**Statement of William J. Goldsborough**
**Director of Fisheries, Chesapeake Bay Foundation**
**Hearing on *H.R. 3840*** and ***H.R. 3841***
**Subcommittee on Fisheries, Wildlife and Oceans**
**House Committee on Natural Resources**
**May 8, 2008**

Madame Chairwoman, Congressmen Saxton, Gilchrest, Wittman and other members of the subcommittee, thank you for inviting me here today to offer my views on the ecological role that Atlantic menhaden play in the coastal environment and the management practices employed in the menhaden fishery. I do so on behalf of the Chesapeake Bay Foundation and our nearly 200,000 members living in all 50 states and many countries around the world.

CBF is a nonprofit conservation organization dedicated to "Saving the Bay." We define this goal in the context of both a healthy estuarine ecosystem and the well-being of the citizens of the region who depend on this unique natural resource. Atlantic menhaden play a unique role for both.

At issue today is the industrial fishery for Atlantic menhaden, a large scale, highly efficient fishery that is prosecuted by one company, Omega Protein, operating from a reduction plant in Reedville, Virginia, on Chesapeake Bay. In 2007, and on average over the last ten years, approximately 175,000 tons of menhaden were landed in the fishery, enough to make Reedville one of the top fishing ports in the United States in tonnage landed. Up to 109,000 tons are taken annually from the waters of Chesapeake Bay in this fishery, although exact figures are not public. The concerns expressed in ***H.R 3840*** and ***H.R. 3841*** have to do with whether or not the socio-economic benefits that accrue to Reedville, Virginia, outweigh the ecological role that these fish play and the indirect economic benefits that result for the citizens of Chesapeake Bay and the Atlantic coast.

Menhaden are, to quote the subcommittee chairwoman in her letter of invitation, "a phytoplankton-consuming forage fish." They consume vast quantities of microscopic plants, and they, in turn, are consumed by predatory fish. They are the herbivores, the base of the aquatic food chain, that provide forage for carnivorous fishes that support valuable sport and commercial fisheries. As such, they are indeed "an integral component of … [the] coastal ecosystem."

Menhaden are filter-feeders. As they filter large volumes of water they feed primarily on phytoplankton, microscopic plants that are typically overabundant in coastal estuaries. Eutrophication, or overenrichment with nitrogen and phosphorus, widely acknowledged as the most serious pollution problem in coastal waters, results in excessive growth of phytoplankton, which leads to turbid water, loss of seagrasses and oxygen-depleted "dead zones." In a recent assessment of eutrophication, mid-Atlantic estuaries were identified by the National Oceanic and Atmospheric Administration as the most eutrophic estuaries nationwide. The mid-Atlantic and its largest estuary, Chesapeake Bay, are the focal area of the industrial menhaden fishery.

By removing phytoplankton from coastal waters, menhaden help diminish the immediate problem of turbid water, but more importantly they serve as mechanisms for the removal of polluting nitrogen from eutrophic estuaries. One highly-regarded study of Narragansett Bay, Rhode Island, estimated that 3-6% of the annual nitrogen export from the Bay was due to menhaden. By applying that analysis to Chesapeake Bay, it can be estimated that 2.7 million pounds of nitrogen would be removed annually by the 109,000 tons of menhaden allowed in the industrial fishery, were they not caught. To put that in monetary context, the cost of reducing nitrogen input to the Bay ranges from $.54 to $397.88 per pound, according to 2003 Chesapeake Bay Program estimates. Even recognizing the difference between nitrogen reduction and removal, menhaden filtering clearly provides a valuable service for coastal waters.

Perhaps even more valuable than nitrogen removal is the "ecological service" provided by menhaden serving as food for higher trophic levels. As schools of menhaden migrate annually along the coast, they are fed upon by a wide range of fish, birds and marine mammals. Included on this list of menhaden-dependent species are striped bass, bluefish, sharks, swordfish, cod, bonito, ospreys, loons, brown pelicans and bottlenose dolphin. [Attached to this testimony is summary information on the dependence of these bird species on Atlantic menhaden.]

The dependence of striped bass on menhaden has received by far the most attention in recent years. As the most sought after sportfish on the East Coast, as well as a valuable commercial species in several states, stripers are a high priority for the general public. Their recovery from near collapse in the early 1980s has been heralded as a fisheries conservation success story, but it is also a clear example of the limitations of managing fisheries one species at a time. Striped bass numbers were brought back to historic highs in a relatively short period of time, but little attention was paid to providing the forage base required by such large numbers of predatory fish. According to one study, striped bass prey consumption increased eight-fold during the recovery, and prey populations were unable to keep up.

