RECOMMENDATIONS TO IMPROVE THE HEALTH AND SUSTAINABILITY OF AMERICA'S MARINE FISHERIES

INTRODUCTION

Since 1998, the American Fly Fishing Trade Association (AFFTA) has been dedicated to guiding the sustainable growth of the fly fishing industry through both trade development and stewardship. Recognizing that the long-term enjoyment of wild places and quality fly fishing requires a sustained commitment to stewardship and conservation of the natural world, AFFTA established the AFFTA Fisheries Fund (AFF) in 2015. AFF works to leverage the full weight of the fly fishing industry to protect and restore our fisheries, amplify the industry's conservation voice, and provide powerful business support for critical conservation issues.

A 2019 report from the United Nations provided the first-ever global scientific consensus on the health of the oceans and the picture it painted was grim.[1] Without dramatic action our marine fisheries and habitats—as well as our recreational fishing—have a tough road ahead. But the other message sounded by these same scientists is that it is not too late to make a difference. As voices of the fly fishing industry, AFFTA and AFF believe it is our responsibility to advocate for the solutions that will allow fisheries—and anglers—to thrive over the long term.

In response to growing threats to healthy marine fisheries and their habitats, AFFTA and AFF undertook a rigorous process to identify and better understand the primary issues related to marine fisheries and habitats. Our goal was to identify policy solutions capable of addressing these threats head-on. To marshal this effort, we convened a Steering Committee of AFFTA members in 2019.

To identify and instruct us on the primary threats to the sustainability of our marine fisheries, the Steering Committee assembled a "blue ribbon" panel of top scientists and managers (see page 28 for committee and panel membership). For each of the topics in this report, we consulted with experts in their respective fields to ensure a diversity of thought and input.

This Blue Ribbon Panel Report identifies a set of solutions that, on their implementation, will strengthen marine fisheries conservation and management, and help lead to more abundant and sustainable recreational fisheries (see summary on page 3). We recognize this solution set is not exhaustive, but it is focused and achievable.

There are numerous issues threatening our fisheries that the fly fishing industry have fought long and hard to address: the threat to Bristol Bay from development of the Pebble Mine, the overwhelming issue of ocean plastic pollution, and the continued decline of the Everglades fishing grounds, to name three. The solutions identified in this report represent a comprehensive and systematic approach that help

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address these and other marine fisheries issues in U.S. coastal and offshore waters, including U.S. territorial waters in the Caribbean, Hawaii, and the far Western Pacific.

In the background, as the Steering Committee and Blue Ribbon Panel crafted their recommendations, there was the ongoing drumbeat of climate change. Far from diminishing or even remaining a steady cadence, the impacts of climate change have continued to grow and magnify. Witness a few:

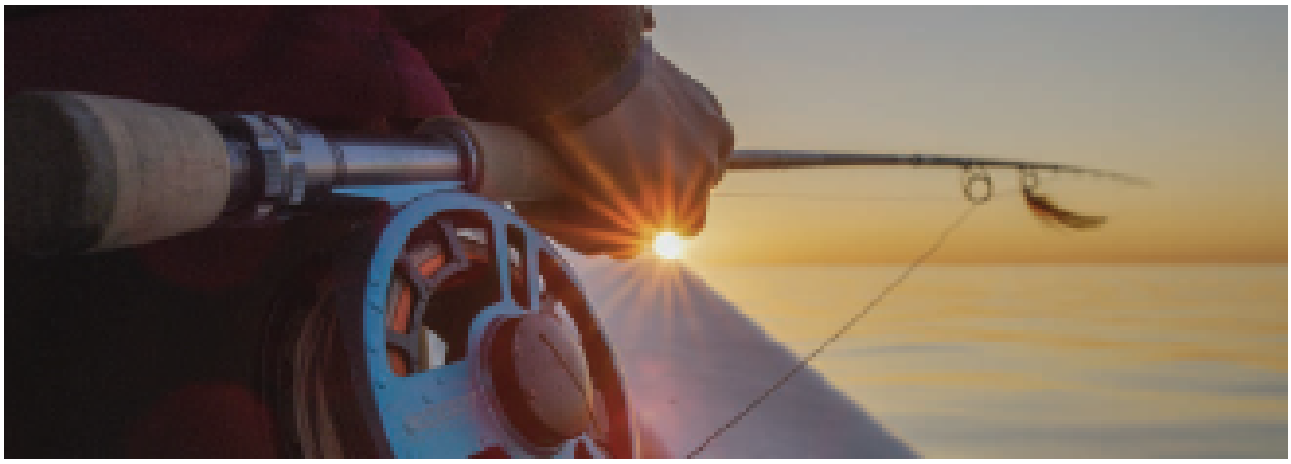
- Chronic and debilitating drought in the western U.S.
- Increasingly violent and unprecedented weather events—hurricanes, storms, and floods
- Higher water temperatures leading to stressed fisheries and reduced fishing opportunities
- Shifting migrations and fish displacements

Importantly, the increasing impacts of climate change have not altered the recommendations presented here. To the contrary, climate change is making these recommendations more and more urgent to address as the window to make proactive, meaningful, and lasting responses gets smaller and shorter.n 2022, AFF and partners launched Tomorrow's Fish to raise knowledge and awareness and move anglers to engage in actions that build climate-ready fisheries.

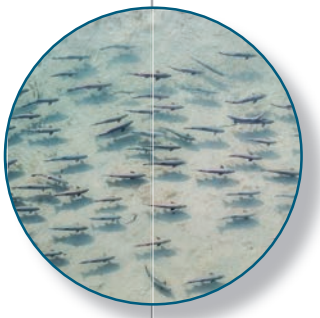
We urge the fly fishing industry to continue to work together in pursuit of these solutions. We need to lead; We need to act.

Lucas Bissett
AFFTA Executive Director

Whitney Tilt
AFF Executive Director



AFFTA's policy solutions fall under three key categories:



RECOVER IMPERILED & OVERFISHED SPECIES

1. Continue to implement the conservation requirements in the Magnuson-Stevens Act
2. Extend proven conservation requirements to fisheries managed by the Atlantic States Marine Fisheries Commission
3. Recover wild salmon and steelhead in the Pacific Northwest

MANAGE FOR ABUNDANT RECREATIONAL FISHERIES

4. Manage for abundance in US recreational fisheries
5. Ensure forage fish are managed in a way that acknowledges their role as a food source
6. Improve the accuracy, timeliness, and compatibility of data collection in recreational fisheries

ADDRESS KEY THREATS TO SUSTAINABLE FISHERIES

7. Protect wild fish populations from industrial finfish aquaculture
8. Give managers tools to adapt to climate change impacts in the oceans
9. Improve habitat protection and increase habitat restoration

POLICY SOLUTIONS

RECOVER IMPERILED & OVERFISHED SPECIES

1. Uphold the science-based measures that end and prevent overfishing and ensure prompt rebuilding of federal fisheries.

- Continue to base fisheries management decisions in best scientific information available.
- Ensure annual catch limits and accountability measures are applied to all sectors.
- Swiftly recover overfished fisheries using current rebuilding timelines, which will ensure abundance and increase fishing opportunities.

