



*The following paper was prepared in July 2012 by NCMC (now **Wild Oceans**) to review and summarize the leading role the organization played in making forage fish conservation a national environmental priority.*

FIRST STEP TAKEN

More than a decade ago, we set out to make conserving the ocean's forage base an environmental priority, calling it the first big step toward a broader ecosystems approach to managing marine fisheries. Because of our dedication to this goal and years of hard work, forage fish conservation is at the center of today's national ocean agenda.

In April of this year, the *Lenfest Forage Fish Task Force* released a report on the science and management of forage fish, drawing unprecedented media attention to the issue. Their report, *Little Fish, Big Impact*, was compiled by an international team of pre-eminent scientists and details a conservative approach to managing herring, mackerel, menhaden, sardine, squid and other lower trophic level species. It reinforces and expands on the recommendations of other recent studies and policy guidance. It is, in many ways, a high-water mark for a national movement we helped launch and energize.

More than any other organization, the National Coalition for Marine Conservation (NCMC) is responsible for anticipating and affecting this sea change in fish conservation, a change that will produce lasting benefits for wild oceans and the future of fishing for so many species we love and care about, from striped marlin to striped bass and everything in between. We did what we do best: identified an emerging problem, offered science-based solutions and determined where best to advocate for precedent-setting policy changes, all the while drawing other fishing and environmental NGOs to the cause. Everything we've done to protect predator-prey relationships in the ocean has been designed to give this effort drive and direction and, as you'll see in the following summary, nearly every major advance has its roots in an NCMC initiative.



The first step has been taken. Of course, that doesn't mean there isn't still a lot of work to do, particularly in protecting other elements of marine ecosystems (e.g., habitat). But every fishery management body, in every region, has recognized the importance of ocean food webs to healthy and sustainable fisheries and is adopting policies or amending plans to protect them. That's something we can all be proud of.

ECOSYSTEM PRINCIPLES ADVISORY PANEL (1997-1999)

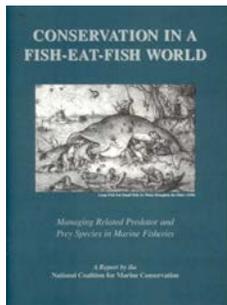
NCMC president Ken Hinman was appointed to represent the conservation community on the *Ecosystem Principles Advisory Panel* (EPAP), assembled by Congress through the Sustainable Fisheries Act of 1996. In 1999, the panel produced its seminal Report to Congress, *Ecosystem-Based Fishery Management*, calling on each federal fishery management council to develop a Fishery Ecosystem Plan (FEP) for its region and laying out clear ecosystem principles to guide these plans.



As a co-author of the report, Hinman made sure it recommended actions that fishery managers could take in the near-term, recognizing that moving to an ecosystem approach to managing and conserving marine fisheries would be an incremental process. A first step, the report emphasized, would be to consider predator-prey interactions affected by fishing under existing fishery management plans (FMPs).

CONSERVATION IN A FISH-EAT-FISH WORLD (1999-2000)

Following release of the EPAP report, NCMC organized a workshop on managing related predator and prey species in marine fisheries, inviting policy makers and scientists from the National Marine Fisheries Service (NMFS), the New England and Mid-Atlantic Fishery Management Councils, and the Atlantic States Marine Fisheries Commission (ASMFC). A year later we published the proceedings under the title *Conservation in a Fish-Eat-Fish World*. Along with general recommendations for making changes to FMPs in order to assess the effects of fishing on other species in the food web, we used Atlantic menhaden as a case study and suggested specific management changes to protect the health of its principal predators, most notably striped bass.

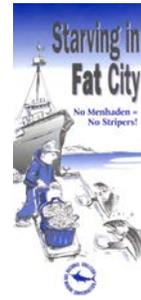
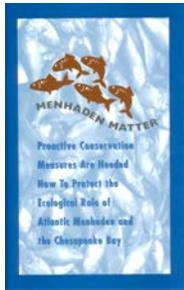


Beginning in the mid-1990s, when striped bass were declared “recovered” by the ASMFC, signs of stress in rockfish populations, particularly in Chesapeake Bay, raised questions about whether the industrial-scale harvest of menhaden, their principal prey, was compatible with abundant populations of not only striped bass, but bluefish, weakfish, osprey and other seabirds. Using the striper/menhaden connection as a bridge to ecosystem-based conservation was a natural for NCMC, since we’d been heavily involved in the successful recovery of striped bass on the east coast, working with ASMFC as far back as 1978 and with Congress on the Atlantic Striped Bass Conservation Act of 1984. We vowed not to “let the striper go from a poster fish for good conservation to a symbol of what can go wrong when we ignore a fish’s ecological needs.”

