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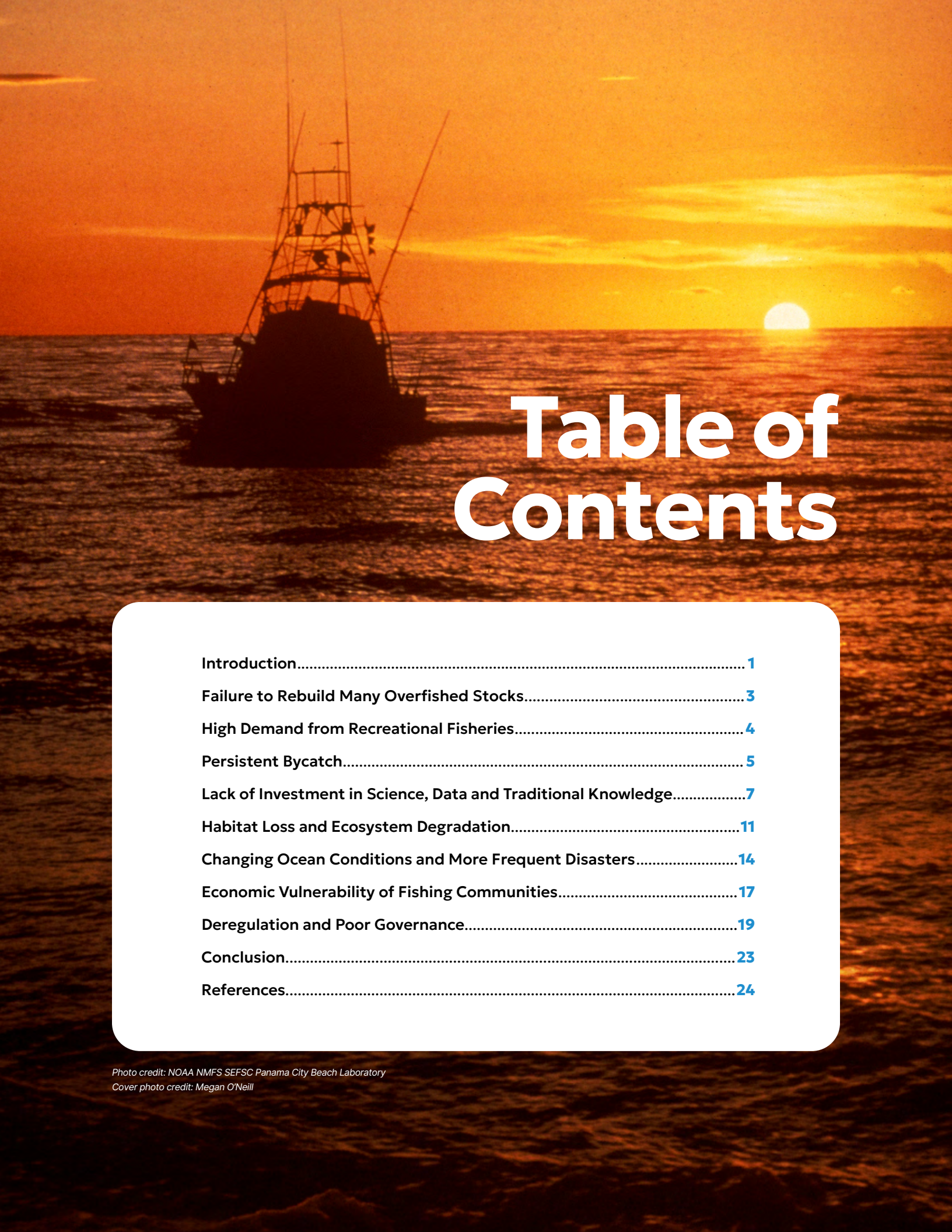
Drifting Off Course

Challenges in U.S. Fisheries Management and Charting the Path Forward



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Introduction

U.S. ocean waters are home to diverse species of fish that feed families, anchor economies, and draw millions of recreational anglers to the coast year after year. Our fisheries support vibrant coastal communities and Indigenous cultures, while also sustaining a vast web of marine life, from the tiniest plankton to dolphins, sea turtles and whales.

But fish populations are not inexhaustible. Overfishing has historically driven iconic fish populations like cod, red snapper, and rockfish into serious decline or collapse. Faced with rapidly disappearing fish stocks that had once been so abundant, Congress, scientists and fishermen worked together to establish a management system that would support fishing for the long term — the Magnuson-Stevens Fishery Conservation and Management Act, or MSA.

Fifty years have passed since the MSA was enacted into law, becoming the primary law governing the management of fisheries in U.S. federal ocean waters. Over time through reauthorization and changes to implementation, the law has evolved to support a management system built on science and adapted to the distinct needs of each fishery and region. The law's central goal is to prevent overfishing while achieving levels of fishing that provide the greatest overall benefit to the nation. This means managing fishing to keep fish populations healthy, abundant, and productive for the long term.

In many ways, the MSA has been a success story, having rebuilt over 50 fish stocks and driven overfishing down to historic lows.[1]

However, a lot has changed for the ocean in the last 50 years, and new challenges are developing that will push our fisheries to their limits. From marine heatwaves to degraded habitats, the fish and ecosystems that millions of Americans rely on are under stress. At the same time, management shortcomings, economic vulnerabilities, food insecurity, lower investment in research, and technology advancements are colliding with long-standing conservation and management challenges like bycatch and continued overfishing.

It's clear that business as usual is not enough to guarantee abundant fish populations that can support coastal communities and fisheries. The future of fishing — and the health of our ocean — for the next five decades will depend on tackling the challenges we face today:

- **Failure to Rebuild Many Overfished Stocks**
- **High Demand from Recreational Fisheries**
- **Persistent Bycatch**
- **Lack of Investment in Science, Data and Traditional Knowledge**
- **Habitat Loss and Ecosystem Degradation**
- **Changing Ocean Conditions and More Frequent Disasters**
- **Economic Vulnerability of Fishing Communities**
- **Deregulation and Poor Governance**

Sustainable seafood is more than just a buzzword. It's about having a management system in place that keeps fish populations at healthy levels so they can benefit fishing communities and the vitality of ocean life.

