp. 135–146., <https://doi.org/10.1016/j.fishres.2011.12.009>. Accessed 1 Sept. 2022.
- ⁹ Sala, Enric, et al. "Protecting the Global Ocean for Biodiversity, Food and Climate." *Nature*, vol. 592, no. 7854, 17 Mar. 2021, pp. 397–402., <https://doi.org/10.1038/s41586-021-03371-z>.
- ¹⁰ "Fishing Gear Type: Dredges." Fao Fisheries & Aquaculture, Food and Agriculture Organization of the United Nations, 2022, <https://www.fao.org/fishery/en/geartype/104/en>.
- ¹¹ Sullivan, Nicholas P. *The Blue Revolution: Hunting, Harvesting, and Farming Seafood in the Information Age*. Island Press, 2022.
- ¹² "Fishing Gear Type: Traps." Fao Fisheries & Aquaculture, Food and Agriculture Organization of the United Nations, 2022, <https://www.fao.org/fishery/en/geartype/108/en>.
- ¹³ Yang, Maya. "Maine's Lobster Fishers Caught up in Fierce Fight with Conservationists over Entangled Whales." *The Guardian*, Guardian News and Media, 13 Nov. 2021, <https://www.theguardian.com/environment/2021/nov/12/maine-lobster-fishers-fight-conservationists-entangled-whales>.
- ¹⁴ Doyle, Alister. "European Over-Fishing Began 1,000 Years Ago-Report." *Reuters*, Thomson Reuters, 24 May 2009, <https://www.reuters.com/article/idUSLM577342>.
- ¹⁵ Sullivan, Nicholas P. *The Blue Revolution: Hunting, Harvesting, and Farming Seafood in the Information Age*. Island Press, 2022.
- ¹⁶ *Ibid.*
- ¹⁷ Whittle, Patrick. "Haul of Atlantic Cod, Once Abundant, Reaches New Low." *WBUR News*, WBUR, 10 May 2022, <https://www.wbur.org/news/2022/05/10/maine-massachusetts-cod-fishing-industry-record-low-catch>.
- ¹⁸ "Status of Stocks 2021." NOAA Fisheries, National Oceanic and Atmospheric Administration, 17 June 2022, <https://www.fisheries.noaa.gov/national/sustainable-fisheries/status-stocks-2021>.
- ¹⁹ "14.4.1: Fish Stocks Sustainability." FAO Sustainable Development Goals, Food and Agriculture Organization of the United Nations, 2022, <https://www.fao.org/sustainable-development-goals/indicators/1441/en/>.
- ²⁰ "A Third Assessment of Global Marine Fisheries Discards." *Responsible Fishing Practices for Sustainable Fisheries*, Food and Agriculture Organization of the United Nations, 2018, <https://www.fao.org/responsible-fishing/resources/detail/en/c/1317018/>.
- ²¹ Krag, Ludvig A., et al. "Selective Haddock (*Melanogrammus Aeglefinus*) Trawling: Avoiding Cod (*Gadus Morhua*) Bycatch." *Fisheries Research*, vol. 101, no. 1-2, 5 Jan. 2010, pp. 20–26., <https://doi.org/10.1016/j.fishres.2009.09.001>. Accessed 1 Sept. 2022.
- ²² Davies, R.W.D., et al. "Defining and Estimating Global Marine Fisheries Bycatch." *Marine Policy*, vol. 33, no. 4, July 2009, pp. 661–672., <https://doi.org/10.1016/j.marpol.2009.01.003>. Accessed 1 Sept. 2022.
- ²³ Zeller, Dirk, et al. "Global Marine Fisheries Discards: A Synthesis of Reconstructed Data." *Fish and Fisheries*, vol. 19, no. 1, 26 June 2017, pp. 30–39., <https://doi.org/10.1111/faf.12233>. Accessed 2 Sept. 2022.

- ²⁴ “Habitat Degradation Is Harming Salmon.” State of Salmon, State of Salmon in Watersheds 2020, 2020, <https://stateofsalmon.wa.gov/executive-summary/challenges/habitat-degradation/>.
