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Preserving the Birthplace of Western Bluefin

The very real danger we in the western Atlantic face when it comes to saving the giant bluefin tuna is the prospect of reducing its breeding population below a critical mass - the minimum population sufficient to sustain itself - resulting in a stock failure that's irreversible. That's what happened to the once-abundant population of bluefin off the northern coast of Europe a half-century ago, where catches by Norway, Denmark and other countries once exceeded the total catch of tuna fisheries in the Mediterranean and the western Atlantic combined. Those fisheries are now gone.

The population of spawning age fish in the west is just 7% of an unexploited stock (14% of the rebuilding target), despite quotas in place since the early 1980s. How close are we to the point of no return? Do we risk finding out?

The fisheries, if not the stock, may have already collapsed. New England tuna fishermen haven't come close to quota since 2003. Dr. Molly Lutcavage, director of the Large Pelagics Research Center at the University of New Hampshire, summed it up: "Our giant fishery has disappeared. The overfishing has gone on too long and it's finally taken down what was once a big fishery."

U.S. coastal fisheries, it seems, were relying on migrants from the much larger eastern stock, but after 10 years of rampant overfishing in the east, the western population has finally been exposed as too small to sustain a viable fishery on its own.

HAPC DESIGNATION FOCUSES CONSERVATION ON GULF SPAWNING GROUNDS



Western bluefin spawn in the Gulf of Mexico and nowhere else. Each spring (March - June) adults return there to give birth to the future of the species. In June, the National Marine Fisheries Service (NMFS) officially designated this region a Habitat Area of Particular Concern (HAPC), bringing heightened awareness to the need to protect this essential bluefin habitat from fishing and non-fishing impacts.

The HAPC could be vital in protecting the gulf from the hasty and unwise development of open-ocean aquaculture. NMFS is currently reviewing a plan submitted by the Gulf Fishery Management Council to permit offshore fish farms. Forage fish, including menhaden, are rounded up as live feed for penned fish, or reduced into fish meal and fish oil and used as aqua-feed. The increase in demand for forage fish that would result from offshore aquaculture, if local sources of feed are utilized, could reduce the prey base available for bluefin and other wild predators. And according to the agency's habitat guidelines, "actions that reduce the availability of a major prey species, either through direct harm or capture...may be considered adverse effects."

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SHARING THE SEA

I don't think it's right for me to be angry. I went into their environment. – Chuck Anderson, shark attack victim

Tales of the hunter defending the hunted are not unusual. The pioneers of wildlife conservation, after all, were sportsmen - hunters and fishers - who evolved, naturally, into passionate protectors of their prey and the wild world they share. Many of today's staunchest conservationists come from these ranks.

But it's definitely news when the hunted stand up for the hunter, in this case one of the most terrifying predators on the planet. About a dozen shark-attack victims went to Congress on June 15th to lobby for stronger laws to protect sharks. In the U.S. and all over the world, sharks are killed for their fins, which are extremely valuable in Asian markets; "finning" is the number one reason many species of shark are endangered. A bill that passed the House earlier this spring and is now before the Senate would close loopholes in our law by, among other things, requiring that all sharks be landed intact. ([see www.savethefish.org/action_items/shark_finning.htm](http://www.savethefish.org/action_items/shark_finning.htm))

On the surface, the "Shark Attack Survivors for Shark Conservation," some missing limbs and others bearing grizzly scars suffered at the jaws of a shark, make compelling, and poignant witnesses against maiming these fearsome predators for profit. But on a deeper level, they're showing a profound respect for nature, even when it's "red in tooth and claw," that we can all learn from. It's a willingness to share the ocean with other predators, recognizing they have

equally important places. It's accepting nature on its own terms, which is something we are rarely willing to do.

A BETTER WAY

We cannot command Nature except by obeying her.
 – Francis Bacon

We are predators ourselves; that's our nature, which we don't deny. But instead of working within natural limits, we've taken to playing God and manipulating the ocean environment in order to catch what are clearly unsustainable amounts of fish. It hasn't worked, but still we persist, as if we know better, as if we've found a better way.

This view is prevalent even among fishery scientists, who ought to know better. As the fishing and environmental communities raise their voices in favor of a more natural ecosystems approach, including a switch to more conservative management of key prey fish like menhaden, herring and mackerel, those wedded to the old ways dig in. The approach we use now is scientific and tested, they tell us. Increasing the numbers of prey fish beyond what their models account for would have unknown effects on the ecosystem, they warn.

These models are based on the antiquated concept of surplus production, which estimates annual yields that will sustain a fishery at a desired size, assuming no effect on other predators. But there is no "surplus" of prey in an ecosystems context, only sharing among predators.

Change is scientific, said Bertrand Russell, progress is ethical. Fisheries science must adapt to our changing ethics and not hold back progress. It's time we adopt a new concept of resource sharing. ([see "Ecological Reference Points for Menhaden," page 3](#))

Ken Hinman, *President*

NATIONAL COALITION FOR MARINE CONSERVATION

Founded in 1973

The NCMC is a 501(c)(3) non-profit organization dedicated to the following goals:

- ◆ preventing overfishing and restoring depleted fish populations to healthy levels
- ◆ promoting sustainable use policies that balance commercial, recreational and ecological values
- ◆ modifying or eliminating wasteful fishing practices
- ◆ improving our understanding of fish and their role in the marine environment
- ◆ preserving coastal habitat and water quality.