Photo credit: Adobe Stock

Failure to Rebuild Many Overfished Stocks

When fish stocks are overfished, their population sizes are too low and their ability to support sustainable fishing is in jeopardy. Overfished stocks mean less catch for fishermen, and the stocks are more vulnerable to collapse. By the 1990s, fishing pressure on many U.S. fish stocks was too high,[2] which led to declines and collapses, ultimately causing economic loss in many fisheries: from an all-time high of $9.3 billion in commercial revenue (adjusted to 2024 dollars) in 1988 to just $5.3 billion by 2002.[3]

The law requires managers to develop a rebuilding plan for any stock that is overfished to bring it back to healthy levels. The process of rebuilding is a hallmark of successful fishery management.[4] As of 2025, 52 U.S. fish stocks have been rebuilt, but 42 stocks remain overfished.[5] Many of those stocks that need to rebuild are still experiencing overfishing despite legal requirements that management should end overfishing immediately. In a National Oceanic and Atmospheric Administration (NOAA) analysis, 65% of stocks in rebuilding plans had flat or decreasing population estimates.[6] When rebuilding plans fail, stocks remain at reduced abundance, increasing the economic strain on communities.

In addition to overfishing, it is likely that other biological and environmental factors are contributing to keep stocks at low abundance levels. Fishing can change both the average size and distribution of ages of fish across the population, which can lower productivity, as older, larger fish tend to produce more viable eggs.[7] Damage to habitats, lack of prey species and bycatch can also keep populations low. And changing environmental conditions can stress fish, making reproduction less successful. But these factors also make rebuilding stocks even more important because abundant stocks can bounce back from shocks more easily and allow fishing levels to rebound.

To get rebuilding back on track, managers need to act more decisively, while accounting for climate change and human-caused impacts to stocks, to end overfishing through improved rebuilding plans. Ultimately, rebuilt fish stocks must remain a central goal of fishery management in order to maximize fishing opportunities for coastal communities.

Solutions

Act early before rebuilding is necessary: Managers are required to manage stocks to avoid the need to rebuild in the first place but rarely take such actions. When a stock begins to decline, taking action to halt that trend is important to avoid the complex management that rebuilding requires.

Consider environmental conditions and other factors in rebuilding plans: Managers should account for changing environmental conditions when developing and implementing a rebuilding plan. A more holistic look across fisheries may be necessary, as factors like bycatch from other fisheries, habitat degradation, or reduced prey abundance could contribute to fish stock declines.

Adapt plans that aren't working: When stocks are failing to rebuild, managers must actively adapt the rebuilding plan to improve the chances of success. When plans fail, new plans should be developed that explicitly address the shortcomings of previous approaches.

High Demand from Recreational Fisheries

Saltwater recreational fishing brings together families, drives economic activity in many coastal towns, and is a beloved pastime in the U.S. In 2023, saltwater anglers took 204 million fishing trips, and recreational fishing contributed about $145.4 billion in sales impacts to the national economy.[8] However, managing saltwater recreational fisheries can be uniquely challenging, especially as coastal populations have increased by 40% over the last 50 years.[9] The number of individual angler trips have increased over time;[10] anglers are geographically distributed rather than consolidated in commercial ports; and angler's catch heads home in coolers instead of into a fish house. Despite the small-scale impact of each individual angler, the cumulative effect of recreational fishing on the health of fish stocks can be very large. In the Southeast, recreational fisheries are allocated more than half of the catch for many popular stocks, such as greater amberjack (80%) and gag grouper (65%) in the Gulf[11] as well as red snapper (71.93%), red grouper (56%) and most of the porgy complex in the South Atlantic.[12]

As a result, managers struggle to sustainably manage recreational fisheries that are largely open access, constrained only by measures such as season lengths and limits on daily catch. In some fisheries, the recreational sector routinely exceeds its annual catch limit. Some anglers are dissatisfied with management and want more opportunities to fish, creating pressure to allow catch above sustainable limits.

It is critical to gain a better understanding of how many anglers there are and how many fish they are catching.[13] Managers need access to better data so they can more effectively manage fisheries within sustainable limits, and anglers need that data so they can make informed decisions about what to fish and how much to catch.

Solutions

Improve recreational surveys: Currently, recreational data collection is fragmented among many assorted surveys, each with different designs and strengths, that cover different species, times and areas. These systems should be improved to meet existing recreational fishing survey and data standards, which will increase the accuracy, precision and timeliness of data.[14] Efforts should be made to ensure survey data is comparable between collection systems. This will allow all data sets to be used in the science that is informing management.

Build a coordinated data system to benefit both managers and anglers: Improved state and federal surveys also need an interoperable data system to transparently deliver data to both managers and anglers. Combining all these sources of data, as well as identifying and filling critical gaps, requires extensive cooperation between federal and state managers, as well as with regional bodies like the Marine Fisheries Commissions and Regional Fishery Management Councils. Such a data system will bring to bear both long-standing data sets that provide information on how catch levels are changing and innovative new approaches that can reduce uncertainty around high-demand fish stocks.

Address sustainable management issues: Managers must ensure recreational fishing is managed consistently with requirements to prevent catch from exceeding annual sustainable limits, which means that greater consideration of precautionary management tools — such as buffers that account for the uncertainty inherent in managing open access fisheries — is necessary.

Photo credit: Jeff Biege

Persistent Bycatch

Bycatch is the unintended catch of non-target fish and other wildlife, such as turtles or marine mammals, which are often tossed back into the ocean either dead or dying. From recreational discards driving stock mortality in the Southeast[15] to salmon bycatch in Alaska contributing to the collapse of traditional Indigenous salmon fisheries,[16] bycatch can lead to sustainability issues, food insecurity and conflicts among user groups.

Fish and other animals caught as bycatch play important roles in marine ecosystems, and many vulnerable species can be caught as part of fishing activities. Protected and endangered species, including many whales, sea turtles and birds, are seriously threatened by continued bycatch. Climate change is exacerbating these issues, as it changes the patterns of predators and prey in the ecosystem.[17] Marine mammals like whales are moving into new areas and coming into conflict more frequently with fishing gear.[18]

Bycatch is both an ecological and economic problem in fisheries, as one fishery's "bycatch" can be other commercially important species.[19] When highly sought species are caught incidentally as bycatch, other fisheries can lose access to their target species and livelihoods, and Indigenous communities can lose their culture and way of life. Fish caught as bycatch no longer reproduce and help replenish their populations, which can contribute to declines and make rebuilding more difficult.

While the MSA includes requirements to minimize bycatch, data collection remains patchy, implementation is weak (only what is "practicable," which often means doing very little) and progress towards reducing bycatch has slowed both nationally and regionally. Minimizing bycatch is critical for ecosystem health and the economic well-being of fishing communities, and it should be treated as a serious problem that requires proactive management and localized solutions that will depend on the fishery, region and species involved.

Solutions

Establish a national commitment to reduce bycatch: A renewed national commitment is necessary to better understand and reduce the impact of bycatch on fishing communities, fish stocks and ecosystems.

Put proven bycatch reduction tools to work: Regions should consider all tools at their disposal to reduce bycatch. Bycatch caps can reduce the amount of unintended catch, and new gear and area closures (either by dynamic hot spots or fixed areas) can reduce interactions. But not all regions actively use these techniques, and some regions that do are failing to use them effectively to drive improvement and are instead merely locking in a status quo or avoiding new management measures.