2. Extend proven conservation requirements to fisheries managed by the Atlantic States Marine Fisheries Commission

- Require an immediate end to overfishing, establish annual catch limits for all stocks, and impose accountability measures when catch limits are exceeded.
- Require within two years a rebuilding plan intended to fully rebuild the stock within a specific time period for any stock designated as overfished.

3. Improve recovery efforts for wild salmon and steelhead in the Pacific Northwest

- Transition to place-based management that emphasizes harvest of targeted fisheries in or near rivers of origin, and away from ocean mixed-stock fisheries.
- Significantly reduce reliance on hatcheries to recover and maintain genetically diverse wild salmon and steelhead populations.
- Identify and protect cold-water refuges to help mitigate the impact of climate change and warming waters on salmon and steelhead populations.

MANAGE FOR ABUNDANT RECREATIONAL FISHERIES

4. Manage for abundance in U.S. recreational fisheries

- Require managers to:
  - Account for the economic and social importance of abundance to recreational fisheries when setting optimum yield for fisheries.

- Include goals and objectives in a fishery management plan that address the value of having an abundance of fish in the water.

- Fund research into the tools and methods to appropriately value abundance in recreational fisheries.

5. Promote abundance by ensuring forage fish are managed in a way that acknowledges their role as a food source

- Require Councils to identify and manage important forage fish in the region, and to set harvest limits for those forage fish that account for its role in the ecosystem.
- Prohibit the creation of new directed fisheries on forage fish until management measures have been put in place to adequately protect the stock.
- Establish buffer zones around areas important to recreational and commercial fishermen to protect fishing grounds from industrial-scale harvest and prevent localized depletion.

6. Improve the accuracy, timeliness, and compatibility of data collection in recreational fisheries

- Fund efforts that increase angler awareness of the importance of providing accurate and timely information to the Marine Recreational Information Program and other fishery surveys.
- Establish minimum standards for all data used to measure recreational effort, catch and landings before they are certified as MRIP-compatible and used to establish federal fishing regulations.
- Increase investment in MRIP to foster improved data collection and validation.
- Support new research to evaluate ways to increase the participation and accuracy of angler-provided data.

ADDRESS KEY THREATS TO SUSTAINABLE FISHERIES

7. Protect wild fish populations from industrial finfish aquaculture

- Establish clear standards ensuring exemplary economic and environmental safeguards for open-ocean finfish aquaculture.
- Explore and, if appropriate, support alternative finfish aquaculture opportunities, such as through closed-loop, land-based facilities.

8. Ensure managers have the appropriate knowledge, information and tools to sustainably manage fisheries in light of climate change impacts

- Create and adequately fund a federal climate-fisheries initiative that can assist managers with the data, information and tools necessary to manage fisheries in a changing climate.
- Establish clear legal standards to address allocation conflicts between jurisdictions.
- To increase the resilience of fish stocks, require Councils' scientific and statistical committees to account for the effects of climate change when recommending acceptable biological catch.

9. Improve fisheries habitat protection and increase habitat restoration

- Improve the integration of habitat protection into fisheries management by incorporating habitat protection and restoration action into fishery management plans.
- Ensure habitat protection and restoration is designed to account for the impacts of climate change.
- Identify and prioritize protection and restoration of blue carbon habitats, which are coastal habitats like mangroves and tidal marshes that effectively store carbon, providing a critical natural solution to mitigate the impacts of carbon emissions.

RECOVER IMPERILED & OVERFISHED SPECIES

1. UPHOLD THE SCIENCE-BASED MEASURES THAT END AND PREVENT OVERFISHING AND ENSURE PROMPT REBUILDING OF FEDERAL FISHERIES

BACKGROUND

The management of our ocean fisheries in the United States is a conservation success story. Dozens of ocean fish that saw major declines as a result of overfishing have today been recovered thanks to the conservation policies that guide federal fisheries management.

The Magnuson-Stevens Act is the primary law governing the management of fisheries in U.S. waters. The law was enacted in 1976 with a goal to ensure the sustainability of U.S. federal fisheries. At that time, United States fishermen shared fishing grounds with a large, completely unregulated fleet of foreign fishing vessels that removed massive quantities of fish from the waters of the continental shelf, impaired the health of fish stocks and outcompeted U.S. fishermen.[2] The Fishery Conservation and Management Act pushed most foreign fishing vessels out of the United States' exclusive economic zone (generally, those waters between 3 and 200 miles from shore), and established a framework for managing the nation's marine fisheries.

Through the 1980's-1990's, despite a clear purpose to manage for the long-term sustainability of the nation's fisheries, the law's conservation and management provisions proved inadequate to prevent overfishing. Regional fishery management councils routinely exceeded maximum sustainable yield with little accountability. Fish stocks fell into a sharp decline, with many important fisheries at a fraction of historical levels.

Congress intervened, and in 1996 amended the law to legally obligate federal fishery managers to prevent overfishing and rebuild overfished stocks within a clearly defined time period, which for most stocks is no more than ten years. Congress also required that fishery management plans and decisions made under those plans be based on the best available science.

Legally requiring federal fishery managers to prevent overfishing and rebuild overfished stocks within a time certain clearly benefitted fish populations. Many began to rebuild.

However, there were also instances when fish stocks did not respond to new management measures. One key issue was that fishermen were not held accountable when they removed too many fish from a population. Once again, Congress intervened and passed the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006,[3] which included language that required federal fishery managers to set annual catch limits for nearly all of the stocks that they manage, and to hold fishermen accountable when those limits are exceeded.

Today, the Magnuson-Stevens Act is considered a global gold standard of federal fishery management systems. The strong conservation framework of the law works because it requires management decisions to be driven by science, and ensures that all fishermen – whether they are casual anglers or commercial fishermen – be accountable to stay within allotted catch limits. As a result, the U.S. has been methodically recovering federal fisheries from coast to coast. To date, nearly fifty previously overfished stocks have been recovered, and overfishing is near all-time lows.[4]

The recovery of our federal fisheries is creating new and more saltwater fishing opportunities, and the fly fishing industry is seeing a surge in saltwater fly fishing sales. Collectively working to ensure vigorous implementation of the science-based measures embodied in the Magnuson-Stevens Act will create additional opportunities for the fly fishing industry as more fisheries are recovered to abundance.

POLICY SOLUTIONS

- Continue to base fisheries management decisions in best scientific information available.
- Ensure annual catch limits and accountability measures are applied to all sectors.
- Swiftly recover overfished fisheries using current rebuilding timelines, which will ensure abundance and increase fishing opportunities.

RECOVER IMPERILED & OVERFISHED SPECIES

2. EXTEND PROVEN CONSERVATION REQUIREMENTS TO FISHERIES MANAGED BY THE ATLANTIC STATES MARINE FISHERIES COMMISSION

BACKGROUND

The Atlantic States Marine Fisheries Commission (ASMFC) is an interstate compact formed in 1942. Like the related Gulf States Marine Fisheries Commission and Pacific States Marine Fisheries Commission, it was originally conceived as an advisory panel, which would provide fishery managers from states in the region opportunity to meet, confer and cooperate with respect to local fisheries issues.