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FOR MENHADEN

Among the Atlantic States Marine Fisheries Commission's objectives this year for conserving and managing Atlantic menhaden, according to the commission's 2009 Action Plan, is to "explore the development of ecological reference points."¹ To this end, the Policy Board in February tasked the Management and Science Committee (MSC) with providing advice to the Menhaden Management Board on developing new reference points; targets and limits designed to protect menhaden's vital role in the ecosystem, in accordance with the objectives of the Interstate Fishery Management Plan², with particular emphasis on providing adequate forage for predatory fish, marine mammals and seabirds.

The Menhaden Management Board initiated an addendum to the Atlantic Menhaden FMP in 2005 to conserve menhaden with a temporary cap on reduction harvest in Chesapeake Bay (through 2010), while addressing concerns about localized depletion in the bay and the possibility of compromised predator-prey interactions, in particular reduced availability of forage for resident and migratory striped bass. A research program recommended by the Menhaden Technical Committee is underway to try and determine if reduced abundance of menhaden is related to observed predator deficiencies (e.g., low weight-to-length ratios and stress-related disease in striped bass) and low larval menhaden recruitment.³

A new benchmark stock assessment for menhaden will be conducted in 2009 and peer reviewed in 2010. This assessment, unfortunately, will employ the coast wide model used in the last assessment and biological reference points developed for stock replacement, not to preserve ecological

function.⁴

CURRENT REFERENCE POINTS ARE INSUFFICIENT FOR ECOSYSTEM-BASED MANAGEMENT

As the Peer Review Panel pointed out in its review of the last benchmark stock assessment for menhaden, the ASMFC's coast wide, single-species assessment model and the reference points established for assessing the status of the stock cannot measure the stock's capacity to provide adequate forage for other species in the ecosystem, nor can it "detect localized depletion and reduced ecological function that could occur when the fishery is concentrated in one part of the coast," such as in and near Chesapeake Bay.⁵

The biological reference points currently in use are two: a fishing mortality (F) target and threshold; and a population fecundity (number of eggs) target and threshold.⁶ These reference points are intended to assure that the stock is capable of sufficient reproduction to replenish itself and that the stock is maintained at a size capable of supporting a viable fishery. As targets and thresholds linking the status of the stock to management goals and actions, they do not account for nor can they prevent the possibility that a fishery, especially one exploiting a key forage species like menhaden, could be overfished in an ecosystem context even if it is not overfished in a single-species context.⁷

Developing ecological reference points for menhaden is similar to the process used to establish the current reference points, in that both are targets and thresholds set to achieve specified management goals. Once again, the current limits are set to determine whether overfishing is occurring or the stock is overfished on a coast wide, single-species basis; that is, to ensure the rate of fishery removals does not exceed the ability of the stock to replenish itself. Ecological reference points, on the other hand, also use traditional benchmarks, such as stock biomass and mortality rate, but are set with ecosystem-based management goals in mind.

As the Peer Review Panel noted, ecological reference points require management goals that specify an allocation of menhaden as forage.⁸ As an example, the Panel suggests that a reference point that would be "responsive to menhaden as a forage species would be one which maximizes population

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4 The Menhaden Management Board in February asked the Stock Assessment Subcommittee to consider an alternative assessment model developed by L.B. Christensen and S.J.D. Martell of the University of British Columbia. Atlantic Menhaden Stock Status Report: New Advice (unpublished manuscript). Although this model also assumes a coast wide stock and uses existing reference points, it suggests that "the Atlantic menhaden stock is currently overfished, and that overfishing is occurring."

5 ASMFC 2004a. Terms of Reference & Advisory Report to Atlantic Menhaden Stock Assessment Peer Review. Stock Assessment Report No. 04-01. p. 4-5. See also 2009 Review of the Fishery Management Plan and State Compliance for the 2008 Atlantic Menhaden Fishery. Atlantic Menhaden Plan Review Team. ASMFC. May 2009.

6 ASMFC 2004b. Addendum 1 to Amendment 1 to the Interstate Fishery Management Plan for Atlantic Menhaden.

7 Pikitch, E.K. et al. 2004. Ecosystem-Based Fishery Management. *Science*. 305: 346-7.

8 ASMFC 2004a. p. 5.

1 ASMFC 2009 Action Plan. p. 5

2 ASMFC 2001. Amendment 1 to the Interstate Fishery Management Plan for Atlantic Menhaden. Fishery Management Report No. 37.

3 ASMFC 2005. Addendum II to Amendment 1 to the Interstate Fishery Management Plan for Atlantic Menhaden. pp. 6-7

ECOLOGICAL REFERENCE POINTS FOR MENHADEN (Continued from page 3)

abundance taking into regard the allocation of fish between F (fishing mortality) and M (natural mortality).⁹

First consideration, then, should be given to how targets and thresholds for menhaden population abundance and total mortality (the relationship of F to M) might be established in an ecosystem-based context. The National Coalition for Marine Conservation offers the following recommendations, based on a review of the scientific literature and approaches recommended and/or implemented in fisheries for other key forage species.