Improve bycatch data, reporting and monitoring: Data improvements are needed across all regions — reporting is not standardized and the data are not centralized, making it hard to track what progress is being made or what new issues are arising.[20]

Increase partnerships to test solutions: Industry and fishermen are key partners in addressing bycatch, as they can test new gear and management approaches, provide critical data, and offer unique firsthand knowledge of changes on the water.

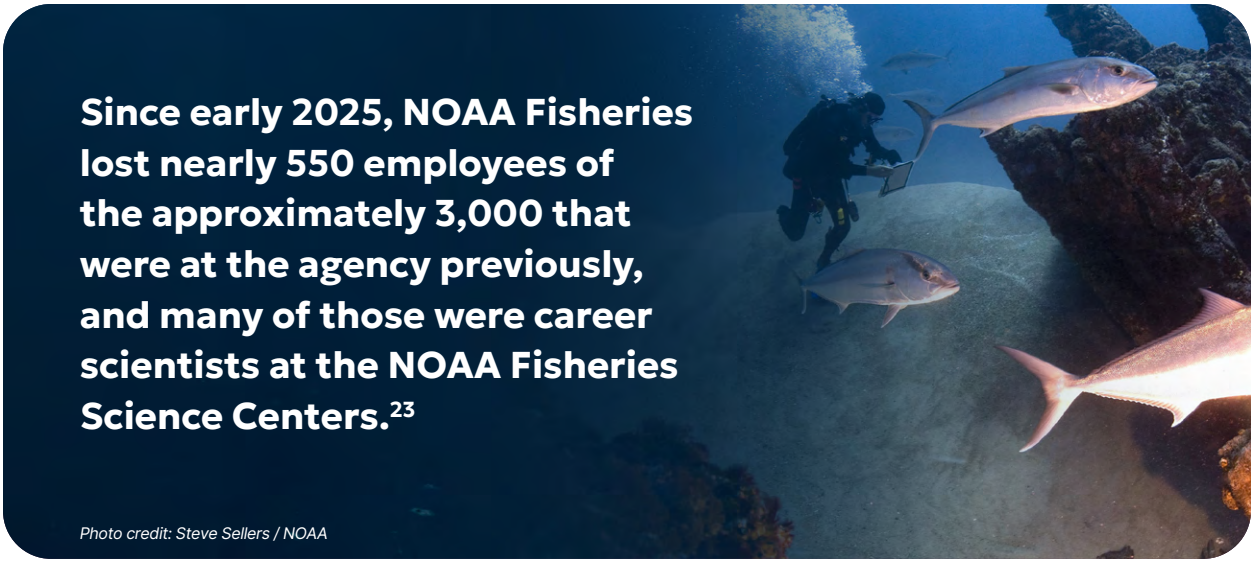
Photo credit: NOAA / William B. Folsom

Recreational Discards

Between 10.5% to 20% of commercial catch is estimated to be discarded in U.S. fisheries.[21] However, bycatch isn't just a problem in commercial fisheries. In recreational fisheries, discards (fish that are caught and then released, usually because they are caught outside of the fishing season or are below the size limit) contribute substantially to the total number of dead fish. Though discard mortality depends on many factors, estimates typically range from 5-45% that die.[22] For example, for every Gulf gag grouper retained, about eight will be thrown back and one of those will die — likely due to stress, barotrauma or being eaten by predators after release. This issue remains largely unresolved by meaningful management actions, as recreational discards are widely considered unavoidable. However, solutions exist — managers can set catch at levels that include the impact of discards, seasonal closures can be used to avoid interactions, and properly used descending devices can reduce mortality.

Lack of Investment in Science, Data and Traditional Knowledge

The MSA requires the best scientific information available to be used to set sustainable fishing limits, which has helped reduce overfishing and rebuild stocks. Conducting scientific research and data collection takes resources — people, time, equipment and facilities — and the science supporting fishery management is underfunded and under-resourced. Recent reductions in staff have affected both NOAA and its National Marine Fisheries Service (NOAA Fisheries). These cuts, along with long-standing gaps in support, mean that it is increasingly difficult to deliver the core information needed to manage fisheries. This comes at a time when innovative approaches to modeling, data collection and forecasting are all available to be implemented but can't get off the ground due to lack of investment. As the marine environment continues to experience more rapid and less predictable changes, the need for investment in science and surveys to quickly identify and respond to ecological shifts is greater now than it has ever been. At the same time, Traditional Knowledge has neither been funded nor integrated throughout the management process and offers an important and critical source of information from Indigenous peoples.



Since early 2025, NOAA Fisheries lost nearly 550 employees of the approximately 3,000 that were at the agency previously, and many of those were career scientists at the NOAA Fisheries Science Centers.[23]

Photo credit: Steve Sellers / NOAA

Minimal survey capacity means less information for management

NOAA Fisheries produces world-class science and research to support conservation and management decisions. At the core of the science enterprise are surveys, which collect data on fish and fishing, including fish abundance, distribution and catch, along with stock assessments, which mathematically determine sustainable catch amounts. Additionally, environmental monitoring of ecosystem health and collection of socioeconomic data support good management decisions. Without these surveys, assessments and data, managers have more uncertainty about the state of the ecosystem, fish stocks and the fishing industry, which often means managers need to set catch lower to avoid overfishing. Missing information may mean they miss an important signal and fail to act to support the fish or fishermen.

Photo credit: Personnel of NOAA Ship NANCY FOSTER

NOAA White Ships

According to NOAA's Office of Marine and Aviation Operations, or OMAO, NOAA has a fleet of 15 oceanographic vessels that conduct a wide range of activities, from fisheries surveys to hydrographic charting and deep-sea research. The average age of those ships is older than 30 years, and by 2030 six of those ships will likely reach the end of their service life (the operational period of a ship).[26] While there are two new research vessels scheduled for delivery in 2026, the *Oceanographer* and *Discoverer*, continued investment will be necessary to replace aging vessels.

NOAA's fleet of "white ships" plays an important role in this data collection, as do cooperative research programs with fishermen. Unfortunately, NOAA's aging fleet and the challenge of finding qualified professional mariners have meant a decline in the number of days the ships are available. In recent years, NOAA's fleet has completed only about half of the days at sea that would be needed to meet NOAA's mandates.[24] In the past, unforeseen maintenance issues have taken ships out of service during critical survey periods. Missing a survey can leave gaps in understanding that translate into huge risks. For example, running trawl surveys every other year in the Gulf of Alaska meant that scientists took longer to detect a decline in Pacific cod that ultimately resulted in a stock collapse and fishery closure.[25]

Lagging stock assessments impact the delivery of timely, quality science for fishery management

Using data collected from fisheries surveys and other sources, stock assessments give managers information on how many fish there are, how fishing impacts a stock, and how many fish can be sustainably caught. Producing regular, high-quality stock assessments for the 500 stocks NOAA Fisheries manages is a challenge — in 2025, the agency produced 183 stock assessments.[27] As science improves, stock assessments tend to become more complicated and intensive, further increasing the need for resources and for highly trained and capable scientists.