Our early focus was on Chesapeake Bay because a) the bay is the striper’s main breeding ground, b) the harvest of menhaden for reduction was concentrated in the bay, and c) bass in the bay exhibited signs of environmental stress. We set about bringing the issue to the attention of policymakers and the public alike, to convince the ASMFC, which had never put any limits on the menhaden catch, to take action.

A PETITION TO SAVE MENHADEN/"MENHADEN MATTER" (2003-2005)

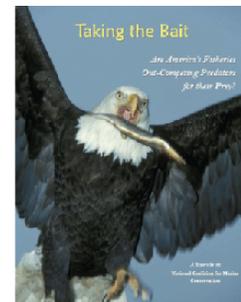
In 2003 we circulated a petition to curtail industrial netting of menhaden in Chesapeake Bay, ultimately gathering close to 5,000 signatures, and took it to the ASMFC's Annual Meeting that December. We were invited to present our 9-page paper documenting the decline of menhaden and its effect on predators to the Menhaden Management Board. We urged the Board to begin the process of amending its interstate FMP. The Board referred our technical paper to its scientific advisors for review, with instructions to report back for discussion and consideration of possible action at the next meeting. From there, a series of events was set in motion: NCMC formed *Menhaden Matter* with the Chesapeake Bay Foundation, Coastal Conservation Association and Environmental Defense (April 2004); ASMFC held a 3-day scientific workshop to assess menhaden's ecological status, with emphasis on its role as forage in Chesapeake Bay (October 2004); a motion was made to place an immediate freeze on catch as a stop-gap measure while ecological management goals were developed; ASMFC voted to cap industrial harvest in Chesapeake Bay for five years (August 2005).



The cap was a precautionary freeze on fishing for menhaden to prevent any increase in the bay catch which would further jeopardize menhaden and its ecological role, and to give researchers time to look into mounting concerns that the lack of menhaden was harming striped bass on their main east coast spawning ground and what to do about it. During this "timeout," NCMC led efforts to change menhaden science and management to account for its importance as forage, participating in virtually every subsequent meeting and workshop between 2006 and the present having anything to do with menhaden.

TAKING THE BAIT/FORAGE FIRST! (2006)

In 2005-6, NCMC conducted an analysis of three federal FMPs for key forage species in New England, the Mid-Atlantic and Pacific coastal regions. The results were published in our report, Taking the Bait: Are America's Fisheries Out-Competing Predators for their Prey?, which served to launch our national *Forage First!* campaign. We made specific recommendations for amending FMPs to explicitly account for and protect a forage base for predators. The report was distributed to all members and staff of the councils as well as national and regional fishing and conservation groups.



The report's author, NCMC executive director Pam Lyons Gromen, spearheaded *Forage First!* She and Ken Hinman made presentations at council meetings, to other NGOs, and at a series of forage fish workshops on both coasts. The report's 4-step blueprint for amending forage fish management plans to explicitly account for predator/prey relationships and to prioritize the protection of these relationships over allocation to fisheries was widely adopted by other organizations as a model for implementing forage fish conservation.

NEW NMFS POLICY ON CONSERVING FORAGE FISH (2007-2009)

After the 2006 reauthorization of the Magnuson-Stevens Act, NCMC saw an opportunity for forage fish conservation to be incorporated into revised National Standard 1 Guidelines (NMFS' operational rules for implementing the Act). We had the idea to augment our ongoing activities at the councils by seeking explicit national guidance from NMFS on a more precautionary approach to managing forage fish. We testified at hearings and submitted written comments urging the agency to give the councils guidance on setting allowable catches within an ecosystems context. We partnered with the Marine Fish Conservation Network to conduct a workshop; NCMC moderated the discussions. The findings were used to construct technical guidance to be incorporated into the NS 1 Guidelines. Because of our efforts, the federal Guidelines that went into effect in 2009 cite maintenance of adequate forage for all components of the ecosystem as a goal in setting annual catch limits for fisheries; require that each FMP address predator-prey interactions and other ecological factors when determining the optimum yield (overall benefit to the nation); and declare that species interactions should be considered as reasons to set catch levels for forage fish lower and maintain forage fish populations higher than conventional management.

We continued to press NMFS to provide technical guidance on how the councils should implement the new policy, ultimately leading to the decision to devote the 4th National SSC Workshop in October 2011 to integrating ecosystem considerations into fisheries management, with an emphasis on forage fish. The workshop's report was released in 2012.

