Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Atlantic Menhaden Management Board

FROM: Atlantic Menhaden Work Group

DATE: October 17, 2024

SUBJECT: Draft Definition of Problem Statement for Precautionary Management in Chesapeake Bay (Updated)

The Atlantic Menhaden Work Group was charged to "consider and evaluate options for further precautionary management of Chesapeake Bay menhaden fisheries, including time and areas closures to be protective of piscivorous birds and fish during critical points of their life cycle." [1] This charge asserts there is an inadequate supply of menhaden to support overall predatory demand in the Bay. However, the Work Group is addressing this charge without determining if there is or is not an adequate supply of menhaden to support predatory demand in the Bay. Instead, it will be developing possible management recommendations, and the Board would determine if or when it is necessary to implement them. The Work Group has drafted the below draft problem statement. It is the intent of the Work Group to have a full report to the Board by the Spring 2025 Commission meeting.

Draft Problem Statement

This charge asserts there is an inadequate availability of menhaden to support overall predatory demand in the Bay. Changes to availability of menhaden may be caused by the following: changes in total abundance, size distribution of the population, and timing of presence and spatial distribution in the Bay. This can be caused by fishing pressure, environmental conditions, habitat suitability, and/or changing predation pressures on a limited spatial and temporal scale.

Since the period of peak menhaden harvest in Chesapeake Bay, environmental conditions, introduction of invasive species, and changes in predation pressure are likely affecting the availability of menhaden.

- Environmental changes include increases in surface water temperature[2], changes in phytoplankton bloom timing,[3] and riverine inputs.[4]
- Piscivorous bird abundance in Chesapeake Bay has increased (*e.g.,* osprey, brown pelicans, and bald eagles).[5] All are known to consume menhaden as part of their diet.[6]

[1] Meeting Summaries, Press Releases, and Motions. Atlantic States Marine Fisheries Commission 2024 Summer Meeting. https://asmfc.org/files/2024SummerMeeting/2024SummerMeetingSummary.pdf

[2] Najjar et al. 2010. Estuarine, Coastal and Shelf Science: 86:1. https://www.sciencedirect.com/science/article/abs/pii/S0272771409004582?via%3Dihub

[3] Harding et al. 2016. Nature: 6: 23773. https://www.nature.com/articles/srep23773#:~:text=Here%2C%20we%20synthesize%20long%2Dterm,over%2Denrichment%20and%20climatic%20conditions.

[4] Ross, A.,C, et al. 2021. Anthropogenic influences on extreme annual streamflow into Chesapeake Bay from the Susquehanna River. [in "Explaining Extremes of 2019 from a Climate Perspective"]. *Bull. Amer. Meteor. Soc.*, **102** (1), S59–S66, doi: https://doi.org/10.1175/BAMS-D-20-0129.1.

[5] https://www.mbr-pwrc.usgs.gov/

[6] https://ccbbirds.org/2009/09/05/flexibility-of-cormorant-and-pelican-diet-assemblages/

- Likewise, other piscivorous fish species have increased in abundance, including red drum, cobia, and Spanish mackerel, while other species, including striped bass and weakfish, have declined in abundance. All are known to consume menhaden as part of an omnivorous diet. This shift from a historical suite of predators to new suite of predators presents an unknown impact on overall predatory demand from piscivorous fishes.

Such changes in menhaden availability may affect the species' ability to fulfill its ecological and/or economic functions.

James Boyle

From: Roberta Kellam <Roberta.Kellam@outlook.com>
Sent: Tuesday, October 15, 2024 4:58 PM
To: Comments
Subject: [External] PUBLIC COMMENTS

PLEASE PROVIDE A COMPLETE COPY OF THESE COMMENTS AND ATTACHMENTS TO THE FULL COMMISSION.

October 15, 2024
From: Roberta Kellam, Franktown, Virginia 23354
TO: Atlantic States Marine Fisheries Commission

I am a former member of Virginia's State Water Control Board (2 terms), and my husband is a former Virginia appointee to the Atlantic States Marine Fisheries Commission. We appreciate your public service and offer the following comments to assist your efforts to develop a time of year restriction on the menhaden reduction fishery in the Chesapeake Bay to address the Osprey breeding crisis.

The scientific research shows that the Osprey reproductivity levels are far below population maintenance levels in the SALINE (>10 ppt) portion of the Chesapeake Bay; whereas the Osprey reproductivity levels in the fresh or lower salinity areas of the Bay watershed are at or slightly above population maintenance levels. The focus of the Osprey-Menhaden Work Group should be on the Osprey reproduction within the Bay waters that are >10 ppt. Please see the attached map of the salinity regime of the Chesapeake Bay.