Funding for scientific activities, both at NOAA and through funding to partners like universities and states agencies, has either stayed flat or been reduced in recent years. Delays in the approval of grants and contracts can mean research slows or is scuttled even if funding is available.[28] These changes don't affect only our knowledge of fish stocks — they erase the next generation of researchers who would have produced this science, while also immediately getting less information out to fishermen, fishing businesses and coastal communities that can help them plan and make decisions.

Traditional and Indigenous knowledge are underutilized

Coproduction of knowledge and diverse knowledge systems can expand understanding of and ability to manage complex social-ecological fishery systems, including in the context of climate change.[29]They can also bring together different stakeholders and knowledge systems in service to shared management goals. This includes both Indigenous and Traditional Knowledge, which is defined as a living body of knowledge acquired and utilized by Indigenous communities through long-term socio-cultural and environmental engagement.[30] This knowledge and these practices can greatly inform management decisions and further seafood sustainability. At present, Tribes and Traditional Knowledge have a very limited role in federal fishery management, and this knowledge is critical to the long-term success of fisheries and communities.

Outdated fishery data systems fail to meet modern needs

Timely and reliable data are critical for responsive and sustainable fisheries management. Robust data systems allow fisheries managers to monitor catch, compare to sustainable limits, and implement effective management measures in response. This means that action can be taken quickly to avoid overfishing, but also that additional opportunities to fish can be provided if bad weather or other unpredictable factors have kept catch lower than anticipated. But our current data collection systems still rely on outdated methods that create unnecessary delays and allow for error. Many fisheries still do not have the ability to submit their data from fishing trips electronically. Data collection systems are siloed by region or fishery, meaning there are duplicative systems that can't share data with each other. The current systems are both inefficient and also highly demanding on staff time to maintain.

Photo credit: Clark Mishler

Solutions

Increase resources for fisheries science and data: Continued investments in — and adequate staffing of — surveys, stock assessments and ecosystem monitoring are critical, as is support for social science to understand and anticipate economic and social responses to fishery conditions. The trend of reduced funding, staffing cuts and grant-approval delays that have recently hamstrung scientific activities must be reversed.

Invest in Traditional Knowledge and Indigenous management: New investment in Traditional Knowledge will feed critical information into the fishery management system. Partnering with Indigenous communities via shared management and Indigenous Guardian/Sentinel programs will expand monitoring capacity and tap into traditional management and ways of knowing.

Invest in new technology thoughtfully: Cutting-edge technologies pioneered by NOAA, private industry and academic institutions are helping to improve the core science enterprise. Data collection is enhanced by the use of uncrewed aerial systems (UAS) and Saildrones, as well as innovative methods such as the use of environmental DNA (eDNA), which can detect the presence of animals in a body of water through water sampling. At the same time, how new technology is adopted matters. Moving abruptly to new technologies or reducing funding to existing surveys can jeopardize our long-term understanding of fish stock dynamics. The solution is to invest in both new and current technologies, carefully plan for their adoption and ensure new data can be compared effectively to existing data.

Update data infrastructure: The modernization of the underlying data infrastructure at NOAA Fisheries is critical to allow the effective onboarding of new and advanced technologies. To get there will take standardization of data collection, development of a cloud-based structure to improve collaboration, transparent access for managers and the public, and the intentional development of platforms that can adapt to new data sources.[31] This interface can then support the rapid expansion of electronic logbooks, camera and artificial intelligence systems for tracking catch, and more.

Grow partnerships with fishing communities to test new technology: Cooperative research with fishing communities can both provide important testing grounds for new technologies and improve community support for fisheries science and data. Accomplishing this will result in a more responsive and efficient data system that better supports managers and fishing communities.

Photo credit: NOAA

Habitat Loss and Ecosystem Degradation

Seafood is the only large-scale food source that still depends on healthy, wild ecosystems for production. Fishing yields many benefits for people, but it can have serious impacts on marine species and the ecosystem. This means that to manage fisheries sustainably, managers need to minimize the negative impacts that fishing has on the ecosystem but also that they need to understand how conditions in the ecosystem are affecting the growth, health and mortality of fish stocks. Factors like habitat, prey base, ocean conditions, water quality and more affect the availability of fish and the success of fishing businesses. Effective fishery management requires an ecosystem approach that takes these critical factors into account.

Fish habitats have insufficient protection

Fish depend on the habitat around them to provide food and shelter and to be a good place to grow, live and breed. Because fisheries rely on abundant fish stocks, healthy habitat is key for supporting fisheries and coastal economies. The loss and degradation of marine and aquatic habitats are serious threats to fisheries. Unfortunately, coastal and ocean habitats face many pressures from fishing and other activities, such as coastal development, rising temperatures, pollution, and sea level rise.

The MSA recognizes the connection between fish and their habitats and requires fishery managers to designate Essential Fish Habitat, or EFH, for the fisheries they manage and to conserve and minimize impacts to that habitat. NOAA Fisheries has used its authorities on EFH to designate 800 million acres of habitat.[32] However, having an EFH designation has resulted in little meaningful protection of that habitat[33] from non-fishing uses, such as sand mining, dredging, and energy exploration and development. Similarly, managers must minimize impacts from fishing — such as damage from fishing gear like trawls, nets, hooks and traps — on EFH only "to the extent practicable," which often results in very little action. The end result is that there is great deal of habitat that is designated as EFH but very few habitats that receive substantial benefit from that designation. Another largely unaddressed problem is that of ghost gear, which can entangle, trap and harm fish and other marine animals long after it is lost or abandoned at sea.

Prey species need extra consideration

Forage fish are small, generally pelagic fish that play an outsize role in the ecosystem because they serve as food for many other species, from larger fish to seabirds and marine mammals. They're also caught in directed fisheries, which brings additional risk to the many predator species that depend on functioning food webs. There is considerable fishing pressure on forage fish, which are caught for fish meal, bait or other products. Many forage fish have either received little management attention or been completely unmanaged. Some councils have taken steps to protect forage fish by prohibiting catch until their populations can be studied and management plans can be developed. Still, taking a single-species approach for forage fish fails to account for their importance as prey to other targeted stocks.[34] And many forage species exhibit natural "boom-and-bust" population cycles that can make management more unpredictable.