MANAGING FOR GREATER ABUNDANCE

The standard population, or biomass, associated with maximizing yields to fisheries is B_{MSY} . The ASMFC in 2004 opted to replace the use of a proxy for an MSY-based spawning stock biomass (SSB) with a fecundity target and threshold.¹⁰ Aside from whether SSB or fecundity is a more accurate indicator of stock reproductivity, standing biomass - or population size - does constitute a better measure of the amount of prey available to meet the needs of dependent predators.

The National Marine Fisheries Service (NMFS) issued new Guidelines effective February 17, 2009 for implementing annual catch limits consistent with the Magnuson-Stevens Act's National Standard 1. In these Guidelines, NMFS recommends setting a population target for forage species higher than the B_{MSY} level in order to maintain adequate forage for all components of the ecosystem.¹¹ This more precautionary approach for forage species abundance is well established in the scientific literature.¹² How much higher than the B_{MSY} level depends on a number of factors, among them the uncertain effects of climate variability and change on fluctuations in prey populations, the uncertain effects of reduced biomass on prey distribution and availability to predators throughout the range of the prey species, and uncertainties in data and scientific advice.

Recent research on forage fish such as Atlantic herring and mackerel suggests that fully accounting for predation demand¹³ in stock assessments and associated reference points - including expected increases in demand from predatory fish and seabirds that are the object of recovery efforts - can dramatically increase estimates of the population size needed to sustain both predators and fisheries, while lowering the yields available to the fishery.¹⁴

9 ASMFC 1999. Terms of Reference & Advisory Report for the Atlantic Menhaden Stock Assessment Peer Review. Stock Assessment Report No. 99-01. p. 5.

10 ASMFC 2004b.

11 50 CFR Part 600.310(e)(3)(iv)(C).

12 Collie, J.S. and H. Gislason. 2001. Biological reference points for fish stocks in a multispecies context. Canadian Journal of Fisheries and Aquatic Sciences. 58: 2167-2176.

13 Prey demand is the prey required to meet dynamic predator population needs, as opposed to merely estimating present predator consumption.

14 W.J. Overholtz, L.D. Jacobson, and J.S. Link. An ecosystem approach for assessment advice and biological reference points for the Gulf of Maine - Georges Bank herring complex. North American Journal of Fisheries Management, 28. 2008. and H. Moustahfid, J.S. Link, W.J. Overholtz, and

While ecosystem models under development attempt to quantify the relationship between predator and prey with the goal of enabling fishery managers to understand the precise trade-offs among various management strategies for each, their application is likely years away. Until we are able to develop assessment models to determine what some scientists call the ecologically sustainable yield¹⁵ for forage fish such as menhaden, precautionary interim management strategies are warranted.¹⁶

To cite an example of an interim strategy already in practice, the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), recognizing the key role of krill in the ecosystem, adopted more conservative reference points than the ones commonly applied in single-species fisheries management.¹⁷ "(T)he requirements of krill predators were incorporated by establishing a level of krill escapement of 75% of the pre-exploitation biomass, instead of the 40-50% level normally used in single-species management. This has been called the 'predator criterion' and it reflects an arbitrary level that needs to be revised to take into account information on the functional relationship between abundance of prey and recruitment in predator populations as it becomes available."¹⁸

The corollary to maintaining a higher target population for key forage species is setting a higher overfished threshold. With each increment of reduction in the target prey population level, the predator population is left with less available food and its population must shrink in size in order to come into equilibrium with the amount of prey available.¹⁹ The standard single-species definition of an overfished stock - the point at which fishing ceases and rebuilding begins - is approximately $\frac{1}{2} B_{MSY}$ - a population level that may still be capable of rebuilding - but which is

(Continued on page 7)

M.C. Tyrrell. The advantage of explicitly incorporating predation mortality into age-structured stock assessment models: an application for Atlantic mackerel. ICES Journal of Marine Science, January 16, 2009.

15 Zabel et al. Ecologically Sustainable Yield, American Scientist, March-April 2003. The authors, from the Northwest Fisheries Science Center of NMFS, recommend moving away from traditional single-species approaches to management to what they call ecologically sustainable yield (ESY), because "the cost of mismanaging a community might be far greater than the cost of mismanaging a fishery. Although overfished stocks have been known to recover, revival of communities that have changed states can be excruciatingly slow or even impossible."

16 Department of Fisheries and Oceans, Canada. Policy on Fisheries for Forage Species. <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/reports-rapports/amac-ccmb/annex4-annexe4-eng.htm>. Biological Pre-requisites for Commercial Fisheries on Forage Species: "It should be possible to estimate the risk that the proposed level of harvest poses to the forage species and ecologically dependent species. In situations where risk presented by a particular level of harvest and consequences of over-harvesting are especially uncertain, exceptionally risk-averse decisions are necessary."