The ASMFC's role changed in 1984, after the Atlantic striped bass stock collapsed and Congress passed the Atlantic Striped Bass Conservation Act (Striped Bass Act) with the hopes of ending the collapse and bringing about the species' recovery.[5] The Striped Bass Act gave the ASMFC leverage to compel the states to comply with the ASMFC's striped bass management plan. Any state found by the ASMFC to be out of compliance with the plan was subject to a federally-imposed moratorium on the state's striped bass fishery until compliance was achieved. The ASMFC's plan, and the states' ensuing compliance, resulted in the recovery of the striped bass population in 1995.

With the success of the Striped Bass Act, and the looming collapse of other important fisheries under the ASFMC's control, Congress passed the Atlantic Coastal Fisheries Cooperative Management Act (Coastal Fisheries Act) which, using the Striped Bass Act as a model, gave the ASMFC leverage to compel compliance with the management plans for any species under the ASMFC's jurisdiction.[6]

Unfortunately, despite this leverage, the ASMFC has failed to rebuild a single overfished stock since the Coastal Fisheries Act was passed. Even striped bass, once the ASMFC's sole success story, is again overfished and experiencing overfishing.[7]

Since the striped bass fishery was rebuilt, the ASMFC has demonstrated an unwillingness to make difficult decisions and take the often unpopular actions needed to rebuild and maintain healthy fish stocks.

As a result, out of the 23 stocks managed solely by the ASMFC, only five are deemed to be fully healthy, while eleven are considered overfished. The status of the rest is unknown.[8]

The ASMFC's troubling track record can be traced directly to political pressure that leads the Commission to prioritize short-term social and economic concerns over the long-term health of fish stocks. This same dynamic existed in the management of federal fisheries before Congress enacted the Magnuson-Stevens Act, which prioritized science-based fisheries management. A similar re-orientation is needed within the ASMFC. Like the federal fishery management councils, the Commission should enforce an immediate end to overfishing, and act swiftly to create rebuilding plans for overfished stocks. The Commission, like the Councils, should rely solely on the advice of its scientific advisors when setting catch limits. The Commission must also follow the dictates of its own management plans.[9]

In the case of striped bass, arguably the most important fish stock on the Atlantic coast, and a favorite target of saltwater fly fishermen, the ASMFC ignored a 2011 warning from its scientists that the stock would become overfished under current management, choosing to forgo harvest reductions and declaring striped bass to be a "green light fishery."[10] Then in 2014, the Commission ignored its own fishery management plan to rebuild female spawning stock biomass when it fell below target.[11] Despite the seemingly mandatory language of the plan, no remedial action was taken. Even after the stock was declared overfished, which tripped another management trigger that clearly calls for mandatory rebuilding, no action to restore the stock to its target level was taken.

The proven success of the federal fishery management regime stands in stark contrast to the failed record of the ASMFC. Striped bass, red drum, and a host of other fisheries managed by the ASMFC are the lifeblood of many fly fishing businesses along the Atlantic Coast. The Commission must take steps to ensure these important fisheries are sustainably managed for the long-term by adopting the science-based measures of the federal fisheries management system.

POLICY SOLUTIONS

- Require an immediate end to overfishing, establish annual catch limits for all stocks, and impose accountability measures when catch limits are exceeded.
- Require within two years a rebuilding plan intended to fully rebuild the stock within a specific time period for any stock designated as overfished.

RECOVER IMPERILED & OVERFISHED SPECIES

3. IMPROVE RECOVERY EFFORTS FOR WILD SALMON AND STEELHEAD IN THE PACIFIC NORTHWEST

BACKGROUND

Wild Pacific salmon and steelhead are among the most revered fisheries on the planet, and draw anglers from around the world to fish the anadromous rivers of the West, from Northern California to Western Alaska. Yet, these icons of the angling world are teetering on the brink. Across the Pacific Northwest, less than 5 percent of historic populations of wild salmon and steelhead return to their natal rivers each year. Wild salmon have been extirpated from 40 percent of their historical range due to habitat loss and degradation. As a result, more than half of the region's 52 population groups have been designated as threatened or endangered under the Endangered Species Act.

The three biggest culprits to the precipitous decline of wild salmon and steelhead are loss of habitat (both from habitat degradation and blockage by dams), overfishing, and the impact of hatchery fish on wild fish. Yet, despite a clear understanding of the threats, robust scientific understanding of salmon ecology, and billions of dollars thrown at the problem, management has generally failed to rebuild depressed wild salmon and steelhead populations or to manage many of them sustainably. In the past three decades, none of the 28 ESA-listed population groups (17 salmon; 11 steelhead) have recovered enough to be delisted despite reductions in fishing seasons, both in the river systems and in saltwater.

Recovering wild salmon and steelhead populations will require a paradigm-shift that puts science and the ecology of these species at the forefront of management. Current salmon management assumes wild salmon can be sustainably harvested in mixed-population fisheries in the ocean, and that losses of wild salmon can be sufficiently mitigated by hatchery fish and habitat restoration projects. Yet, the vast majority of science demonstrates this management approach is leading to wild fishery declines. We will not be able to reverse the troubling decline of our wild salmon populations without rethinking these assumptions.

The health of wild salmon and steelhead populations is highly variable, with some strong runs, like Bristol Bay sockeye (both sport and commercial), and the wild steelhead of British Columbia's Skeena system. Yet, many salmon runs are grossly depleted, and as a result are protected under the Endangered Species Act. Part of what makes salmon management difficult is this variation in stock health, as salmon from many different populations can mingle in local waters.

For example, salmon stocks from many different rivers congregate in the oceans. Currently, a common management strategy is to treat these mixed-population groups as a single fishery, even though the fishery may contain both healthy and threatened salmon stocks. The result is that the harvest rates set on a mixed-stock fishery can inadvertently deplete the smaller or less productive stocks, further threatening their viability. A similar scenario can happen in rivers, where several salmon species may occur in the river at similar times.

To avoid unintentional over-harvest of our threatened salmon stocks, and to properly acknowledge the variability among Pacific salmon, management should transition to single-stock fisheries. Recent modeling studies have found that single-stock fisheries were more effective in maximizing the amount of harvest opportunity on healthy stocks, while more effectively maintaining stocks of conservation concern.[12]

River-specific management, also referred to as place-based management, is an approach that has been effectively employed for many Atlantic salmon populations and rivers, and would support single-stock fisheries. Requiring fisheries to be located as close as practical to the rivers of origin of the target population would significantly reduce pressure on threatened stocks. The Bristol Bay sockeye salmon fishery is a great example of this approach. Focusing on river-specific management would allow managers to set clear targets for the number of spawning fish allowed to migrate up the river; develop habitat protection and restoration criteria that support spawning and juvenile rearing; describe and maintain the biological diversity of each species and populations within the river; and prevent interbreeding between hatchery and wild fish. River specific management would also employ selective fishing methods and gear that can release fish unintentionally caught with no or very low mortality. Innovative fish traps currently being piloted on the Columbia River are one very effective example.[13]

There is a mistaken belief among some that large-scale hatchery production is the only way to recover salmon and steelhead populations to fishable and harvestable levels. But a clear body of science has demonstrated that hatchery fish harm the genetic integrity and vigor of wild salmon and steelhead populations, and reduce survival and reproduction in wild stocks. Hatchery fish also compete with wild salmon for prey and habitat, which might be particularly problematic in the ocean, where billions of hatchery fish congregate from around the Pacific Rim. Perhaps most important to consider, hatcheries create an illusion of salmon and steelhead

abundance, which in turn has created an angling "constituency" for hatchery fish, even at the expense of the recovery of our wild salmon and steelhead populations. Reducing reliance on hatcheries is necessary if we truly care about recovering wild salmon and steelhead. In the short term, this may require trade-offs that reduce fishing opportunities today to secure long-term recovery.