Poor water quality can drive fish stock declines

Fish health depends on the quality of water they swim in. At different stages of their lives, fish may spend time in estuaries, seagrass beds and offshore waters, which means fisheries rely on healthy coastal and ocean waters. Poor water quality, chemical and nutrient pollution, and low-oxygen "dead" zones impact fisheries, particularly if they force fish to flee to new areas or cause fish kills or disease outbreaks that make fish unsafe to eat. Wastewater and contaminants not only harm fish populations, but they can also pose a threat to human health if they end up in the seafood supply.

Ensuring healthy water quality is one piece of the puzzle for supporting sustainable fisheries, yet many of the solutions for improving water quality are outside of the authorities of fishery managers and NOAA, creating much frustration among fishermen who feel a critical factor in fishery health is being ignored.

Photo credit: NOAA / Robert Schwemmer

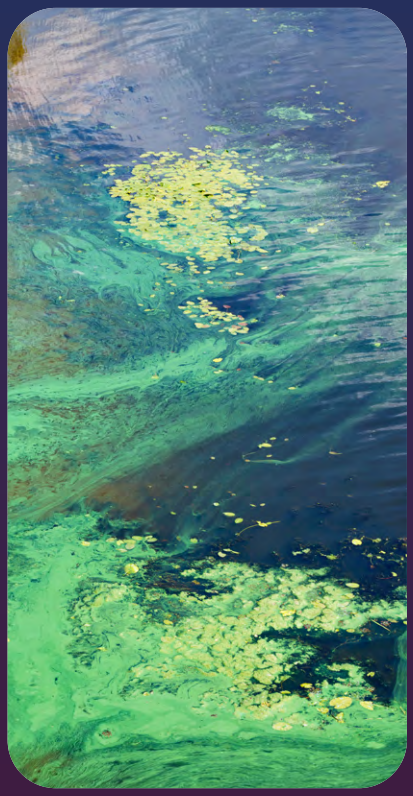


Photo credit: Adobe Stock

Harmful Algal Blooms

Harmful algal blooms, or HABs, can be especially damaging for fish. In some cases, these HABs are driven by nutrient pollution in the water from runoff. HABs can use up available oxygen in the water, leading to dead zones that can't sustain fish. HABs (often red tides) in the Southeastern U.S. produce a toxin that can lead to devastating fish kills that harm fish populations and limit fishing opportunity. Severe blooms can extend beyond estuaries and into reefs and offshore areas. The effects are immediate and can be long-lasting, having impacts on both fishing communities and local tourism. While HABs are naturally occurring, they are likely to increase both in intensity and duration in response to climate change.[35] In many areas, NOAA's National Centers for Coastal and Ocean Science, along with partners, provide HAB forecasts that warn the public and fishery managers when and where HABs are developing.

Solutions

Implement meaningful protections for essential fish habitats: Managers should implement protections that conserve and manage EFH to enhance fishery productivity, improve resilience to environmental change, provide shelter for other marine life, protect coasts from storms and flooding, and provide a host of other benefits. Vulnerable habitats and those essential to supporting key species should merit extra attention, including limits on harmful fishing gears. Habitat areas not previously exposed to fishing should be strongly considered for long-term protection. Assessments should be done routinely to understand whether or not fishing impacts are increasing in EFH to ensure sufficient reduction measures are being taken.

Reduce impact from non-fishing activities: The EFH consultation process, where NOAA advises federal agencies considering actions in EFH, should result in real actions that minimize impacts.

Implement precautionary management for forage fish: Because of their important role in the food web, forage fish need precautionary management that reflects their value in the water—and not just in nets.

Integrate water quality into stock assessments: Fisheries scientists are now finding ways to include the impacts of pollution, runoff and harmful algal blooms in stock assessments. Providing greater funding and capacity to integrate water quality considerations in stock assessments is an important step forward.

Photo credit: Scott Dickerson

Changing Ocean Conditions and More Frequent Disasters

There are few, if any, threats more serious for ocean ecosystems than climate change, which poses a substantial risk to the future of fisheries and the fishing communities that depend on them. Climate change is resulting in warming waters, ocean acidification and deoxygenation that are jeopardizing the long-term viability of fish stocks.[36] Warming has already caused declines in the productivity of fisheries, and the maximum potential catch globally could decrease as much as 25% by the end of the century.[37] Fish stocks are shifting their ranges and distributions deeper and poleward in search of cooler waters.[38] Other impacts include changes to how fish grow and reproduce, new interactions with prey and other species as fish adapt to changed conditions, and increased vulnerability to other stressors and disease. For fishermen, fluctuating timing of fish migrations, rising sea levels, increasing storminess and extreme heat are altering fishing practices and opportunities.

Climate change is also a problem for sustainable management, which takes a retrospective approach by using understanding of the past to inform management in the future. While this approach was relatively successful in periods with more consistent conditions, climate change is demanding that stability can no longer be taken for granted. In addition, managers have not traditionally taken ecosystem and climate information into consideration — either in stock assessments or in fishery management plans. This is needed to make management more responsive, yet a recent Government Accountability Office report found that progress is slow — only 12 of 46 fishery management plans included any information related to climate.[39]

Changing ocean conditions driven by climate change further exacerbate economic precarity, as fishermen face stocks that are moving from historic fishing grounds and showing changes in productivity — both of which can significantly affect the cost and consistency of continuing to catch fish. Even as fishing begins to adapt to changing conditions, some of the most basic solutions — such as moving fishing effort as stocks shift with warming waters — risk impacting, or even outright abandoning, historic fishing communities.[40]

Fisheries disasters are worse and more frequent

More intense climate-driven effects are accelerating the frequency and intensity of extreme, unpredictable shocks to ecosystems, such as hurricanes, marine heatwaves or harmful algal blooms — collectively referred to simply as disasters. These sudden events threaten the survival of many species throughout the ecosystem by causing impacts such as large-scale fish mortality, toxic phytoplankton or suffocation-inducing hypoxia.