17 Gascon, V. and Werner, R. CCAMLR and Antarctic Krill: Ecosystem Management Around the Great White Continent. Sustainable Development Law & Policy. Fall 2006. p. 14-16.

18 Constable, A.J., de la Mare, W.K., Agnew, D.J., Everson, I., and Miller, D. 2000. Managing fisheries to conserve the Antarctic marine ecosystem: practical implementation of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). ICES Journal of Marine Science, 57: 778-791.

19 Rounsefell, G.A. Ecology, utilization, and management of marine fisheries. C.V. Mosby Co. 1975.

DEPARTMENT OF COMMERCE REVIEWS GULF OF MEXICO AQUACULTURE FMP

*Legislators and Non-government Organizations
Urge Secretary to Reject Plan*

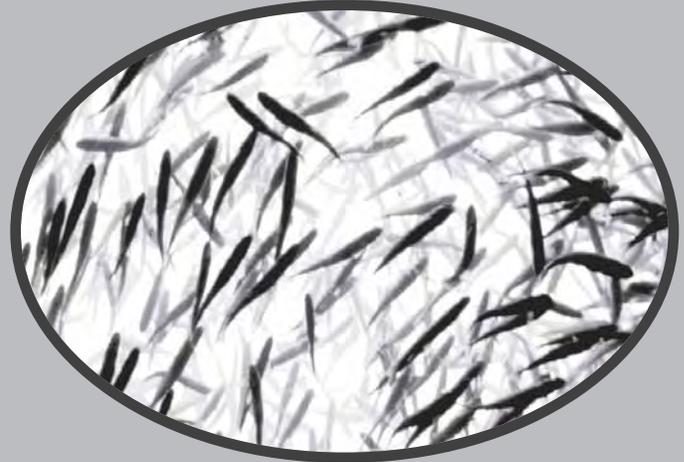
On June 4th, the Department of Commerce announced that it had begun its review of the Gulf of Mexico Fishery Management Council's Fishery Management Plan for Regulating Offshore Aquaculture in the Gulf of Mexico (Aquaculture FMP) and invited public comment on the plan.

Despite overwhelming opposition from an alliance of 124 independent scientists and organizations that includes NCMC, the Aquaculture FMP was approved for Secretarial review by the Gulf Council at its January 2009 meeting. The alliance argued that the Council lacks the statutory authority to develop a permitting system for open ocean aquaculture, and the Council's actions undermine the role of Congress in developing a national framework with explicit environmental standards for aquaculture operations in federal waters.

Of the many environmental concerns not adequately addressed in the Aquaculture FMP is the increased use of wild forage fish to satisfy demand for aquaculture feed. In comments to the Gulf Council and the National Marine Fisheries Service, which operates under the Department of Commerce, NCMC executive director Pam Gromen refuted the Aquaculture FMP assertion that current management of menhaden stocks would protect the food web from increased local demand for fish feed. "The single-species assessments used for Atlantic and Gulf menhaden cannot and do not address the critical issue of whether or not present fishing pressure provides adequate forage for predators," she stated.

The Aquaculture Plan would also allow siting of aquaculture facilities in Habitat Areas of Particular Concern (HAPCs) unless the HAPCs were established by the Gulf Council. Highly Migratory Species HAPCs, such as the newly designated bluefin tuna HAPC, would be excluded from protection. (see "Sanctuary," page 1)

In response to the Department of Commerce announcement confirming receipt of the Gulf Council's Aquaculture FMP, 37 members of Congress submitted a bipartisan letter to Secretary of Commerce Gary Locke urging him to disapprove the plan because "it would lay the groundwork for a fragmented regulatory system for offshore aquaculture in the United States that threatens marine ecosystems, wild fish, and coastal communities." Secretary Locke is expected to make a preliminary determination by September 2009 as to whether or not the Aquaculture FMP should be implemented. □



WEST COAST FORAGE FISH REPORT RECOMMENDATIONS PRESENTED AT PACIFIC COUNCIL MEETING

NCMC executive director Pam Gromen teamed up with PRBO (Point Reyes Bird Observatory) Conservation Science consultant Jennifer Koepcke to present an overview of the report *Ecosystem-based Management of West Coast Forage Species* to the Pacific Fishery Management Council's Coastal Pelagic Species advisory bodies. The presentation was made at the June Pacific Council meeting in Spokane, Washington.

Released in January of this year, the report outlines recommendations to advance ecosystem-based research and management of the California Current forage base. Recommendations were crafted by a West Coast Forage Fish Steering Committee, a diverse group appointed by PRBO Conservation Science to represent scientists, state and federal agencies, fishermen, and environmental organizations including NCMC.

Through its Coastal Pelagic Species Fishery Management Plan (CPS FMP), the Pacific Council manages Pacific sardine, northern anchovy, Pacific and jack mackerel, market squid, and krill; all serve a critical ecological role as forage during their life cycles. The Pacific Council notably recognizes maintaining adequate forage for dependent species in its CPS FMP objectives and bans fishing for krill because of its ecological importance - a ban that will go into effect on August 12th. However, the Council is challenged by inadequate resources and tools for ecosystem-based management, and stakeholders remain confused as to how adequate forage is accounted for in harvest guidelines.