In addition to reducing reliance on hatcheries, current efforts to restore and open access to habitat isolated by dams must continue. But in restoring habitat, we must consider the effects of climate change. In the Pacific Northwest, climate change is, among other factors, leading to warming stream temperatures. In some large rivers, like the Columbia – where one to two million adult salmon and steelhead migrate upriver each year – warming stream temperatures can reach harmful and sometimes even lethal temperatures in the summer months. To minimize exposure to excessively warm waters, salmon and steelhead will rest in areas where cooler tributary rivers flow into the mainstem. These areas are referred to as cold-water refuges. Anglers have come to recognize these refuges as prime fishing spots, and fishing pressure (including catch and release) in these locations has been shown to minimize the successful return of these fish to their spawning grounds.[14] To effectively recover salmon and steelhead populations in the Columbia basin – and likely elsewhere – cold water refuges

should be identified and fishing in these refuges should be restricted.

The steps to recover our wild salmon and steelhead populations will not be easy, but the risk of losing these storied fisheries is real. Recovery will require bold action from managers and a collective commitment from the angling community. Wild salmon and steelhead can and will rebuild themselves because they are adaptable, resilient, persistent and incredibly productive – we just need to give them a chance.

POLICY SOLUTIONS

- Transition to place-based management that emphasizes harvest of targeted fisheries in or near the rivers of origin, and away from ocean mixed-stock fisheries.
- Significantly reduce reliance on hatcheries to recover and maintain genetically diverse wild salmon and steelhead populations.
- Identify and protect cold-water refuges to help mitigate the impact of climate change and warming waters on salmon and steelhead populations.

MANAGE FOR ABUNDANT RECREATIONAL FISHERIES

4. MANAGE FOR ABUNDANCE IN U.S. RECREATIONAL FISHERIES

BACKGROUND

The Magnuson-Stevens Act includes national standards and other legal provisions that govern all fishing in the federal waters of the United States. National Standard 1 requires that "Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry."[15]

The Act defines optimum yield:
The term 'optimum,' with respect to the yield from a fishery, means the amount of fish which—

(A) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems;

(B) is prescribed as such on the basis of the maximum sustained yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and

(C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.[16]

What this means is that regional fishery management councils can lower harvest levels to ensure the optimum availability of fish to meet goals related to recreational fishing and/or the environment. However, it is unusual to see a council consider any economic, social or ecological factors when setting optimum yield.

Because many managed stocks support large commercial fisheries, the regional fishery management councils generally seek to maximize harvest, and so set the optimum yield in managed fisheries at or very close to maximum sustainable yield (MSY) (which is the maximum level of harvest that can be sustained in a healthy population). Managing to MSY makes sense in commercially dominated fisheries, where both food production and economic benefits are generally tied to harvest levels. But managing for maximum harvest at the expense of abundance doesn't work as well for recreational fisheries. Because anglers are primarily seeking recreational opportunities, not food, having an abundance of fish to catch – including big fish – provides the opportunity and economic value that saltwater guides, as well as everyday anglers, need.

In some fisheries, particularly those targeted by fly fishermen (e.g., Atlantic bluefish), anglers release a large proportion of the fish that they catch.[17] In such release-dominated fisheries, abundance drives angler effort,[18] and angler effort drives economic activity for the recreational fishing industry. Such fisheries provide a perfect example of when optimum yield should be reduced below MSY in order to generate greater abundance, and the greater social and economic benefits that such abundance would generate.

So far, no regional fishery management council has explicitly considered the value of abundance in setting optimum yield. There is no established methodology for calculating how ecological, social, or economic factors might be used to set an optimum yield below

MSY. Because such actions are so seldom taken, there are no court decisions that have construed Magnuson-Stevens' language and provide guidance on how such calculations ought to be done.[19]

Recently, the Mid-Atlantic Fishery Management Council asked stakeholders to comment on both the "economic and intrinsic value of recreationally released fish" and the "value of unharvested quota" in its pending review of the Atlantic bluefish fishery.[20] Thus, it appears that fishery managers may be ready to at least consider setting an optimum yield that significantly differs from MSY. They should be encouraged to do so.

Setting an optimum yield well below MSY, based on ecological factors, is also seldom done, although some conservation groups are aggressively advocating for the National Marine Fisheries Service (NMFS) to do so with respect to forage fish.[21]

Historically, regional fishery management councils have been reluctant to establish optimum yield below MSY, despite the clear language of Magnuson-Stevens that provides for such action. Yet, as the current Bluefish amendment process suggests, councils may be willing to consider setting such lower optimum yields in the future, if a viable argument based on economic, social, and ecological factors can be made.

Such a lower optimum yield would benefit the fly fishing industry, as it would lead to greater fish abundance, a likely increase in the abundance of larger fish (higher fishing mortality rates tend to remove a disproportionately higher number of large fish from a population), and a resultant increase in angling effort, as fishermen are more likely to venture out on the water when fishing is good. Setting optimum yield based on a consideration of ecological factors is also likely to yield a greater abundance of forage fish species, which will benefit the larger game fish – such as striped bass, redfish and bluefish – that many saltwater anglers pursue.

POLICY SOLUTIONS

- Require managers to:
  - Account for the economic and social importance of abundance to recreational fisheries when setting optimum yield for fisheries.
  - Include goals and objectives in a fishery management plan that address the value of having an abundance of fish in the water.
- Fund research into the tools and methods to appropriately value abundance in recreational fisheries.

MANAGE FOR ABUNDANT RECREATIONAL FISHERIES

5. PROMOTE ABUNDANCE BY ENSURING FORAGE FISH ARE MANAGED IN A WAY THAT ACKNOWLEDGES THEIR ROLE AS A FOOD SOURCE

BACKGROUND

Fish are part of a food web that must remain intact if each of its component parts is to thrive. Forage fish, which are fish that larger predators typically feed upon, are a critical component of that food web.

Forage fish are also critical to angling success, as they concentrate game fish and draw such fish to the surface and into shallow coastal waters where they are most accessible to fly and light-tackle anglers.

Scientists recommend a precautionary approach to forage fish management, with harvest capped at 50% of the maximum sustainable yield, in order to maintain a healthy food web.[22] Forage fish stocks are vulnerable to population collapse when the effects of fishing and unfavorable environmental conditions act together. Yet in some locations, forage fish like menhaden, herring and anchovies are targeted by some of the world's largest fisheries.