Disasters also inflict serious pain on the livelihoods of fishermen and their communities. While there is an official "fishery disaster" process that afflicted states, Tribes or fisheries can use to request aid, the extreme length of time between impact and assistance — generally more than three years — severely limits the relief provided to stressed businesses.[41] In the last three decades, there have been over 75 climate-related fishery disasters, resulting in cumulative losses of over $3.2 billion.[42]

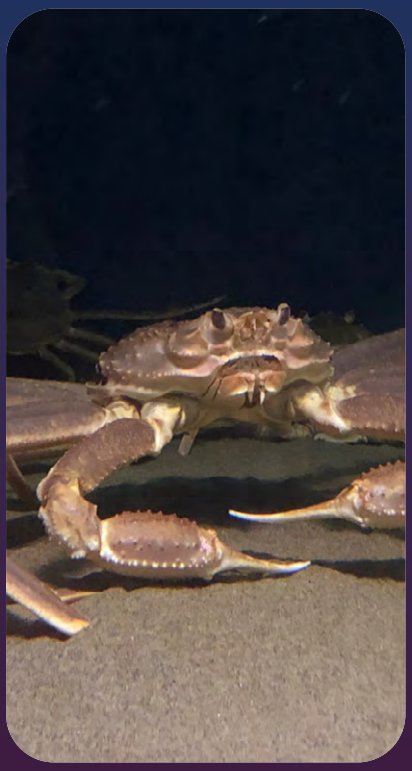


Photo credit: Lt. John Crofts / NOAA

Marine Heatwaves

Marine heatwaves are extended periods of warmer-than-usual ocean temperatures that can wreak havoc on ecosystems. The Pacific Coast experienced a large and persistent marine heatwave known as "the Blob" from 2014-2016. This climate-induced event killed species such as whales, dolphins, salmon and seabirds, caused huge abnormal shifts in the locations of many more, and spurred increases in toxic phytoplankton and hypoxia.[43] A similar marine heatwave occurred in the eastern Bering Sea in 2018-2019 and caused the loss of more than 10 *billion* snow crabs, eventually collapsing the related fishery and causing severe economic stress throughout the region.[44] This was particularly acute on the island of St. Paul, a mostly Indigenous community that declared a cultural, economic and social emergency in the wake of the disaster.[45]

Cuts to NOAA staff, data collection and monitoring programs now threaten progress towards the development of early warning systems to anticipate and respond to fishery disasters, undermining our ability to learn from past events.[46] There is also little guidance on fishery disaster response and recovery, increasing the risk that management decisions may have unintended effects, such as reducing the ability of the stock to recover or inadvertently spreading the economic impact to other fisheries and markets. There are also serious disparities in who is served by the status quo disaster response.

Independent, smaller-scale operators, who often have fewer options to respond to environmental shocks than larger vessels,[47] may be especially threatened as disasters become more frequent in the future. Those most in need can't afford to wait out the process and risk going out of business. Fishery disaster aid is typically distributed to vessels, but it is unknown how much of that aid ever reaches crew or other fishing-related sectors. All told, disasters and the inadequate response to them are shaping the character and long-term trajectory of entire fishing communities.

Solutions

Equip scientists and managers with climate science and data: Ecosystem and climate information must be made available to fisheries scientists and managers in formats and tools they can readily use. Increased support and resources for researchers, data collection and monitoring programs must be provided to better understand how environmental factors influence stock health, forecast ocean conditions deliver climate-informed stock assessments and develop early warning systems for fishery disasters.

Integrate climate considerations into management decisions: Managers must integrate climate information into management processes, including by taking action now with the tools and guidelines already in hand. Managers must also incorporate climate risk into management, especially for core decisions like setting catch levels. Shifting stocks and the fisheries that emerge when stocks are in new areas will require planning and monitoring.

Improve federal fishery disaster aid implementation and financial tools to keep fishermen afloat: The federal fishery disaster aid program is itself in desperate need of aid. Despite recent improvements, Congress must still appropriate funds for each individual disaster, and the length of time to receive aid is still counted in years. Alternative pathways to keeping fishermen financially afloat, such as fisheries insurance, should be further explored as well.

Improve disaster preparedness: Fishermen and managers should not be flying blind each time a disaster does strike. At minimum, creating a response plan for likely disasters a particular fishery will face — before they're needed — can identify options and give managers a chance to forecast and avoid unintended ecological and economic outcomes that might otherwise occur as fishermen scramble to adapt with little warning.