- ²⁵ Milman, Oliver. “Pollution from Car Tires Is Killing off Salmon on US West Coast, Study Finds.” *The Guardian*, Guardian News and Media, 3 Dec. 2020, <https://www.theguardian.com/environment/2020/dec/03/coho-salmon-pollution-car-tires-die-off>.
- ²⁶ “Larger-than-Average Gulf of Mexico ‘Dead Zone’ Measured.” National Oceanic and Atmospheric Administration, National Oceanic and Atmospheric Administration, 3 Aug. 2021, <https://www.noaa.gov/news-release/larger-than-average-gulf-of-mexico-dead-zone-measured>.
- ²⁷ US Department of Commerce, National Oceanic and Atmospheric Administration. “What Is Ocean Acidification?” NOAA’s National Ocean Service, National Oceanic and Atmospheric Administration, 26 Feb. 2021, [https://oceanservice.noaa.gov/facts/acidification.html#:~:text=Ocean%20acidification%20refers%20to%20a,CO2\)%20from%20the%20atmosphere](https://oceanservice.noaa.gov/facts/acidification.html#:~:text=Ocean%20acidification%20refers%20to%20a,CO2)%20from%20the%20atmosphere).
- ²⁸ Rosen, Yereth. “Alaska Worries for Its Salmon Run as Climate Change Warms Arctic Waters.” Reuters, Thomson Reuters, 25 Feb. 2022, <https://www.reuters.com/business/cop/alaska-worries-its-salmon-run-climate-change-warms-arctic-waters-2022-02-25/>.
- ²⁹ Pörtner, Hans, et al. “Climate Change 2022: Impacts, Adaptation and Vulnerability—Technical Summary.” IPCC, Intergovernmental Panel on Climate Change, Feb. 2022, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_TechnicalSummary.pdf.
- ³⁰ Wikler, Maia. “Alaska Native Villages Band Together to Keep the Yukon River’s Wild Salmon Afloat.” *High Country News—Know the West*, High Country News, 26 Oct. 2021, <https://www.hcn.org/issues/53.11/indigenous-affairs-fish-alaska-native-villages-band-together-to-keep-the-yukon-rivers-wild-salmon-afloat>.
- ³¹ Clarke, Wendy Mitman. “Water Bound.” Chesapeake Quarterly, Maryland Sea Grant College, Feb. 2021, <https://storymaps.arcgis.com/stories/1c6f8f445a7c43e5982e6e4682df537e>.
- ³² Maxwell, Tonya. “Gullah Culture Depends on the Ocean’s Abundance.” *The Asheville Citizen Times*, The Citizen-Times, 22 Apr. 2017, <https://www.citizen-times.com/story/news/local/2017/04/22/gullah-culture-depends-oceans-abundance/100639004/>.
- ³³ Ibid.
- ³⁴ Mock, Brentin. “The Forgotten Black Fishermen in the Gulf Oil Spill.” *Our Time Press*, Our Time Press, 25 May 2010, <https://ourtimepress.com/the-forgotten-black-fishermen-in-the-gulf-oil-spill/>.
- ³⁵ “Catch Share Programs by Council Region.” NOAA Fisheries, National Oceanic and Atmospheric Administration, 26 July 2022, <https://www.fisheries.noaa.gov/national/sustainable-fisheries/catch-share-programs-council-region>.
- ³⁶ Van der Voo, Lee. *The Fish Market: Inside the Big-Money Battle for the Ocean and Your Dinner Plate*. St. Martin’s Press, 2016.
- ³⁷ Ibid.
- ³⁸ Goldfarb, Ben. “The Deliciously Fishy Case of the ‘Codfather.’” *Mother Jones*, Mother Jones, 25 Sept. 2017, <https://www.motherjones.com/environment/2017/03/codfather-carlos-rafael-fish-fraud-catchshares/>.
- ³⁹ Ibid.
- ⁴⁰ Sennott, Will. “How Foreign Private Equity Hooked New England’s Fishing Industry.” *ProPublica*, ProPublica, 6 July 2022, <https://www.propublica.org/article/fishing-new-bedford-private-equity>.
- ⁴¹ “History of Management of Gulf of Mexico Red Snapper.” NOAA Fisheries, National Oceanic and Atmospheric Administration, 28 Apr. 2021, <https://www.fisheries.noaa.gov/history-management-gulf-mexico-red-snapper>.