There is currently a lack of direction for managers to identify and manage forage fish for their role in the ecosystem. Some species, such as Atlantic herring, Pacific sardines and various squids, are subject to federal fishery management plans, but those plans focus on the sustainable harvest of those stocks, not maintaining intact food webs. Many forage fish species aren't managed at all. Managers cannot successfully rebuild and maintain healthy fish stocks unless the forage base is healthy, too.

Some progress is being made. The Atlantic States Marine Fisheries Commission (ASMFC) imposed a cap on the amount of Atlantic menhaden that large purse seine vessels may harvest inside the Chesapeake Bay, in an effort to avoid locally depleting the stock and disrupting the food web in the Chesapeake system. The ASMFC has also developed "ecological reference points" for Atlantic menhaden, which provide guidance on the number of menhaden that can be safely removed from the population while still allowing the species to fulfill its traditional ecological role.[23]

But such actions remain the exception. Fisheries managers have not made sufficient efforts to identify the forage fish species that are harvested in their jurisdiction, and to manage those fish to ensure their role in the broader ecosystem is not compromised.

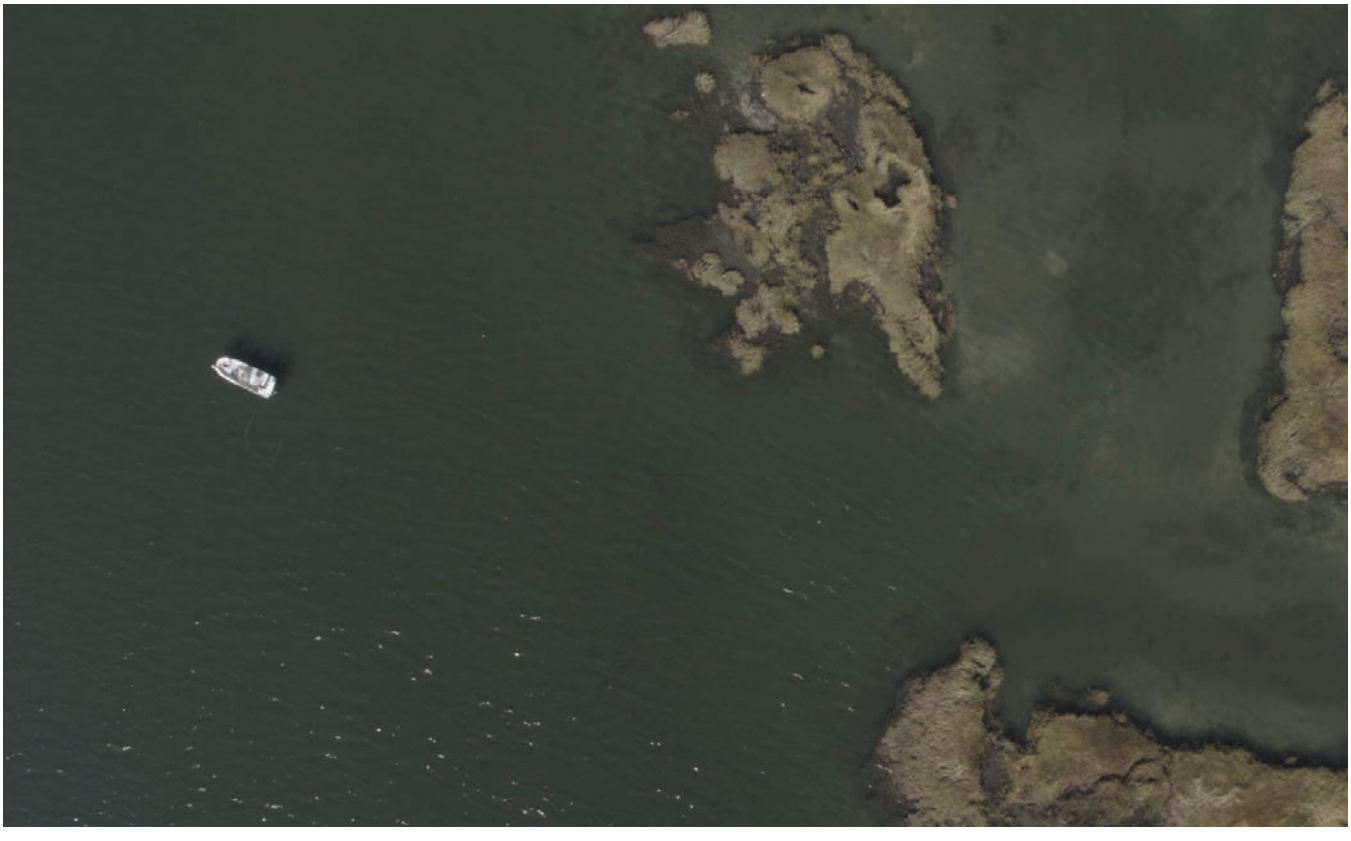
Some federal fishery management councils are beginning to focus on unfished forage species. Both the Pacific Fishery Management Council[24] and the Mid-

Atlantic Fishery Management Council[25] have recently adopted regulations that prevent the development of new fisheries that target unmanaged forage species until scientists can develop enough data to predict the impacts of such fisheries on both the relevant forage fish and their ecosystem, and devise appropriate management measures that minimize the chances of harm to either. This approach should be adopted across all regions.

In New England, recreational fishermen were concerned that large, mid-water trawls used in the Atlantic herring fishery were causing localized depletion of that important forage species, and so were adversely affecting the striped bass, cod, bluefin tuna and other fisheries.[26] In response, the New England Fishery Management Council acted to prohibit the use of such trawls within 10 miles of shore off much of New England. This is good policy and important to protect recreational interests. Councils should establish buffer zones around areas important to recreational (and commercial) fishermen to protect forage fish from industrial-scale harvest and prevent localized depletion.

POLICY SOLUTIONS

- Require Councils to identify and manage important forage fish in the region, and to set harvest limits for those forage fish that account for its role in the ecosystem.
- Prohibit the creation of new directed fisheries on forage fish until management measures have been put in place to adequately protect the stock.
- Establish buffer zones around areas important to recreational and commercial fishermen to protect fishing grounds from industrial-scale harvest and prevent localized depletion.



MANAGE FOR ABUNDANT RECREATIONAL FISHERIES

6. IMPROVE THE ACCURACY, TIMELINESS, AND COMPATIBILITY OF DATA COLLECTION IN RECREATIONAL FISHERIES

BACKGROUND

The effectiveness of any recreational fishery management program is directly dependent upon the quality of the data that underlies each management decision.[27] Such data takes two forms; the biological data directly related to the health of fish stocks, and the data related to recreational fishing effort, catch and landings.