The ASMFC Osprey-Menhaden Workgroup focused on the food demands of the entire population of Osprey in the entire Chesapeake Bay, including the Osprey in the fresh and slightly saline portion of the Bay. Dr. Watts' 2024 research shows that it is only the Osprey population in the SALINE portion of the Bay that is doing poorly. It seems that Osprey breeding in waters that support the invasive blue catfish are utilizing catfish for food supply. Furthermore, the ASMFC Osprey-Menhaden work group should focus on the breeding schedule for Osprey in the saline part of the bay, mostly in the lower Chesapeake Bay in Virginia, rather than the Maryland breeding schedule as reported by USGS.

Below are the results of the 2024 Osprey Breeding Report from the College of William and Mary, Center for Conservation Biology. Attached is a map of the Bay showing the study areas and success rate. As you can see, osprey nests in the fresh areas with <1 ppt salinity in the Rappahannock and James Rivers fledged 1.31 and 1.39 young per pair, whereas the mainstem of the Chesapeake Bay with >10 ppt salinity ranged from .23 to .90 fledged per pair. Notably, the Osprey Menhaden work group has not contacted or met with Professor Watts to discuss his 2024 research or his prior several decades of research on Osprey in the Chesapeake Bay.

Table 1: Osprey breeding outcomes in the Chesapeake Bay (2024). Source – Center for Conservation Biology, William & Mary.

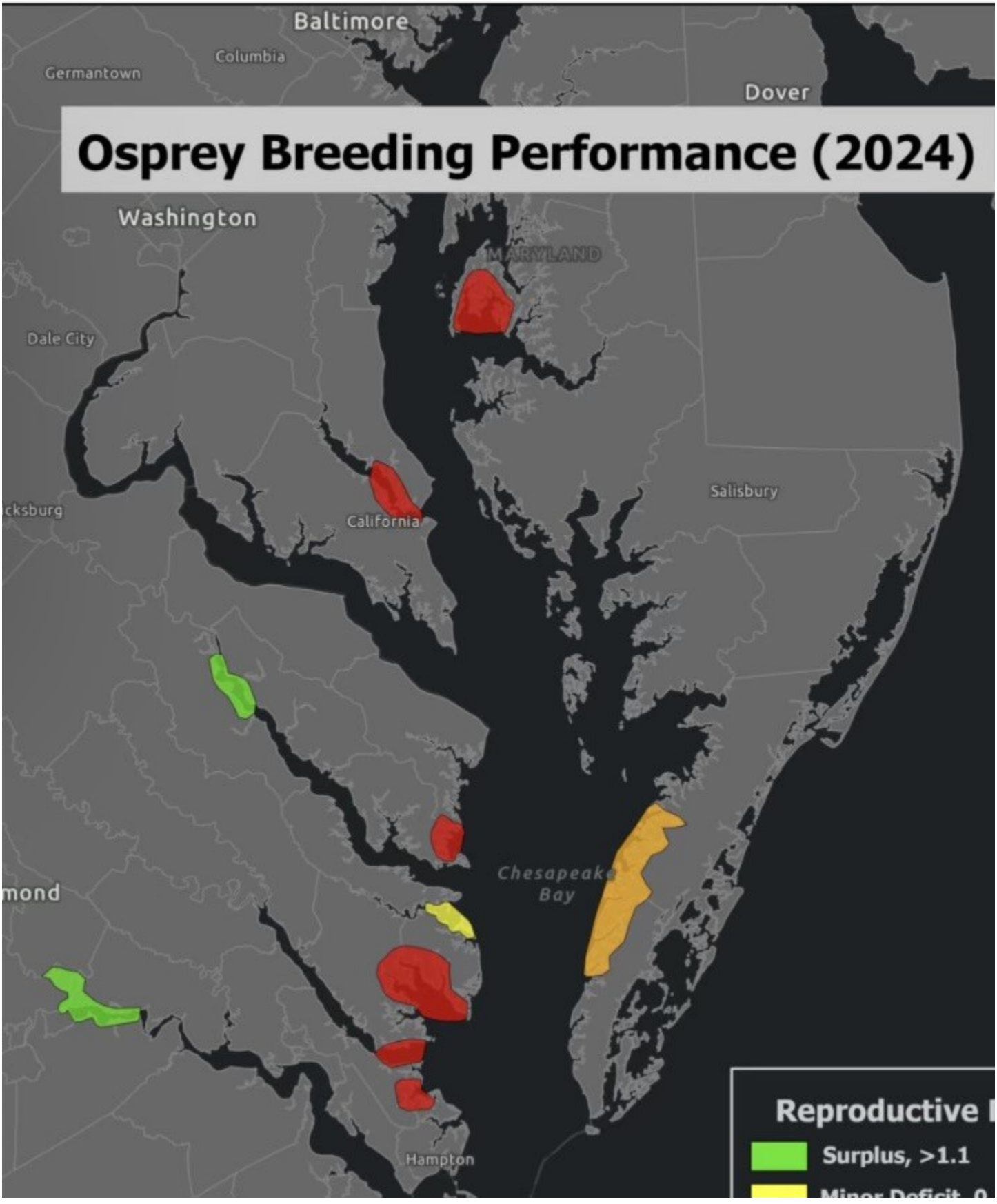
Site	Pairs	Reproductive Rate young/pr (SE)	Pairs Not Laying (%)	Successful Pairs (%)	Failed Pairs (%)	1-chick Broods (%)
Main Stem (>10 ppt)						
Choptank River	60	0.23 (0.07)	21.7	18.3	60.0	72.7
Patuxent River	49	0.51 (0.11)	22.4	34.7	42.9	58.8
Fleets Bay	38	0.08 (0.05)	57.9	7.9	34.2	100.0
Eastern Shore	57	0.75 (0.13)	14.0	40.4	45.6	44.0