The goal of the Spokane presentation was to initiate a constructive dialogue within the Council process in order to identify common goals among stakeholders and to encourage a stepwise approach to CPS ecosystem-based management, so managers can begin to move forward. □

OVER 100 STAKEHOLDER GROUPS CALL ON U.S. SECRETARY OF COMMERCE TO TAKE EMERGENCY ACTION TO RESTORE RIVER HERRING

The National Coalition for Marine Conservation joined with the Marine Fish Conservation Network, Cape Cod Commercial Hook Fishermen's Association, the Massachusetts Striped Bass Association, and 100 other fishing, conservation, science and faith-based organizations in asking U.S. Secretary of Commerce Gary Locke to take urgent action to protect river herring.

The groups sent a letter supporting an Atlantic States Marine Fisheries Commission's (ASMFC) request that the Secretary take Emergency Action to effectively monitor and minimize river herring bycatch in ocean fisheries. The Commerce Secretary is also urged to support cooperative efforts between the Atlantic states and the federal New England and Mid-Atlantic Fishery Management Councils to better manage river herring and other fish that travel between state and federally-managed waters.

"The number of groups signing this letter sends a powerful message to the Secretary of Commerce and federal fishery managers in New England and the Mid-Atlantic that we want to see a serious effort made to restore river herring," said Brooks Mountcastle, Mid-Atlantic Representative for the Marine Fish Conservation Network. "River herring play an important role in the ecosystem as prey for predator fish, marine mammals, and seabirds. Failing to act would mean more than the loss of a species, but a loss of profound cultural and historical significance for many coastal communities."

River herring (alewife and blueback herring) are anadromous fish, distinct from their oceanic cousin, the sea herring, in that they spawn in rivers but spend most of their lives at sea, migrating back to their natal rivers in the spring to spawn. Designated "Species of Concern" by the National Marine Fisheries Service to foster efforts to prevent an Endangered Species Act listing, river herring were once so common along the Atlantic Coast that many towns had festivals named after them. Herring returning to their home rivers was the equivalent of the American robin heralding the arrival of spring for many coastal communities.

"The recreational fishing community supported a moratorium on river herring harvest almost five years ago, and there has been no significant improvement made since then. If river herring had wings, they would have been added to the endangered species list years ago," said Patrick Paquette, Past President and Government Affairs Officer for the Massachusetts Striped Bass Association. In fact, the Mass. Department of Marine Fisheries reports that in 1989, there were approximately 388,000 river herring migrating up the Merrimack River, while in 2007, there were only 1,170.

The small, silvery fish are prized as both food and bait fish. Because they are a fishery resource shared by the coastal Atlantic states, they are managed by the ASMFC, a body comprised of representatives from 15 states from Maine to

Florida. In May, the ASMFC determined that the Secretary of Commerce needed to take emergency action to assess and reduce the impacts of bycatch on river herring populations at sea, beyond state jurisdiction (3-200 miles offshore). The decision was an important victory for the groups fighting to bring attention to river herring ocean bycatch.

"There is no question that river herring are falling through the cracks in our fisheries management systems," said Pam Lyons Gromen, Executive Director of the National Coalition for Marine Conservation. "The body responsible for river herring management, the ASMFC, is limited to actions in states' waters even though river herring spend most of their lives at sea in federal waters managed by the New England and Mid-Atlantic Fishery Management Councils."

Today, river herring bycatch (unintentionally caught while fishing for another species) in federally-regulated ocean fisheries exceeds the in-river landings of river herring on the entire East Coast. A preliminary study estimates that in 2007, there were 1.7 million pounds of river herring bycatch in the Atlantic sea herring fishery. Actual estimates of river herring bycatch in ocean fisheries are hard to obtain because of insufficient fishery observer coverage. For example, between 2004 and 2008, only 48 out of 1,065 Atlantic mackerel fishing trips had federally trained observers onboard to document the catch.

"It's even worse than it sounds," said Tom Rudolph, Herring Campaign Operations Director for the Cape Cod Commercial Hook Fishermen's Association. "Even when observers are on board, they are often denied access to the catch which prevents accurate and complete sampling. For instance, over 16 percent of the tows for which an observer was aboard in the Atlantic herring fishery in 2007 were considered 'unobserved' because fish were dumped out of the net without allowing the observers to sample them."

The Secretary of Commerce has the authority to take an emergency action and implement measures, like adequate and accountable monitoring, to protect river herring. According to this unprecedented and diverse coalition, the management system is failing, and therefore the letter signers have come together to speak in a unified voice. The letter calls on Secretary Locke to take action and bring river herring back. □



Visit www.savethefish.org to read the letter to Secretary Locke, including a list of all signing organizations.

ECOLOGICAL REFERENCE POINTS FOR MENHADEN (Continued from page 4)

about ¼ or less of an un-fished population.²⁰

In an ecosystems context, it is clearly risk-prone to assume that the biomass of a target forage species can be reduced to below half its pre-exploitation state without causing reduction in the ecosystem's capacity to support healthy and abundant populations of predator species.²¹ Therefore, an overfished threshold should also be set substantially higher than in the traditional single-species approach, and probably no lower than B_{MSY} .