Photo credit: Bethany Kraft / Ocean Conservancy

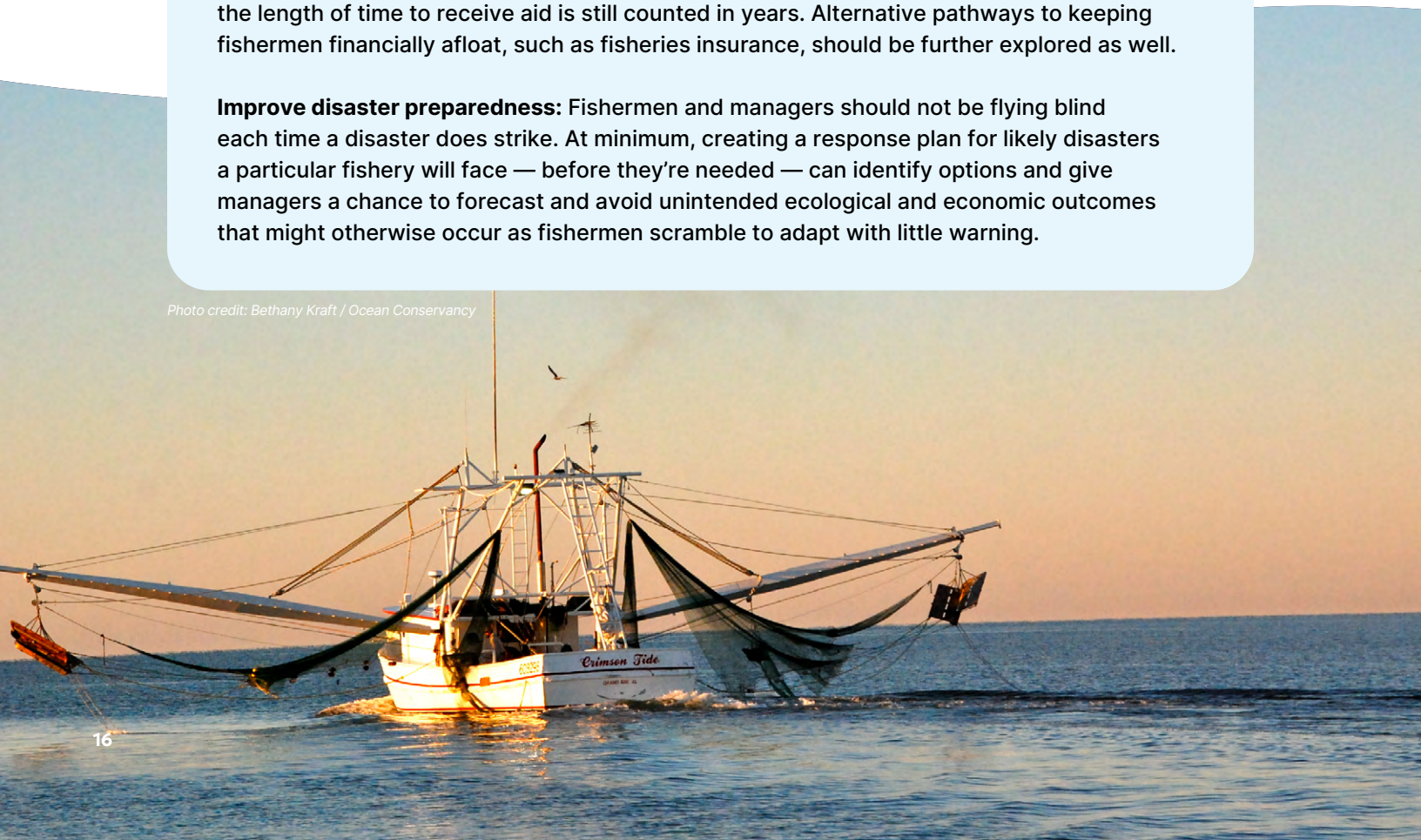


Photo credit: Adobe Stock

Economic Vulnerability of Fishing Communities

Sustainable fisheries are about both fish and people. Fisheries management is about conservation that delivers the most benefit for the nation, meaning that the well-being of the people who fish commercially, recreationally, and as part of subsistence and Tribal practices is critical to a successful system. Since healthy fish stocks allow for more fishing, efforts to conserve and manage fisheries for the long-term are fundamental to supporting fishing communities. While our fishing communities have largely recovered from the disastrous overfishing that led to collapses in the 1990s, they still face significant challenges due to declining and overfished stocks, climate shocks and economic headwinds. These short-term pressures can overwhelm management decision-making, leading to compromises that jeopardize the health of fish stocks and ecosystems.

Fishing and fish are central to the food security, culture and well-being of Tribal and Indigenous communities, yet many are facing dramatic impacts from management decisions and a changing climate. Without fish, every aspect of life is threatened and impacts are dire.

Fishing livelihoods are also an important contributor to many local economies. Commercial and recreational fishing together contribute more than $319 billion in sales impacts and support over two million jobs.[48] However, despite stable landings, commercial revenue in U.S. fisheries has been declining in recent years, from a high of $7.3 billion in 2021 (adjusted to real 2023 dollars) down to $5.12 billion in 2023 and $4.9 billion in 2024. Much of this decline has been driven by low seafood prices, growing costs, and shifting markets and supply chains. External economic forces, such as inflation, tariffs and rising fuel costs, continue to severely compound these impacts.

U.S. fishermen must also compete with seafood imported from outside the U.S., which is not always subject to the same standards and strong enforcement under which U.S. fisheries operate. Foreign fisheries that undercut prices through illegal fishing, forced labor or weak environmental practices inflict harm on U.S. fishermen that play by better rules and deserve a fair price for their catch.

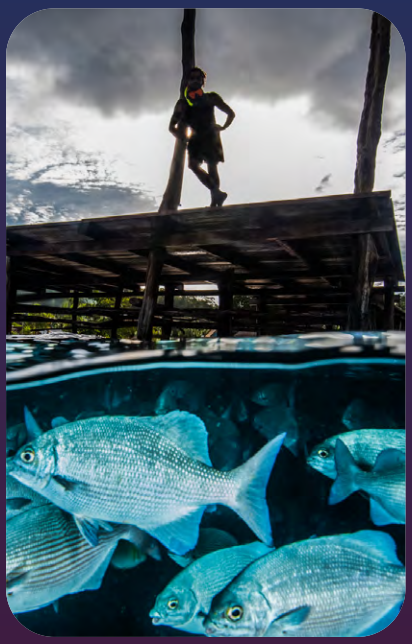


Photo credit: Eliska Mencova

Community Economic Vulnerability

Economic challenges to individual fisheries also create severe economic vulnerability for entire coastal communities. The knock-on effects for fishing-related economies, such as the closing of processing plants, can leave many local residents unemployed and drain small communities of more than half their tax revenue, undercutting important social services.[49] Even under normal circumstances, fishing-dependent communities are more susceptible to disruptions than other coastal communities, based on social indicators including personal disruption, poverty, housing disruption and housing characteristics.[50]

Solutions

Leverage U.S. policy to minimize threats from unfair import competition: Policies that hold foreign imports to the same sustainable standards as U.S. seafood, such as the Marine Mammal Protection Act and NOAA's Seafood Import Monitoring Program (implemented under the MSA), can help keep U.S. fishermen competitive while creating conservation incentives domestically and abroad. Strong enforcement and increased data transparency, crucial for progress on curtailing the importing of seafood sourced from illegal, unreported and unregulated fishing, will continue to be necessary in the future.

Clearly identify community priorities in management: A key part of the equation for sustainable fisheries is transparently considering the long-term social, economic and cultural goals of fishing participants. Establishing shared goals for management can help all participants consider the tradeoffs of different approaches under consideration, help identify where goals (either within one fishery or across fisheries) may be in conflict or alignment with another, and help managers develop targeted solutions for community problems.


Photo credit: Alamy

Deregulation and Poor Governance

In the last 50 years, the management under the MSA has risen to new challenges; improved the health of stocks; expanded to consider ecosystem impacts of fishing; and supported industry, culture and recreation. But instead of tackling the modern-day challenges, there is a concerning trend to turn away from the best practices that we know deliver sustainable fisheries.

Removing stocks from federal management

Fisheries management works — studies consistently show that managed fisheries recover from overfishing, better support communities, and keep catch at sustainable levels.[51] The MSA recognizes this, defining that fisheries are in need of "conservation and management" to rebuild and maintain them so they can supply food and recreational benefits and so that adverse effects on the environment are avoided.[52]

But NOAA Fisheries and some of the councils are now acting to remove stocks from federal management, citing time and resource constraints. Stocks removed from management could be handed over to the states, removed from management protections altogether, or retained within the federal system as "ecosystem component species" that have few or no management safeguards in place.

Moving stocks to state management comes with risk. Fish stocks that are solely managed by states have lower management intensity, more uncertainty as to the status of stock health and weaker management requirements.[53] Many states are simply not equipped with the same infrastructure as

the federal system to support data collection, assessment and management analysis that is needed to keep stocks sustainable. States often cannot estimate whether overfishing is occurring or calculate the abundance of fish stocks. And most do not have best-practice requirements to end overfishing and rebuild stocks.

In the rush to remove stocks from management, it's unclear how decisions are being made and what the cost of those decisions may be for ecosystems, fish stocks and communities. For example, on the West Coast, 35 groundfish stocks are being removed from management and an additional 18 are being recategorized as ecosystem component species; three stocks are only being managed federally in part of their range, creating a patchwork of management. The likely impacts of this shift — on management, the health of the stock or the fishing community — are entirely unknown.