- ⁴² “Catching Fish in International Waters.” *World Ocean Review*, 2022, <https://worldoceanreview.com/en/work/fisheries/deep-sea-fishing/catching-fish-in-international-waters/>.
- ⁴³ “Rules and Consequences: How to Improve International Fisheries.” The Pew Charitable Trusts, The Pew Charitable Trusts, 20 July 2020, <https://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2020/07/rules-and-consequences-how-to-improve-international-fisheries>.
- ⁴⁴ McVeigh, Karen. “Disappearances, Danger and Death: What Is Happening to Fishery Observers?” *The Guardian*, Guardian News and Media, 22 May 2020, <https://www.theguardian.com/environment/2020/may/22/disappearances-danger-and-death-what-is-happening-to-fishery-observers>.
- ⁴⁵ “Illegal, Unreported, and Unregulated Fishing Accounts for More than \$2 Billion of U.S. Seafood Imports, Reports USITC.” USITC, United States International Trade Commission, 18 Mar. 2021, https://www.usitc.gov/press_room/news_release/2021/er031811740.htm.
- ⁴⁶ Spiegel, Emily J, and Laurie J Beyranevand. “Seafood Fraud: Analysis of Legal Approaches in the United States.” *The Center for Agriculture and Food Systems*, Vermont Law and Graduate School, June 2022, https://www.vermontlaw.edu/sites/default/files/2022-06/seafood-fraud-analysis-us-legal-approaches_20220627_1153.pdf.

- ⁴⁷ “An AP Investigation Helps Free Slaves in the 21st Century.” AP Explore, Associated Press, 12 July 2016, <https://www.ap.org/explore/seafood-from-slaves/>.
- ⁴⁸ Van der Voo, Lee. “The US Is a Dumping Ground for Illegal Seafood. Some Lawmakers Want to Clean up the Market.” *Civil Eats*, 13 June 2022, <https://civileats.com/2022/06/13/the-us-is-a-dumping-ground-for-illegal-seafood-some-lawmakers-want-to-clean-up-the-market/>.
- ⁴⁹ Costello, Christopher; Ovando, Daniel. “Status, Institutions, and Prospects for Global Capture Fisheries.” *Annual Review of Environment and Resources*, vol. 44, no. 1, 2019, 177–200., doi:10.1146/annurev-environ-101718-033310.
- ⁵⁰ Béné, C., Macfadyen, G., Allison, E.H., 2007. “Increasing the Contribution of Small-Scale Fisheries to Poverty Alleviation and Food Security.” *Fao.org*, Food and Agriculture Organization of the United Nations (FAO Fisheries Technical Paper No. No. 481).
- ⁵¹ Schuhbauer, Anna, and U. Sumaila. “Economic Viability and Small-Scale Fisheries—a Review.” *Ecological Economics*, vol. 124, Apr. 2016, pp. 69–75., <https://doi.org/10.1016/j.ecolecon.2016.01.018>.
- ⁵² Thilsted, Shakuntala Haraksingh, et al. “Sustaining Healthy Diets: The Role of Capture Fisheries and Aquaculture for Improving Nutrition in the Post-2015 Era.” *Food Policy*, vol. 61, May 2016, pp. 126–131., <https://doi.org/10.1016/j.foodpol.2016.02.005>. Accessed 2 Sept. 2022.
- ⁵³ Hicks, Christina C., et al. “Harnessing Global Fisheries to Tackle Micronutrient Deficiencies.” *Nature*, vol. 574, no. 7776, 25 Sept. 2019, pp. 95–98., <https://doi.org/10.1038/s41586-019-1592-6>. Accessed 2 Sept. 2022.
- ⁵⁴ “Towards Blue Transformation.” *Fao.org*, United Nations Food and Agriculture Organization, 2022, <https://www.fao.org/documents/card/en/c/cc0461en>.
- ⁵⁵ “Advice about Eating Fish.” *FDA.gov*, U.S. Food and Drug Administration, 8 June 2022, <https://www.fda.gov/food/consumers/advice-about-eating-fish#:~:text=The%20Dietary%20Guidelines%20for%20Americans%20recommends%3A,that%20are%20lower%20in%20mercury>.