Most estimates of recreational effort, catch, and landings data in federal waters are produced by the Marine Recreational Information Program (MRIP), which relies on a number of different surveys to produce its data. In states between Maine and Mississippi, as well as Hawaii, data relating to anglers fishing from shore and from private and rental boats is developed through Access Point Angler Intercept Survey (APAIS), which randomly surveys anglers returning from fishing and counts and measures their catch, as well as the Fishing Effort Survey, which is mailed to anglers randomly selected from lists developed by MRIP. Separate surveys collect data on the for-hire fleet, while other surveys are used in states not participating in APAIS.[28]

The National Academy of Sciences has generally endorsed MRIP's methodology and statistical soundness.[29] NOAA has worked, and continues to work, in partnership with angling communities to continue to improve the program, which could be bolstered by additional funding to increase the number of dockside intercepts and improve the timeliness of data.

Despite significant advancements in MRIP, some in the angling community still question the soundness of MRIP's estimates. Yet, the integrity of MRIP estimates is dependent upon the cooperation and honest reporting of anglers themselves. If anglers cooperate with MRIP surveyors and provide truthful information, more accurate stock assessments and more effective fishery regulations will follow. As such, it is critical to raise angler awareness of the importance of timely and honest reporting to MRIP and other fishery surveys.

Yet higher levels of angler confidence and cooperation aren't the only things necessary to maximize the accuracy of MRIP estimates. The National Academy of Scientists recommended that the MRIP investigate incorporating new technologies, including smartphone

apps and electronic diaries, into its data collection process, and develop ways to make the MRIP better suited for accurately estimating catch and effort at the state level and for in-season harvest monitoring.[30]

For the latter two purposes, expanded state/federal partnerships, which develop data programs managed by individual states, may provide a practical option.

Some state programs have already demonstrated their value. The Louisiana Recreational Creel Survey (LA Creel), developed by the Louisiana Department of Wildlife and Fisheries (LDWF), is one example of a state program that can provide data unavailable through the MRIP, including "estimates by state drainage basin,...catch estimates for offshore fisheries that are more precise than MRIP general survey estimates, and...preliminary harvest estimates weekly during the fishing season."[31]

However, high-quality state surveys come at a price. LA Creel costs the LDWF about $2.25 million per year. Louisiana decided to fund the project by raising the cost of its saltwater fishing license by $7.50.[32] Whatever the source, adequate funding to support improvements to the MRIP and related state/federal partnerships will be necessary.

Additionally, care must be taken to ensure the integrity and compatibility of any state program and the recreational data collected. Minimum standards related to accuracy, precision and validation rates, as well as requirements for calibration and compatibility with federal systems, must be put in place. State programs then need to demonstrate compliance with these standards before such data is used to set federal fishing regulations.

Currently, the MRIP conducts random surveys of anglers, and then uses that survey data to calculate estimates of effort, catch, and landings. One idea is to replace this approach with a census in which all anglers are required to report their activity through various electronic means, such as logbooks or smartphone apps.

Electronic data, voluntarily supplied by anglers, is seen by many as an integral part of the future of fisheries management, but for the time being, voluntarily-supplied angler data is not reliable enough to be used for management decisions. Such data would almost certainly be biased, as the persons who took the time to supply it would probably not present a representative cross-section of the larger angling community. Even putting such biases aside, the overall accuracy of such data would have to be verified in what would, of necessity, be an overly costly, complex and time-consuming effort.

Until a statistical model can be devised that adequately addresses the various biases, errors, and perhaps intentionally false values that such data may contain, whatever potential such voluntarily-supplied electronic data holds cannot be practically realized.

The collection of recreational fishing data remains an evolving process. Enhanced funding for identifying and addressing the obstacles to angler electronic reporting could yet yield a breakthrough that would make it a viable tool.

POLICY SOLUTIONS

- Fund efforts that increase angler awareness of the importance of providing accurate and timely information to the Marine Recreational Information Program (MRIP) and other fishery surveys.
- Establish minimum standards for all data used to measure recreational effort, catch and landings before they are certified as MRIP-compatible and used to establish federal fishing regulations.
- Increase investment in MRIP to foster improved data collection and validation.
- Support new research to evaluate ways to increase the participation and accuracy of angler-provided data.

ADDRESS KEY THREATS TO SUSTAINABLE FISHERIES

7. PROTECT WILD FISH POPULATIONS FROM INDUSTRIAL FINFISH AQUACULTURE

BACKGROUND

The Trump Administration has prioritized the establishment and creation of finfish aquaculture operations in federal marine waters. NOAA Fisheries has stated that increasing marine aquaculture production is a high-priority objective in the Department of Commerce, and the agency has committed itself to creating "a more predictable and timely process for accelerating the growth of U.S. aquaculture."[33]

NOAA Fisheries does not currently have legal authority to issue permits for new aquaculture operations, and its attempt to issue a permit for an open-ocean aquaculture facility in the Gulf of Mexico was overturned in court.[34] Another facility, which operators hope to build off the west coast of Florida, is awaiting various federal approvals.[35] Such approvals should not be granted, as there is no federal law authorizing the siting of aquaculture facilities in the exclusive economic zone, and no federal law providing for adequate and comprehensive regulation of offshore aquaculture operations.

In recent years, Congress has been discussing legislation to authorize and provide direction for offshore aquaculture.[36] But a lack of federal permitting and regulatory authority is not the only obstacle to offshore aquaculture operations.

Aquaculture facilities themselves can have many adverse impacts on fish and their habitats. Farming finfish requires containing them in enclosed net-pens, creating a concentrated production environment that can lead to the spread of infectious diseases, parasites and viruses both within the net-pens and into the surrounding environment. Wild fish populations, which often will aggregate around cages and pens to eat excess feed given to the farmed fish, can become infected and can further transport diseases, parasites and viruses throughout the population. For instance, imported sardines – fed to caged tuna at an Australian facility – were believed to have introduced an exotic disease to the local sardine population, which suffered high levels of mortality as a result.[37] Furthermore, as wild fish aggregate at the facilities, their presence can attract predators, such as birds and marine mammals that could also be exposed to diseases.

Beyond diseases, the facilities themselves are a source of pollution. Fish waste is released directly into the ocean environment. Fish waste is high in nitrogen and phosphorus, which in aquatic environments can cause algal blooms and hypoxic conditions[38] that can suffocate marine life and habitats. In places like the Gulf of Mexico, where high levels of anthropogenic nutrients are already significantly impacting water quality, additional nutrients would only exacerbate the threat of red tide. Furthermore, industrial ocean fish-farms use antibiotics and other veterinary drugs on the farmed fish, and these treatments leech into the ocean, causing harm to water quality, habitat, and marine life.

Wild fish and their habitats can also be harmed by escapees from aquaculture facilities. Farmed fish can breed with wild fish, introducing genetic material more favorable to a captive-breeding environment than to life in the wild.[39] Even farms that claim to raise "sterile" fish, like the one being proposed by Cooke Aquaculture in Washington State, concede the risk of interbreeding remains, as the sterility rate is not 100 percent. If the escaped fish are exotic species, such fish could begin to reproduce in the wild and cause widespread, permanent disruption of marine ecosystems.[40] Escaped fish also compete with wild fish for prey and for habitat. Recovery of escaped fish is generally not a viable mitigation, as only about 8% of fish that escape can be caught.[41]

Fish escapes from net pens are not an uncommon occurrence. Escapes can occur in large-scale events, such as when a net-pen suffers damage, or through "leakage", which refers to low-level escapes over time. Currently, efforts to jump-start offshore finfish aquaculture have focused on the Gulf of Mexico, a high-frequency hurricane region. Much of the Gulf of Mexico is too shallow for aquaculture facilities to be safe from hurricanes. For example, the Ekman Depth (depth to which wind-induced currents are felt) for Hurricane Florence (a Category 4 hurricane in 2018) was 250 feet. The U.S. National Hurricane Center database shows the high frequency of hurricanes throughout the region. For example, since 1852, there have been 77 tropical storms or hurricanes that have passed within 65 miles of the proposed aquaculture site off the Florida coast in the Gulf of Mexico. The cages proposed to be used at this site would not be able to withstand hurricane-force waves and currents.