Striped bass in Chesapeake Bay have been food limited ever since they were declared "recovered" in 1995 and have probably been suffering from malnutrition. Reduced growth rates and low body weight have been observed for most of that time. Skin lesions began appearing on fish in 1997, and a serious disease known to be fatal in captive populations, mycobacteriosis, was soon identified. It is not known conclusively what the cause(s) might be, but physiological stress from poor nutrition and water quality are the leading candidates.

Both the menhaden and striped bass fisheries are managed by the Atlantic States Marine Fisheries Commission (ASMFC). The Commission revamped its menhaden plan in 2001 and for the first time formally recognized menhaden's important ecological role. Since then, it has been grappling with the very difficult issue of how to optimize both the economy and ecology of menhaden. Faced with reports of striped bass health problems, possibly linked to lack of food, the Commission capped the industrial fishery in Chesapeake Bay at current levels in 2006 as a precautionary step. At the same time it worked with NOAA to initiate an intensive research program to better define the status and management options for menhaden in Chesapeake Bay.

Some stakeholders were disappointed in the cap approach, feeling that the case for conserving menhaden is so strong that the public good is clearly best served by shutting down the industrial fishery. Therein lies the origin of the legislation under consideration today – an attempt to serve the broadest public good and to err on the side of the resource.

But the Commission is obligated to utilize the best available science and a formal process, both of which are essential for maintaining the integrity of the fishery management process. The primary scientific tool of fishery management is the stock assessment, a population model which describes the condition of a stock relative to adopted benchmarks or "reference points." The stock assessment for menhaden, which is rerun and peer-reviewed every three years, has consistently concluded that the population is not overfished on a coastwide basis. With that backdrop, the Commission felt it could do little more to restrict the industrial fishery than it did. In short, the cap and research package were reasonable, responsible and defensible actions under the circumstances.

Having said that, the current stock assessment is a single-species model, meaning it is not designed to account for interactions between menhaden and other species or the environment. It is also a coastwide model that, as pointed out in a peer review, "…would not detect localized depletion and reduced ecological function that could occur when the fishery is concentrated in one part of the coast." In addition, credible concerns have been raised about the mechanics of the model itself. In particular, there is disagreement about the estimates of "natural mortality" used in

the model, which is the primary way that menhaden's role as forage for other species would be quantified.

The 2008 fishing year is the third out of a five year term for the cap on Chesapeake Bay landings and the research program. The cap was conceived as a temporary measure to hold the line against any increases in Chesapeake Bay catch in the short term. Of equal, if not more importance, is the research program, which was designed to provide a stronger technical basis for ecologically-based management of the fishery. The conservation stakeholders that supported this package have consistently advocated that the research deserves close and continuous scrutiny to ensure that it will yield useful information. Menhaden management during the period of the cap and certainly afterward must be adaptive and apply new, technically-sound information as soon as it is available. A strong, well supported research program is key.

CBF's view is that the ASMFC is the preferred avenue for menhaden management. Process is important. The impatience with this process and the commitment to menhaden ecology embodied in this legislation are honorably conceived, but we should give the temporary cap and a strong research program a chance to work. If by the end of the cap and research program in 2010 the Commission process does not appear to be on track to sufficiently protect Atlantic menhaden's ecological role as called for in its 2001 plan, a legislated approach may appropriate.

For now, CBF urges this subcommittee to do all it can to encourage the following:

1. a greater sense of urgency and a more committed partnership between NOAA and ASMFC to develop ecosystem-based management (EBM)

2. enhanced resources for both NOAA and ASMFC to conduct the research and engage the experts necessary to implement EBM for menhaden

3. a Menhaden Science Workshop in 2008 to evaluate all research to date and prepare any promising new tools and data for use in the scheduled 2009 stock assessment

4. development of ecologically-based reference points for menhaden for implementation in the 2011 fishing season

Madame Chairwoman, I thank you for bringing this issue before the subcommittee, and I thank the sponsors of the legislation for their dedication to improving menhaden management. I urge you and the subcommittee to assist NOAA and the ASMFC in any way you can to achieve the goal of an appropriate balance between menhaden economic and ecological objectives.

## APPENDIX

### Bird Dependence on Menhaden: A Brief Summary of Four Case Histories

Paul R. Spitzer, Ph.D., 31672 Old Orchard Rd. Trappe, MD 21673

Three large charismatic bird species in the mid-Atlantic coastal region are known to prey on menhaden whenever they can: Osprey, Brown Pelican, and Common Loon.
A fourth species, the Gannet, is an exclusively Canadian breeder (6 very large colonies) that winters commonly along our coasts. Based on strong circumstantial evidence it is thought to feed heavily on menhaden, but this remains unstudied and thus unproven.

**OSPREYS** dive from the air to catch menhaden in their extended talons, to a depth of about 0.5 m. The menhaden's constant plankton-feeding behavior near the water's surface makes it very vulnerable to ospreys. Several studies have found that menhaden (mostly 1 and 2 year old fish) are the osprey's most important prey item by number and weight in Chesapeake Bay. Recent surveys (Watts *et al.* 2004) tally nearly 3,500 active osprey nests (=breeding pairs) around Chesapeake Bay, a unique concentration worldwide.