- ⁵⁶ Cashion, Tim, et al. “Most Fish Destined for Fishmeal Production Are Food-Grade Fish.” *Fish and Fisheries*, vol. 18, no. 5, 13 Feb. 2017, pp. 837–844., <https://doi.org/10.1111/faf.12209>. Accessed 2 Sept. 2022.
- ⁵⁷ “Towards Blue Transformation.” *Fao.org*, United Nations Food and Agriculture Organization, 2022, <https://www.fao.org/documents/card/en/c/cc0461en>.
- ⁵⁸ Costello, Christopher, and Daniel Ovando. “Status, Institutions, and Prospects for Global Capture Fisheries.” *Annual Review of Environment and Resources*, vol. 44, no. 1, 2019, pp. 177–200., <https://doi.org/10.1146/annurev-environ-101718-033310>. Accessed 2 Sept. 2022.
- ⁵⁹ Hilborn, Ray, et al. “Effective Fisheries Management Instrumental in Improving Fish Stock Status.” *Proceedings of the National Academy of Sciences*, vol. 117, no. 4, 13 Jan. 2020, pp. 2218–2224., <https://doi.org/10.1073/pnas.1909726116>. Accessed 2 Sept. 2022.
- ⁶⁰ Costello, Christopher, and Daniel Ovando. “Status, Institutions, and Prospects for Global Capture Fisheries.” *Annual Review of Environment and Resources*, vol. 44, no. 1, 2019, pp. 177–200., <https://doi.org/10.1146/annurev-environ-101718-033310>. Accessed 2 Sept. 2022.
- ⁶¹ Troell, Max, et al. “Scoping Report: The Role of Seafood in Sustainable and Healthy Diets.” *EAT Forum*, EAT, Nov. 2019, https://eatforum.org/content/uploads/2019/11/Seafood_Scoping_Report_EAT-Lancet.pdf.
- ⁶² Nordman, Erik. “Lobster Gangs and Debunking ‘The Tragedy of the Commons.’” *YES! Magazine*, YES! Media, 11 Aug. 2021, <https://www.yesmagazine.org/economy/2021/08/11/the-commons-lobster-maine-elinor-os-trom>.
- ⁶³ Corson, Trevor. “Learning from Maine’s Lobster Wars.” *The Atlantic*, Atlantic Media Company, 16 Sept. 2009, <https://www.theatlantic.com/health/archive/2009/09/learning-from-maines-lobster-wars/26613/>.
- ⁶⁴ Wilson, James, et al. “The Precursors of Governance in the Maine Lobster Fishery.” *Proceedings of the National Academy of Sciences*, vol. 104, no. 39, 25 Sept. 2007, pp. 15212–15217., <https://doi.org/10.1073/pnas.0702241104>. Accessed 2 Sept. 2022.
- ⁶⁵ Nordman, Erik. “Lobster Gangs and Debunking ‘The Tragedy of the Commons.’” *YES! Magazine*, YES! Media, 11 Aug. 2021, <https://www.yesmagazine.org/economy/2021/08/11/the-commons-lobster-maine-elinor-os-trom>.
- ⁶⁶ “2021 Maine Lobster Harvest the Most Valuable in the History of the Fishery.” *Office of Governor Janet T. Mills*, State of Maine, 14 Feb. 2022, <https://www.maine.gov/governor/mills/news/2021-maine-lobster-harvest-most-valuable-history-fishery-2022-02-14>.
- ⁶⁷ “Statement of Commercial Fishermen and the North American Marine Alliance (NAMA) on Private Equity Firm Dominating Fisheries Access and Ownership.” *NAMA*, North American Marine Alliance, 27 July 2022, https://www.namanet.org/sites/default/files/field_file/NAMA%20Statement%20on%20Private%20Equity%20Firm%20and%20ProPublic%20Article.pdf.
- ⁶⁸ Mello, Justin. “Opinion: First, ground fishing takeover - next is the scallop industry.” *The New Bedford Light*, 7 July 2022, <https://newbedfordlight.org/opinion-first-ground-fishing-takeover-next-is-the-scallop-industry/>.



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