STRICTER CRITERIA FOR CERTIFYING FORAGE FISHERIES AS SUSTAINABLE (2006-2011)

The Marine Stewardship Council (MSC) announced in 2006 that it was assessing the Gulf of California sardine fishery, the first feed-grade or reduction fishery to apply to for the MSC's "sustainable" label. When the MSC called on other reduction fisheries to follow suit and apply for certification "in order to ensure the sustainability of these wild-capture fish used for feed stocks in aquaculture," we saw a potential disaster. The aquaculture industry's heavy dependence on wild-caught fish for feed is widely recognized as a serious risk to marine ecosystems. A subsequent NCMC review of MSC certification methodology revealed major weaknesses in its criteria; forage fisheries could be awarded the MSC label absent any safeguards for the ecosystem or dependent predators. We formally entered the certification process for the sardine fishery, with letters and detailed critiques of MSC assessment methodology, encouraged other NGOs to get involved, and met with MSC officials on a number of occasions, urging the organization to "raise the bar" on forage fishery assessments.

As a direct result of the efforts of NCMC and our allies, MSC's criteria for certifying forage fisheries were strengthened in 2008 and the council agreed in 2009 to re-do their assessment of west coast sardine using the new criteria. But we provided another written evaluation of the new scoring system, showing that it was still inadequate to ensure that the ecological role of sardine and other forage species is protected. Later that year MSC agreed to convene a Low Trophic Level (forage



species) Fisheries Workshop, which we were invited to participate in, and then convened a Low Trophic Level Working Group to continue to examine the issues raised.

We were pleased when the new guidance crafted by this working group (and published in a peer reviewed journal) was adopted by the MSC in August 2011, specifying levels of forage stock abundance to be maintained to protect the ecosystem. For a minimum passing score, a fishery must be maintained at no less than 40% of its un-fished biomass. The preferred target population is 75% of an un-fished level. Not only did this mean tougher standards for MSC certification, but it also gave us, along with the new NS1 Guidelines, leverage to seek similar changes in other management bodies.

PRESERVING THE NORTHEAST FORAGE BASE (2006-2012)

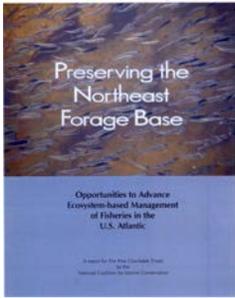
Stock status reports raise serious concern as to how much longer the Northeast ecosystem can sustain heavy exploitation of its forage base. Recent stock assessments and status reports for almost all forage species in the region - Atlantic herring, Atlantic mackerel, Atlantic menhaden, butterfish, American shad and river herring - reveal stocks in decline or nearing historically low abundance.

With our Taking the Bait blueprint in hand, we began working to amend the New England Council's Atlantic herring plan in 2006. By the end of 2007 the plan was amended with a new objective that explicitly recognizes the importance of sea herring as prey. The council also implemented a near-shore closure to mid-water trawls in the Gulf of Maine where herring are scarce. Around the same time we joined a new *Herring Alliance*, giving a collective voice to nine regional and national groups (at the start; it's since grown to over 30) with interests in herring as prey for cod and haddock, bluefin tuna, whales and seabirds.

NCMC also leads efforts at the Mid-Atlantic Council to amend the Mackerel, Squid & Butterfish (MSB) FMP to account for forage needs. Our initial concerns about "ecosystem overfishing" of squid prompted the council to establish an Ecosystems Committee in 2005 and hold public hearings. Most recently, the council has initiated development of a Fishery Ecosystem Plan for the mid-Atlantic region and its science advisors have created a "decision tree" for assessing and minimizing risks to mackerel, squid and butterfish.

After a 2007 report blaming the disappearance of river herring on at-sea bycatch in the sea herring and mackerel trawl fisheries, NCMC's Pam Gromen played a leading role in efforts at the ASMFC to amend the interstate River Herring & Shad FMP to get greater in-state protection of these anadromous species in their rivers of origin and calling on federal councils to reduce mortality while the fish are out in the ocean. Pam serves as chair of the river herring advisory panel. Because of the need for federal action, in 2009 we successfully got river herring bycatch reduction included as an objective in new amendments to the Atlantic herring and mackerel FMPs covering the offshore trawl fisheries.

In December 2010, the NCMC laid out the case for preserving the northeast forage base in a 44-page report. The purpose of *Preserving the Northeast Forage Base: Opportunities to Advance Ecosystem-based Management of Fisheries in the U.S. Atlantic*, was



to outline NCMC’s forage work plan on the east coast and to assist the fishing and environmental communities in evaluating opportunities for advocacy in the conservation of forage fish. It features an extensive overview of Northeast forage fisheries (shad and river herring, menhaden, mackerel, squid and butterfish, and sea herring), including recent issues and actions at the New England and Mid-Atlantic Councils as well as at the ASMFC, and an in-depth discussion of obstacles and opportunities along with specific recommendations for short- and long-term action.