AVOIDING LOCALIZED DEPLETION

Ecological reference points may also account for the fact that setting a more conservative target population goal does not fully account for and protect a prey fish's role in the ecosystem. Fishing a prey population down to a fraction of its un-fished level in order to increase fishery yields causes not simply a reduction in the number of prey (total population), but also a change in the type of prey available (size/age) and distribution throughout their natural range.²² Each of these factors is important to predators finding an adequate supply of food where and when they need it.

The Policy on Fisheries for Forage Species of Canada's Department of Fisheries and Oceans states: "Management plans for commercial fisheries on forage species should include explicit provisions to ensure that fisheries do not unduly concentrate harvest and do not produce local depletions of the forage species... Forage species should be managed in ways which ensure local depletion of population components does not occur. Local depletion of the forage species could result in food shortage for the dependent predators, even if the overall harvest of the forage species was sustainable."²³

To avoid localized depletion and maintain prey availability, ecological reference points for Atlantic menhaden should establish, in addition to population biomass targets and thresholds:

- Target population age structure, i.e., an age distribution reflecting that of a natural, pre-exploitation population; and,
- Target population density, i.e., prey availability distributed in time and space to avoid local or regional depletions. Time-area limits (caps) can be used to distribute catches geographically.

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20 The National Marine Fisheries Service (NMFS) estimates the stock size at MSY at approximately 40% (range 36.8% to 50%) of the un-fished or pre-exploitation stock size. NMFS National Standard 1 Guidelines (1998): 63 FR 24216.

21 T. Ragen. 2001. Maximum sustainable yield and the protection of marine ecosystems: a fisheries controversy in Alaska. Author's unpublished manuscript. The author is Executive Director of the U.S. Marine Mammal Commission.

22 Ragen. 2001.

23 DFO, Canada. Policy on Fisheries for Forage Species.

RED FLAGS OVER CHESAPEAKE BAY

Last February, the Atlantic States Marine Fisheries Commission (ASMFC) selected NCMC president Ken Hinman to represent the conservation community on a new Menhaden Research Guidance Group. The Guidance Group was established in response to concerns raised by NCMC and others about progress on the menhaden research agenda set out by ASMFC in 2006 when the catch in Chesapeake Bay was capped for 5-years; namely, whether or not it will answer questions about localized depletion in the bay, the status of menhaden's role as forage, and other ecological issues.

The group consists of the marine fisheries directors from Maryland and Virginia, the executive directors of the ASMFC and Potomac River Fisheries Commission, the director of the NOAA Chesapeake Bay Office (CBO), and a representative from the conservation community and from the menhaden industry. It is responsible for reviewing ongoing and existing Chesapeake Bay research programs and providing guidance for future work to ensure the needs of menhaden conservation and management are being met.

The NOAA CBO devoted a full day to presentations on menhaden research at its 2009 Fisheries Science Symposium held April 21-22 in Laurel, Maryland. Most of the work is ongoing, so the results are preliminary and inconclusive. But a number of the findings so far raise red flags about menhaden depletion - the same flags that prompted the current cap on bay landings by the reduction fishery - even higher:

- **Myco Kills.** Mycobacteriosis, the stress-related disease afflicting well over half of the bay's striped bass population with lesions and tumors, ultimately kills its victims. New studies show mortality is more than twice as high in infected bass that in those without the disease, whose cause is unknown but could be related to poor nutrition. Myco also slows a fish's growth rate by a third.
- **Number of Juvenile Menhaden Still Low.** The number of juvenile menhaden in the bay, the primary nursery for the Atlantic stock, has been in decline since the mid-1980s and remains at historic lows. The concern is that the scarcity of juveniles may be affecting menhaden's historical role as a major food source for fish and other predators. The decline in juveniles predates the recovery of striped bass, so increased predation demand may be keeping the number of young fish low, but it did not cause the initial decline.
- **Declining Bay Catch.** Research to estimate abundance of menhaden in the bay is incomplete. But the bay catch is declining, to a 40-year low. In each year since 2006, the reduction fishery has not come close to filling its quota, suggesting reduced availability of fish in the bay.
- **Predation Demand Up, Supply Down.**
 - ◇ Seabird populations in the bay have increased significantly from when their numbers were greatly reduced by DDT, and so has their need for prey fish; nearly 8 times what it was 30 years ago. Ospreys, unlike pelicans and cormorants, are not generalized feeders and depend heavily on menhaden. In the 1980s menhaden made up 75% of the diet of osprey nestlings. Today it's only 25%. While the number of nests throughout the bay is up, survival of nestlings is as poor as it was in the DDT era.
 - ◇ Similarly, in a bay-wide survey of striped bass gut contents, menhaden accounted for only 8% of the striper's diet. Historically, juvenile menhaden comprised 70-80% of the diet of adult bass. The most recent stock assessments show natural mortality of striped bass is on the rise, while reproduction is down. □

ALLOCATING PREY TO PREDATORS

Collie and Gislason, in examining the use of single-species reference points in a multi-species or ecosystem context, conclude that such reference points are inappropriate for forage species which have natural mortality rates that fluctuate substantially. They suggest a more appropriate alternative for forage fish is to manage for total mortality by decreasing fishing mortality when natural mortality increases.²⁴

In an un-fished population at a natural equilibrium, total mortality (Z) for a species equals natural mortality, which for a forage fish like menhaden is primarily predation. In a population that is at a fishing-induced equilibrium, the amount of predation is reduced to accommodate desired fishery yields. As a result, estimates of natural mortality (M) used in single-species assessments are influenced by the fishing mortality rate (F). The M that is “determined” is therefore an *a priori* allocation to predators, rather than a determination of actual predator needs.