Beyond such direct threats to native fish and marine habitats, aquaculture can cause other problems. Fish grown in aquaculture facilities are sometimes obtained by removing them, as juveniles, from naturally occurring populations. Some aquaculture operations can consume large quantities of fish-meal and other fish foods, which are derived from various forage species. It can take as much as six and a half pounds of fish-based feed to produce one pound of farmed fish.[42] Given

that most forage species used to produce such feeds are already either fully utilized or even overfished, any expansion of aquaculture could easily have a detrimental impact on forage fish stocks.[43]

Experiences from Norway, Canada, and facilities in state waters have demonstrated that finfish aquaculture poses a threat to wild fisheries and marine ecosystems. A finfish aquaculture industry does not yet exist in U.S. federal waters. It seems unreasonable to put viable, existing industries like recreational fishing unnecessarily at risk, especially when there are viable alternatives to offshore finfish aquaculture.

Closed-loop, land-based aquaculture facilities do not need to be connected to natural waters and can therefore raise fish without the threat of escape or pollution of local waters. Well-designed facilities can be run with no antibiotics, drugs, or chemicals, and can even utilize renewable energy. They can also be placed near markets, reducing fuel and transport costs. Exploring such alternative aquaculture opportunities is a wiser approach to addressing seafood supply concerns than putting wild fisheries, habitats and the recreational (and commercial) fishing industries at risk.[44]

POLICY SOLUTIONS

- Establish clear standards ensuring exemplary economic and environmental safeguards for open-ocean finfish aquaculture.
- Explore and, if appropriate, support alternative finfish aquaculture opportunities, such as through closed-loop, land-based facilities.

ADDRESS KEY THREATS TO SUSTAINABLE FISHERIES

8. ENSURE MANAGERS HAVE THE APPROPRIATE KNOWLEDGE, INFORMATION AND TOOLS TO SUSTAINABLY MANAGE FISHERIES IN LIGHT OF CLIMATE CHANGE IMPACTS

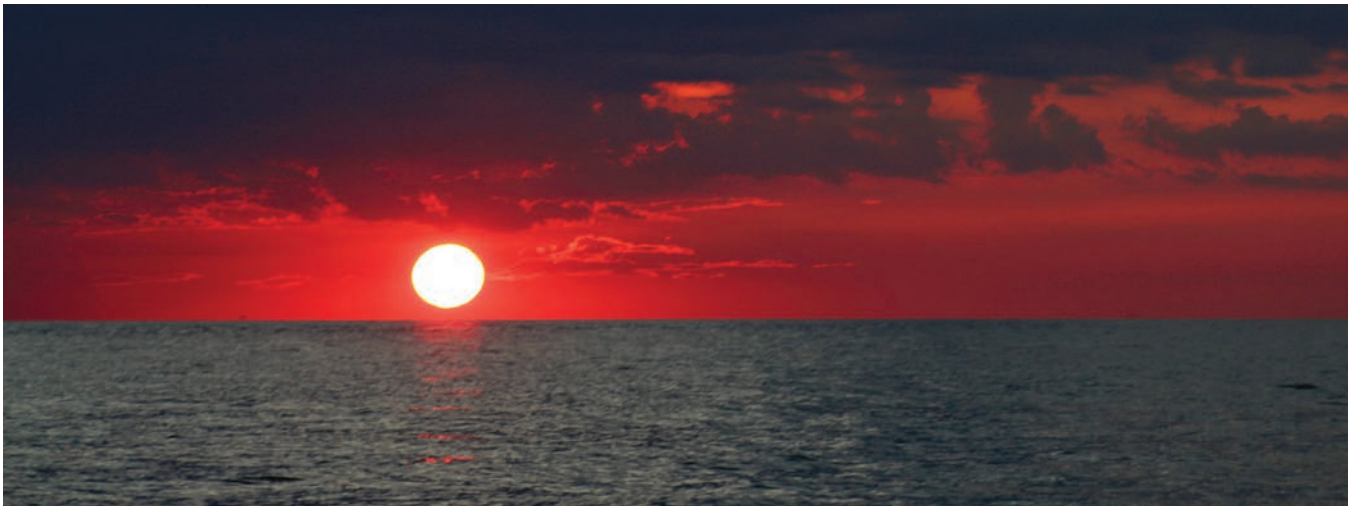
BACKGROUND

Climate change is significantly affecting ocean ecosystems, the abundance and distribution of fish and the nature of saltwater fishing. In late 2019, the Intergovernmental Panel on Climate Change issued the Special Report on the Ocean and Cryosphere in a Changing Climate, which provides the first-ever global scientific consensus on the severe consequences of climate change for the ocean and its fisheries.[45]

According to the scientific consensus, for decades the oceans have been absorbing 90% of the heat in the atmosphere, and the warming is accelerating. But warming does not occur evenly throughout the world's oceans. There are "hot spots". In the U.S., one hot spot is the Gulf of Maine, where ocean water temperatures are warming 7 times faster than on average. Warming waters are contributing to sea-level rise, with an average rise of 0.5 to 4.26 feet by the end of the century. Warmer water has less capacity to hold gas, and thus the amount of dissolved oxygen in the ocean is decreasing, increasing low-oxygen "dead zones". Finally, the ocean, because it absorbs carbon dioxide directly, is also becoming more acidic.

All four of these physical changes are happening simultaneously, and together these changes are impacting where fish live, their productivity, and their life cycles. Such changes are already challenging fisheries management.

A number of species are shifting their natural ranges. Of the nearly 70 federally-tracked species in the North Atlantic, 85% have shifted their range to deeper waters and/or to the north to find water temperatures that align with their habitat needs. On the Pacific coast, species will shift toward the north and west.



In the Gulf of Mexico, where the shoreline blocks northward migration, populations may shift to the west and to the southeast, and into deeper water.[46] Such shifts will be limited by the availability of suitable physical habitat.

Changes in New England and the mid-Atlantic region have been especially stark. The center of black sea bass abundance has already shifted north 200 miles, from the waters off Virginia to those off New Jersey, and the shift remains underway.[47] Summer flounder have shifted their center of abundance even more, by about 250 miles.[48]

Changes in ocean oxygen levels are impacting habitats. Scientists tracking billfish and large tuna noted that their behavior changed due to the loss of oxygen in deeper waters. The billfish were no longer diving very deep, which means they linger at the surface longer, a fact that makes them easier to catch. One implication of this shift in habitat is it may become easier to overfish these species.