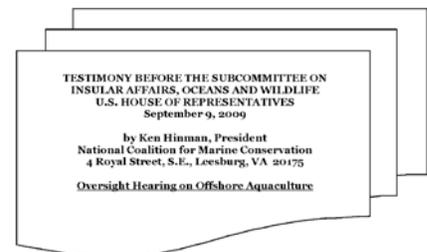
Earlier this summer, a broad-based effort over the last two years led by NCMC and the Herring Alliance secured approval of Amendment 5 to the Atlantic Herring Plan and Amendment 14 to the Mackerel Plan, each with provisions that will vastly improve catch monitoring and reduce river herring and shad bycatch in the industrial mid-water trawl fisheries that target sea herring and mackerel but incidentally take millions of shad and river herring every year.

SETTING STRONG STANDARDS FOR OFFSHORE AQUACULTURE (2008-PRESENT)

The global aquaculture industry is the largest consumer of forage fish, for meal and oil to feed farmed fish like salmon and tuna. The demand is expected to double in the next decade as the offshore aquaculture industry grows. Increasing pressure on forage fish will be felt by ocean predators as they compete for a food source that becomes more and more limited.

NCMC has been involved in setting national policy for open-ocean aquaculture since 2008, insisting that the U.S. establish strong environmental standards for fish farming, including limits on the use of wild fish as feed for aquaculture. We were pleased when a 2010 NOAA/Department of Agriculture report on *The Future of Aquafeeds* incorporated our concerns (and those of our partners in a loose and diverse coalition of interested groups, ranging from the Pacific Coast Federation of Fishermen’s Associations to the Ocean Conservancy) by recognizing the importance of pelagic forage fish to marine ecosystems. The report acknowledges that increased demand for use of forage fish for use in aquaculture could provide an incentive to over-exploit these fisheries, with negative consequences for the marine environment, and that future supplies of forage fish may be limited as an ecosystem-based approach is applied to manage these fisheries. As the report states, “fisheries managed according to single species sustainable yield measures may not be sustainable from an ecosystem perspective if the importance of forage fish to other animals in the ecosystem is not accounted for. Catch limits or quotas may be reduced to leave a greater supply of forage fish in the oceans to support ecosystem functions.”

We continue to weigh in with NOAA on its aquaculture policy, commending the agency for affirming that aquaculture should be “in harmony with healthy, productive, and resilient marine ecosystems,” but demanding that the administration propose mandatory conditions for offshore aquaculture permitting that would prevent harm to marine ecosystems. We’ve also submitted comments on various bills introduced in Congress that



would set policy for developing an offshore aquaculture industry. NCMC president Ken Hinman testified before a House Fisheries and Oceans Subcommittee hearing in September 2009. So far, NOAA's policy has not been implemented and legislation is stalled; forage is only one of many environmental concerns to be addressed before the U.S. gets into the open-ocean fish farming business.

PROTECTING THE WEST COAST FORAGE BASE (2005-2012)

NCMC's activities at the Pacific Council go back to 2006 and initiation of an amendment to the Coastal Pelagic Species (CPS) plan to prohibit harvest of krill. This action by the council, eventually approved by NMFS in 2009, reinforced our request to the council to convert the CPS plan – which covers sardine, mackerel, anchovy, squid and krill – into a true Forage Fish plan. Since then, the Pacific Council has taken important steps toward ecosystem-based management of west coast forage fish, through the CPS plan and its nascent Fishery Ecosystem Plan.

In 2008-9 we participated in the development of a west coast regional forage fish project under the auspices of the Point Reyes Bird Observatory's Conservation Science program. Pam Gromen served on the steering committee and helped write the report, "Ecosystem-Based Management of West Coast Forage Species." NCMC and PRBO made a joint presentation on the results of the report to the Pacific Council in June 2009. We asked the council to review and evaluate the CPS FMP to more fully account for the needs of predators in setting annual catch limits and to add other important, unmanaged forage fish for monitoring purposes. Eventually the council agreed to re-evaluate the sardine harvest guidelines and add more forage species (Pacific herring and jack smelt so far) to the FMP. We also began work with the council on developing a new FEP to link monitoring and assessment of a range of California Current forage species in order to establish a baseline for a healthy west coast forage base.