To the north, at Gardiners Bay in N.Y. State, the famous osprey colony on Gardiners Island feeds on larger migratory menhaden 3 years old. These fish are typically about 30 cm (nearly one foot) in length, and are taken in "heroic dives", in which the hunting osprey knifes down with considerable force into open deep water. The island is surrounded by this habitat: During and before the 20$^{th}$ century, Gardiners Bay was a famous menhaden destination and warm-weather habitat (several references). During the first half of the 20$^{th}$ century, various biologists reported from 150 to 300 active osprey nests on Gardiners Island. The post-DDT history of this osprey colony tracks the production of juvenile menhaden in Chesapeake Bay as reported by Maryland DNR (Uphoff 2003): In the early 1970's, reproduction was poor and there was no population recovery. From the late 1970's to the early 1990's, coincident with strong menhaden production, osprey reproduction was generally good and the colony recovered from 26 to 71 nests. 1992-93 marks the "regime shift" in Chesapeake juvenile menhaden production (Uphoff 2003), which has remained weak since then. Gardiners Island osprey reproduction has been below replacement rate in most years since 1994, with good egg hatching followed by much starvation of nestlings. The colony declined to a historical low of 23 nests in 2007, despite the owners' provision of abundant nest platforms. Thus I argue that the Gardiners Island ospreys serve as a bioindicator: This is a "Menhaden-Based Osprey Colony", and menhaden will be essential if it is to flourish again (Spitzer 2004).

**BROWN PELICANS** and their young regurgitate their fresh stomach contents when disturbed at their nesting colonies. Thus numerous visitors have observed, both in Chesapeake Bay, MD/VA, and Core Sound, NC, that small menhaden 1 and 2 years old form much of breeding pelican diet. The feeding pelican's dramatic head-first aerial "crash dive" to the surface, in which the distensible bill serves as a scoop, fits completely with menhaden behavior near the surface.

In Chesapeake Bay, pelicans nest in large colonies on predator-free islands (Shanks and Holland) surrounded by waters that are feeding sanctuaries for menhaden, by reason of being too shallow for purse-seine boats or above the Maryland state line.

**COMMON LOONS** are common on mid-Atlantic coastal waters during migration and winter. They dive from the surface and flock-feed on "peanut" (age 0) menhaden schools in green plankton-rich water, pursuing them from below to trap them at the surface. Common Loons were at times dramatically abundant in Chesapeake and NC waters before the 1992-93

menhaden "regime shift", and that level of abundance has not since recurred (details in Spitzer 2008). In March-June 1993, loons suffered an "emaciation mortality event" in NC, many hundreds dying of starvation (Spitzer 1995, Augspurger *et al.* 1998). The adults' winter flightless period (unique to the loon) severely limited their mobility in response to food failure. Flighted but inexperienced juvenile loons also succumbed. A succession of storms contributed physical stress, but not enough to explain the magnitude and duration of the loons' starvation.

**GANNETS** winter along the mid-Atlantic coast, and in the lower Chesapeake Bay. They often flock-feed on fish, plunging down in a spectacular aerial dive, with speed and force like a javelin, followed by underwater pursuit. Sometimes they use flocks of feeding loons to locate schooling prey and push them towards the surface. They have tremendous aerial mobility. The times and places of gannet abundance often fit well with menhaden distribution patterns, but no scientific study has yet been done to confirm what is probably a fundamental food-chain connection. Throughout the mild winter of 2008, menhaden were available as potential prey well up Chesapeake Bay, and gannet flocks were also present at least as far north as Kent Island.

## Literature Cited


Augspurger, T., Franson, J.C., Converse, K.A., Spitzer, P.R., and Miller, E.A. 1998. An epizootic of Common Loons in coastal waters of North Carolina: Concentrations of elemental contaminants and results of necropsies. Env. Tox. & Chem. 17,2:205-9.

Spitzer, P.R. 1995. Common Loon mortality in marine environments. Environmental Reviews 3:223-229. National Research Council of Canada.

Spitzer, P.R. 2004. Osprey study at Gardiners Bay, NY: Summary Report to NYSDEC and TNC. 9 pp.

Spitzer, P.R. 2008. Conservation biology of nonbreeding Common Loons. Ms. in prep.

Uphoff, J.H. 2003. Predator-prey analysis of striped bass and Atlantic menhaden in upper Chesapeake Bay. Fisheries Management and Ecology 10:313-322.

Watts, B.D., Byrd, M.A, and Watts, M.U. 2004. Status and distribution of breeding ospreys in the Chesapeake Bay: 1995-1996. Journal of Raptor Research 38:47-54.