Some management bodies have recommended that an ecosystem-based approach to managing forage fish would be to allocate prey to predators first, before allocating to the fisheries. The NOAA Chesapeake Bay Office’s FEP, *Fisheries Ecosystem Planning for Chesapeake Bay*, recommends that fishery managers “(c)onsider explicitly strong linkages between predators and prey in allocating fishery resources. Be precautionary by determining the needs of predators before allocating forage species to fisheries.”²⁵

Following on Collie and Gislason, doing this would entail estimating an amount of prey fish to set aside to supply predators at desired levels, then determining the sustainable fishing mortality rate; or, $Z - M = F$. The predation mortality used in the menhaden stock assessment (M_p , a subset of M), which is estimated from the Multispecies VPA, is thought to produce a more accurate fishing mortality rate for the purpose of staying within current biological reference points. But as the ASMFC has pointed out, the MSVPA cannot provide information about the size and composition of striped bass and other predator populations a given menhaden population can support.²⁶

The natural mortality rate (M) used in the stock assessment, based on the MSVPA, is 0.45. The current fishing mortality reference points for menhaden are an F_{TARGET} of 0.75 and an $F_{THRESHOLD}$ of 1.18.

One class of reference points used to approximate fishing at the MSY level for data poor stocks, or when there

is a high degree of uncertainty about stock status, is $F=M$ or where F is a fraction of M, e.g., $F=0.75M$.²⁷ It is commonly assumed that when harvesting at MSY, F is roughly equal to M. If the goal is to maintain a higher biomass, as in the case of forage species, then F should be set no higher than M and preferably lower. Indeed, one author of the Chesapeake Bay FEP, referencing Collie and Gislason, has recommended that for menhaden, F should as a rule be less than or equal to M.²⁸ The North Pacific Fishery Management Council, which uses a tiered system for setting buffers between overfishing limits and target catch levels based on stock life history and uncertainties in the assessment, establishes an overfishing level (MSY) for walleye pollock, an important forage fish in Alaskan waters, that is equal to M and a target F that is set at $0.75M$.²⁹

SUMMARY

Ecological reference points for Atlantic menhaden used as an alternative to the commonly used single-species reference points could nonetheless use stock biomass and fishing mortality rate as reference points for setting targets and thresholds to achieve more conservative, ecosystem-based fishery management goals.

In Table 1 (below), we present what ecological reference points for menhaden might look like, based on the preceding discussion on the scientific literature and approaches used to manage forage fish elsewhere. B is the stock biomass, B_{MAX} is the biomass in the absence of fishing, $B_{MAX_{75\%}}$ is 75 percent of the un-fished biomass, and B_{MSY} is the biomass associated with producing the maximum sustainable yield. F is the fishing mortality rate, M is the natural mortality rate and $F=.75M$ is a fishing mortality rate that corresponds to 75% of the natural mortality rate. □

Table 1.

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

27 Field, J.C. 2002. A review of the theory, application and potential ecological consequences of F40% harvest policies in the northeast Pacific. School of Aquatic and Fisheries Sciences. University of Washington. Prepared for the Alaskan Oceans Network.

28 Houde, E.D. University of Maryland Center for Environmental Science. Developing, Adopting, and Implementing EBFM in Chesapeake Bay. A presentation to the Conference on Ecosystem Based Management: The Chesapeake and Other Systems. Baltimore, MD. March 23, 2009.

29 Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area. North Pacific Fishery Management Council. April 2009. p. 15.

24 Collie, J.S. and H. Gislason. 2001.

25 Fisheries Ecosystem Planning for Chesapeake Bay, NOAA Chesapeake Bay Office, 2006. pp. 320-1.

26 Brad Spear, Senior Fishery Management Plan Coordinator for Policy, ASMFC. Coast-wide Stock Assessment of Atlantic Menhaden. Proceedings of the Menhaden Science and Policy Symposium. Narragansett, RI. November 30, 2007. p. 14. The MSVPA includes only three predators - striped bass, bluefish and weakfish – on a prey species known to be preyed on numerous fish, marine mammals and seabirds.

WEGMANS GOES MARLIN FREE

Wegmans Food Markets, Inc., based in Rochester, N.Y., reaffirms its commitment to selling sustainable seafood by becoming the first supermarket chain to endorse the Take Marlin Off the Menu campaign (www.takemarlinoffthemenue.org) and refusing to sell marlin, sailfish and spearfish at its 72 stores located throughout New York, Pennsylvania, New Jersey, Virginia and Maryland.