In June of this year, the council took two giant steps forward. First, the council reviewed and approved a draft FEP for adoption in early 2013 and okayed the outline for an Annual State of the California Current Ecosystem Report to inform council management decisions. Second, the council declared a goal of prohibiting new fisheries for currently unmanaged forage species and adopted a strategy for implementing it, either through the FEP or the CPS plan.

ECOLOGICAL REFERENCE POINTS FOR ATLANTIC MENHADEN (2009)

In the years since a precautionary cap was placed on the harvest of menhaden in Chesapeake Bay, NCMC has been urging the ASMFC to develop ecological reference points (that is, limits on fishing mortality and targets for stock abundance) to gauge the status of menhaden and guide future management. In 2008 we were successful in persuading the commission to task its Management & Science Committee (MSC) with exploring new reference points and reporting back to the ASMFC in 2009. In the meantime, NCMC researched and prepared a scientific paper, [Ecological Reference Points for Atlantic](#)

Menhaden, and submitted it to the MSC. Our paper was based on a review of the scientific literature and management policies and practices used in other forage fisheries in the U.S. and abroad. Our recommendations gained the support of the chair of the MSC and inspired the Maryland Department of Natural Resources to make a motion at the August 2009 meeting of the Management Board to begin a new amendment to the menhaden FMP in 2010 that would incorporate reference points that protect menhaden as forage.

The NCMC white paper challenged the existing reference points as inadequate; a position affirmed by an independent peer review panel a year later (see below). Our recommended targets and limits – target abundance levels at 75% of the unfished level and fishing mortality below natural mortality levels - were corroborated in subsequent recommendations by the MSC’s Low Trophic Level Task Force (2011) and the Lenfest Forage Fish Task Force (2012).

Table 1. Ecological Reference Points for Atlantic Menhaden

<i>Reference Point</i>	<i>Target</i>	<i>Threshold</i>
Biomass	$B_{MAX_{75\%}}$	B_{MSY}
Fishing Mortality Rate	$F = .75M$	$F=M$

BACK TO THE BEGINNING: MENHADEN ADDENDUM V & AMENDMENT 2 (2010-2012)

NCMC began our campaign to protect the ecological role of key forage species with Atlantic menhaden, invaluable prey for striped bass and many other east coast fish as well as mammals and seabirds. So it is that with menhaden, we’ve had perhaps our biggest victory in a long line of successes.

A 2010 motion at ASMFC set everything into play, coming after a 2009 stock assessment that showed a depleted Atlantic menhaden population. But the reference points in the menhaden FMP were so low that no alarms about overfishing were triggered. An independent peer review panel, however, concluded that the reference points were inadequate and recommended new, more conservative targets and limits relative to unfished levels. The motion passed by the Menhaden Management Board in May 2010 called for the ASMFC’s science advisors to develop a range of alternative reference points for “spawning stock biomass or population fecundity relative to the unfished level and a reference point associated with abundance,” and to take into consideration reference points used for other pelagic forage species.



In the years leading up to this action, NCMC had been there, at virtually every prior meeting of the Management Board, Technical Committee, Advisory Panel and Stock Assessment Subcommittee, as well as dozens of ecosystem-based management meetings and workshops sponsored by NOAA, the Chesapeake Bay Program and others, expressing concern about the low numbers of menhaden and calling for more conservative reference points to reflect menhaden’s ecological role. We submitted policy papers and scientific studies showing how menhaden’s current reference points were substantially below what is recommended, especially for key prey species. In 2010, when the peer review panel highlighted menhaden’s low abundance and agreed that the reference points used to assess the stock were themselves too low, the

Board was empowered to move to develop new reference points that, not incidentally, would consider how we treat other forage fish.

Over the course of the next year, NCMC fought for a range of targets, specifically 20%, 30% and 40% of the unfished level, each of which would increase menhaden abundance substantially from current levels. We supplied supporting rationale to the Menhaden Plan Development Team for each target level, showing the need to provide a suitable buffer between the target and the overfishing limit to minimize risk of overfishing and pointing to emerging standards for forage and other species, standards we'd helped develop. Our target options and the rationale to support them were inserted into Draft Addendum V for public comment almost verbatim.

In the end, an addendum that began in March 2011 with only an overfishing threshold of 15% of its spawning potential offered target options of 20%, 30% and 40%. The public now had the conservative management options it had been asking for all these years and came out in support of them in unprecedented numbers. The rest, as they say, is history. On November 9, 2011, the ASMFC approved Addendum V with a new management target of 30% - three times the current population level - to "increase menhaden abundance and availability as a forage species." Management measures to achieve this goal will be implemented in 2013 through Amendment 2 to the Interstate Menhaden FMP.

*National Coalition for Marine Conservation
July 2012*