Scientists have also documented declines in the productivity (i.e., successful reproduction) of some fish species. Less productive populations lead to less abundance in the ocean, and a resulting decline in fishing opportunity. Productivity can also be impacted in the short term by extreme events driven by climate change, such as the "blob" in the Pacific Northwest that caused a cascade of impacts, including fishery closures, harmful algal blooms and large mortality events. Similarly, significant flooding events in the Midwest inundated the Gulf of Mexico with freshwater, which led to die-offs of important fisheries and fish being pushed away from their habitats.

Taken together, these changes pose significant challenges for fisheries managers striving to sustainably manage our fisheries. New tools and information, along with new data streams, will be required to ensure our fisheries management system maintains its effectiveness. Funding to support a new climate-fisheries initiative at the federal level that gives fisheries managers the tools and information they need is critical.

As we adjust to a changing world, fisheries managers (and the scientific committees that provide scientific advice) should take a conservative approach to setting catch levels to ensure healthy fishery populations. Healthy fisheries are more able to adapt to the stresses caused by warming waters and changes in habitat. Ensuring our fisheries are resilient today will go a long way to ensuring abundant fisheries in the future.

The implications of shifting of fish populations on anglers also needs attention. Allocations in some recreational fisheries are based, in whole or in part, on obsolete data that reflects where fish were caught in the past, rather than where they are being caught today.[49] As fish move into new areas, allocations should change to address such movements. In more and more locations, fishermen in states where the fish used to be, still enjoy the highest allocations. Meanwhile, fishermen in states where the fish actually are today receive a trivial share of the catch. Clear and legally binding standards are needed to address reallocation in such instances.

POLICY SOLUTIONS

- Create and adequately fund a federal climate-fisheries initiative that can assist managers with the data, information and tools necessary to manage fisheries in a changing climate.
- Establish clear legal standards to address allocation conflicts between jurisdictions.
- To increase the resilience of fish stocks, require Councils' scientific and statistical committees to account for the effects of climate change when recommending acceptable biological catch.

ADDRESS KEY THREATS TO SUSTAINABLE FISHERIES

9. IMPROVE FISHERIES HABITAT PROTECTION AND INCREASE HABITAT RESTORATION

BACKGROUND

Congress, recognizing the fundamental importance of habitat protection to securing our nation's fisheries, added a provision to the Magnuson-Stevens Act in 1996 requiring regional fishery management councils to describe and identify "essential fish habitat" for federally managed species. Councils have complied with this provision, but the identification of essential fish habitat has not been especially effective in protecting the types and amount of habitat that will ensure healthy fisheries over the long-term. While there is variability in how Councils have approached protecting habitat to benefit fisheries, in many cases the Councils have not specifically analyzed to what extent habitat protection and restoration is needed to support healthy fisheries over the long term. Once habitat is lost or significantly degraded, the impacts on the health of the fishery can be irreversible. Thus, habitat must become an integrated focus of fisheries management moving forward. Councils must assess the habitat protection and restoration needs in each fishery, and then report on progress made toward addressing those needs within a specific timeframe.

Our ocean and coastal areas are, by nature, dynamic – changing day in and day out. Climate change is amplifying this change, and making it less predictable. As a result, habitat restoration and protection efforts must acknowledge and account for how habitats will move and/or change. This will require approaching

protection and restoration with a landscape (seascape) perspective, and a focus on maintaining and restoring physical processes (like sediment delivery) and ecosystem dynamics (like removing invasive species). Sea level rise in particular will impact coastal habitats, which have shown the ability to move inland if room for such migration exists (e.g., undeveloped land). Protecting and restoring ocean habitats such as coral reefs, kelp forests, and deep-sea corals will promote resilience and biodiversity. Significantly ramping up habitat protection and restoration will be essential to increase the resilience of our fisheries to climate change, and such efforts must consider and account for the impacts of climate change.

Within this context, habitat protection and restoration should prioritize "blue carbon" ecosystems, including mangroves, sea grass beds, and tidal marshes. These coastal ecosystems absorb carbon dioxide and store carbon in their soils at a rate of up to four times that of forests. These ecosystems also disproportionately provide essential habitat for many recreational fisheries. Protecting these habitats helps to keep greenhouse gases safely locked away and provides for the habitat needs of fisheries. Conversely, loss of these habitats allows greenhouse gases to escape into the atmosphere and exacerbate warming. While coastal habitats are known for their role in sequestering carbon, other ocean habitats likely also play important roles in the carbon cycle, and further study is needed on this front.

POLICY SOLUTIONS

- Improve the integration of habitat protection into fisheries management by incorporating habitat protection and restoration action into fishery management plans.
- Ensure habitat protection and restoration is designed to account for the impacts of climate change.
- Identify and prioritize protection and restoration of blue carbon habitats, which are coastal habitats that effectively store carbon, providing a critical natural solution to mitigate the impacts of carbon emissions.

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The spirit of collaboration, curiosity, and a commitment to conservation that epitomizes the fly fishing industry was evident in the Steering Committee that oversaw the development of the policy solutions identified in this report. The Committee represented the diversity of members of AFFTA itself, from manufacturers to guides, to media to conservation organizations. Committee members volunteered their time and talents to this project, and we gratefully acknowledge their contributions.

STEERING COMMITTEE MEMBERS

(in alphabetical order):

- Brent Bauer – Umpqua Feather Merchants; Science and Policy Committee Chair for AFFTA
- Tom Bie – The Drake
- Lucas Bissett – Low Tide Charters; Government Affairs Chair for AFFTA
- Ben Bulis – AFFTA CEO & President
- John Gale – Backcountry Hunters & Anglers
- Mark Harbaugh – Patagonia (retired)
- John McMurray – One Cast Charters; American Saltwater Guides Association
- Regan Nelson – AFFTA Conservation Director
- Tom Sadler – Marine Fish Conservation Network
- Abbie Schuster – Kismet Outfitters
- Matt Smythe – AFFTA Communications Director

A the core of this report is the assembly of a blue ribbon panel of scientists, advocates and fisheries managers--experts that provided deep-dive presentations and ongoing discussions with Steering Committee members. Their willingness to share their time and expertise with us is the only reason we were able to produce this report. It should be noted that all content and the policy recommendations in this report are AFFTA and AFF's alone, and have not been endorsed or otherwise approved by the Blue Ribbon Panel members. We thank them profusely for their contributions.

BLUE RIBBON PANELISTS

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- Dr. Aaron Adams – Bonefish & Tarpon Trust
- Bill Bakke – Salmon Advocate (retired)
- Kurt Beardslee – Wild Fish Conservancy
- Captain Rick Bellevance – Priority Charters
- Dr. Richard Cody – NOAA Fisheries Office of Science & Technology
- Dr. Stephen Crooks – Silvestrum Climate Associates
- Marianne Cufone, Esq. – Loyola University College of Law; Recirculating Farms Coalition
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- David Moskowitz – The Conservation Angler
- Corey Ridings – Ocean Conservancy
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- Kate Wing – KW Consulting
- Charles Witek – Author, One Angler's Voyage

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