In recognition of Wegmans' commitment to not selling marlin, the Take Marlin Off the Menu campaign, launched eight months ago by the National Coalition for Marine Conservation, the International Game Fish Association and The Billfish Foundation, wants consumers to know they can purchase their seafood at their nearest Wegmans supermarket with the full knowledge that Wegmans is officially "Marlin Free."

Supporting the Take Marlin Off the Menu campaign is in keeping with Wegmans' reputation for innovation. Founded in 1916, Wegmans is recognized as a leader throughout its industry, distinguished for its innovative approaches to customer service. In 2008, Wegmans published its Sustainable Seafood Sourcing Philosophy, a policy that has been followed for many years and is promoted at all Wegmans stores, as well as on its website. Wegmans also posts a chart of items sold in its stores that are certified sustainable and those which are not sold due to sustainability concerns.

"As an industry, we have a great deal of influence in what Americans eat," says Carl Salamone, vice president of seafood. "Every day, in supermarkets across the country, consumers ask seafood professionals what's great to eat. That's when we can point consumers to fish and seafood that is flavorful and good for our environment. Because when the marlin are gone, we all lose."

"This is a huge step for our campaign because Wegmans is respected by consumers for its commitment to customer service," adds Ken Hinman, president of the National Coalition for Marine Conservation. "We applaud Wegmans for stepping forward among its peers in the supermarket industry and coming out on the side of marlin and other billfish." □

SANCTUARY *(Continued from page 1)*

The HAPC does not automatically restrict fishing, but future fishery conservation measures, says NMFS, "could include gear restrictions, time/area closures, or other measures to minimize impacts to the habitat at such time as the information indicates such action is necessary to protect the habitat." One of these impacts is from longlining in the gulf. Longliners are prohibited from targeting bluefin, but they still take a significant bycatch while fishing for yellowfin tuna and swordfish, perhaps hundreds of giants each year.

If a bluefin is in the gulf during spawning season, it's a western spawner. The number of bluefin able to successfully reproduce in the gulf is critical, not just to rebuilding, but to saving the species itself. Stock assessments already confirm we've severely depleted the spawning population, but they may be out-of-date, assuming bluefin mature at 8 years of age. Recent research, in two separate studies, suggests that bluefin that spawn in the gulf do not fully mature until 11 or 12 years of age. If so, that would reduce the number of fish we're counting as spawners by up to a third.

BREEDING BLUEFIN NEED A REFUGE FROM LONGLINING

In June, NMFS issued an Advanced Notice of Proposed Rulemaking to get public feedback on possible changes to regulations for the U.S. bluefin fishery, including how to regulate the incidental, or longline, category. The industry wants looser rules to allow them to land more bluefin, given how far under quota the directed fishery is.

That's opened the door for bluefin advocates, fishermen and environmentalists alike, to renew efforts to further restrict gulf longlining in order to speed the recovery.

The National Coalition for Marine Conservation and other interested groups will be submitting comments on the longline fishery's bycatch of bluefin, with emphasis on the need to take stronger action to minimize fishing impacts on breeding bluefin, including a closure to longlining during spawning season. No other fishery has a bigger impact on western bluefin at this critical time within this Habitat Area of Particular Concern. The scoping period is open until August 31, 2009, after which NMFS will review comments and propose measures for inclusion in a future rulemaking.

The U.S. cannot save a highly migratory fish like bluefin tuna all by itself, but the situation is dire enough that we must do all we can, at home and abroad. That includes getting behind the movement to list bluefin under the Convention on International Trade in Endangered Species (CITES), which would prohibit all trade in the species, no matter where it is caught. In July, NMFS asked for public comment on U.S. proposals to take to CITES in 2010, indicating it is undecided on whether or not to submit a proposal for listing northern bluefin tuna and is looking for additional information. The comment period runs through September 11, 2009. □

Visit www.savethefish.org to support NCMC's efforts to save the bluefin tuna, and for information on how you can comment on the NMFS proposals.



THINKING OF SIGNING UP FOR VERIZON FiOS SERVICE?

Help NCMC in the Process

The National Coalition for Marine Conservation recently signed up with Verizon's Velocity fundraising program, which benefits charities each time someone signs up for one or more FiOS services in Maryland, Virginia, West Virginia, Washington DC, Washington state, Oregon or California. For example, if NCMC is your designated charity, we receive \$20 from Verizon if you sign up for FiOS TV, \$25 if you sign up for FiOS Internet, and up to \$65 on a FiOS Triple Freedom order! **All you need to do is order from a special sales number, and give them NCMC's code.** There is no extra cost to you, and you are still eligible for all FiOS promotions (except online offers). This offer applies only to residential FiOS orders, not business orders.

If you live in any of the states listed above, please see the enclosed Verizon flyer in this newsletter for ordering details. The program is open to anyone, not just NCMC members, so please pass the flyer along if you cannot use it. More information on the Velocity program can be found on Verizon's web site at www.verizon.com/velocity.

Thanks for your support!



Your mailing label now includes your membership renewal date.



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