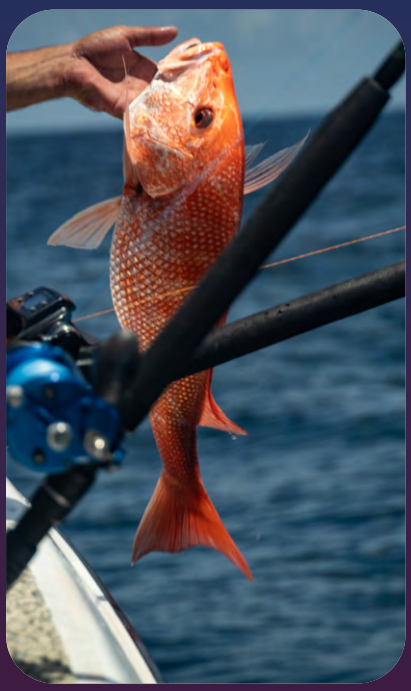


Photo credit: Adobe Stock

Challenges in the Shared Management of Gulf Red Snapper

Even stocks in shared management partnerships between the federal government and states have shown declines. In the Gulf, there has been nearly a decade of state-delegated management for private recreational red snapper, and managers are considering extending this model to other fish stocks and regions. But there are concerning signs that the stock — once a rebuilding success story — is in decline. Fishermen are having to travel further offshore to catch red snapper and the average size of the stock is declining, which are clear signs that fishing pressure is too high.

Best practices and legal requirements are being eroded

Successful fishery management requires frequent and adaptive revisions within a strong structural framework; for example, new catch limits are set, the opening dates of seasons are changed, the distribution of catch among users is modified to achieve the goals of the MSA. Regulations are therefore used to customize fishery management, maximizing opportunities for fishing while conserving the fish stock for ecosystem health and future opportunity. They are also critical for implementing new data-collection programs, many of which are co-developed with the fishing industry.

Photo credit: Helena Lemos

Negative perceptions of regulation, combined with the inherent challenges of managing so many different types of fishing, have led to efforts to add "more flexibility" to fishery management or to "deregulate" fisheries. While policies and investments are needed to support fishermen adapting to conditions on the water, it's essential they are consistent with core and proven fishery management principles that have delivered important progress addressing overfishing and rebuilding stocks. Rolling back important regulations risks the long-term health of economically important stocks. Flexibility and deregulation also carry a high risk of unintended consequences; for example, new habitat or bycatch interactions, unexpected fishing mortality, localized depletion, and economic impacts — such as price declines in the face of market gluts — may follow.

Concerns about overregulation are driving delays at NOAA in issuing the core regulations that operate fisheries. For example, seasons have opened late or stayed open for too long, which costs both near-term opportunity and can cause damage to stocks that results in lowered catch limits later. Efforts to open new fishing opportunities through the use of exempted fishing permits, like those being considered for red snapper in the South Atlantic, risk allowing catch to far exceed limits that are already set at levels to allow the maximum sustainable amount of fishing.

Fishery management councils leave out key voices

The MSA lays out a unique management framework that includes input and decision-making from state and federal resource managers, fishermen and the fishing industry, scientists and the public through the councils. While this system allows for regionalized development of fishery management plans, there are limited seats, the process for getting a seat is highly political, and many stakeholders are shut out of the process.

In some regions, the council membership is heavily skewed toward commercial interests and, in other regions, towards recreational interests. There are many other groups with a stake in healthy fisheries, including Indigenous people, conservation representatives and coastal business owners who depend on healthy fisheries to support local tourism,

yet these groups are rarely represented on the councils. In a past survey, more than 90% of council members believed they were appointed to represent, and did indeed represent, a specific sector of the fishing industry.[54]

Native American people have stewarded fisheries and oceans for millennia, long pre-dating the MSA, and hold sovereign and inherent rights to fish and manage fisheries. Yet most are excluded from the federal fishery management process, and the rights and food security of Indigenous people are not considered in management decisions. For example, there are 229 federally recognized Tribes in Alaska, but there is no dedicated Tribal seat on the North Pacific Council.

Solutions

Improve representation on councils: Ensuring fair and balanced council makeup is critical for supporting the interests of a diversity of fisheries and for balanced management outcomes. NOAA Fisheries has a responsibility to ensure the impacts of fishery management decisions are not disproportionately harming particular communities. The nomination and appointment process should prioritize representation and balance in a way that is transparent and includes thoughtful consideration of the concerns of unrepresented sectors.

Ensure a meaningful role for Native American Tribes in management: Ensuring a meaningful role for Tribes on the councils and throughout the management process recognizes the sovereignty of Tribes and will lead to better management. Tribal seats can ensure representation, and incorporation of Tribes and Indigenous Knowledge throughout the process is critical to the future of our fisheries.

Require rigorous justification to remove stocks from federal management: When considering removing stocks from management, the burden of proof should be high to show that the move is justified. Any changes should occur only after transparent and stakeholder-inclusive processes and should be accompanied by careful analyses to understand the impacts. Robust follow-up monitoring should occur to detect any emerging problems before they can cascade. Any decision to shift management from one authority to another needs to be taken with thought, analysis and careful consideration of impacts, as well as with input from the fishermen and others who would be affected.

Issue regulations promptly: Delays in issuing regulations after councils have acted mean that outdated regulations remain in place and that opportunities to improve management are lost. It is critical to effectively implement the management measures that keep fishing sustainable. Issues within NOAA Fisheries that delay prompt action should be addressed.

Maintain proven conservation practices: Efforts to update management and empower fishermen to be more adaptable are important. But changes that remove proven conservation solutions, or that alter how fisheries interact with each other and the environment, should be carefully considered before action is taken. Investment in data and science that can equip managers with the ability to better forecast likely changes in fishing behavior resulting from policy changes, including subsequent market impacts or cross-fishery conflicts, will be a key tool for identifying and addressing unintended consequences — both ecological and economic.

Conclusion

Over the last fifty years, Congress, fishery managers, scientists, fishing interests and other stakeholders have worked together to build a fishery management system that has delivered rebuilt stocks and increased fishing opportunities. It's a story of adaptation, cooperation and innovation. But the work isn't done. To paraphrase Benjamin Franklin, we have a successful system — if we can keep it.

The future of fisheries is going to depend on continued efforts to address the new challenges outlined in this report. The ocean is changing and stressed by climate change, pollution and expanding industrial demands; the markets for fishery products are under strain; and an increasing number of people want opportunities to fish. Overall, our current systems for dealing with these challenges are falling short, and our investment in solutions is insufficient.

But there is no reason to believe we can't be successful. New technologies, new partnerships, new science and new opportunities can help us rise to these challenges as we've done in the previous five decades. Working together, we can ensure future generations can fish on abundant stocks in healthy ecosystems.

Photo credit: Patti Davidson

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