Piankatank River	37	0.89 (0.16)	27.0	54.1	18.9	45.0
Mobjack Bay	75	0.40 (0.08)	30.7	29.3	40.0	68.2
York River	58	0.52 (0.12)	37.9	31.0	31.0	50.0
Poquoson River	47	0.43 (0.10)	27.7	31.9	40.4	66.6
Elizabeth River	36	0.69 (0.14)	27.8	47.2	25.0	52.9
Lynnhaven River	30	0.90 (0.19)	0.0	50.0	50.0	33.3
MAIN STEM TOTAL	**487**	**0.51 (0.04)**	**27.1**	**33.1**	**39.8**	**54.6**
Reference (<1 ppt)						
Rappahannock River	33	1.31 (0.19)	0.0	63.6	36.4	14.3
James River	51	1.39 (0.33)	5.9	66.7	27.5	20.6
REFERENCE TOTAL	**84**	**1.36 (0.12)**	**3.6**	**65.5**	**31.0**	**18.2**

Eastern Shore Creek Data listed from South to North:

Hungars Creek – 21 pairs, 28 fledged = 1.33 young/pair
Nassawaddox Creek – 18 pairs, 5 fledged = 0.28 young/pair
Occahannock Creek – 8 pairs, 4 fledged = 0.5 young/pair
Onancock Creek – 7 pairs, 5 young – 0.71 young/pair
Pungoteague Creek – 3 pairs, 1 young – 0.33 young/pair

In addition, I am providing the ASMFC with the full comments of Professor Bryan Watts that were submitted to the ASMFC Osprey-Menhaden Work Group for their October 2, 2024 meeting; these comments addressed the comments submitted by Omega Protein. Please read it thoroughly as I believe it addresses many misconceptions.
Sincerely,


Baltimore
Columbia
Germantown
Dover
Osprey Breeding Performance (2024)
Washington
MARYLAND
Dale City
Salisbury
California
Chesapeake Bay
Hampton
Surplus, >1.1

RESPONSE TO OMEGA COMMENTS REGARDING OSPREY AS SUBMITTED TO THE ASMFC OSPREY-MENHADEN WORK GROUP FOR THE OCTOBER 2, 2024 MEETING BY Bryan Watts, PhD, Center for Conservation Biology, William & Mary

OMEGA Comment - To put it charitably, the motion puts the proverbial horse before the cart, assuming that "further precautionary management" measures – *i.e.*, measures beyond the precautionary Chesapeake Bay reduction fishery cap 51,000 metric tons ("mt") – are needed to protect
piscivorous birds and fish. There is no evidence, however, that the menhaden bait and reduction fisheries in the Bay are having any adverse impacts on avian or fish predators. Nor is it likely that the current menhaden fishery in the Chesapeake Bay is having adverse effects given that it is currently being prosecuted at some of the lowest levels in the past 150-plus years and the unitary, migratory menhaden stock is both highly abundant and conservatively managed.
WATTS RESPONSE - To the contrary, this assessment and consideration is overdue not premature. There has been evidence for at least 20 years that consumers in the Bay (osprey and striped bass as only 2 examples) that depend on menhaden as a primary food source have been impacted by low menhaden availability. The current level of harvest relative to historic harvest is not relevant to this issue. The famous collapse of the Pacific sardine stock is a prime example of this same pattern. When a stock is limited within a specific location you do not accelerate harvest you ease back on harvest to allow for recovery.

OMEGA COMMENT - It is unclear what information the Working Group intends to base any recommendations upon. At the Summer Meeting, the Menhaden Board was presented with a detailed presentation by the U.S. Geological Survey ("USGS") on what is known, and not known, about the present state of local populations of osprey in the Chesapeake Bay region. The Board was informed that, overall, the regional osprey population increased 1,801% between 1966 and 2022. The USGS scientists noted that over a shorter timeframe – 2012-2022 – there had been a slight decline in their numbers within the mainstem of the Bay and its tributaries (though increased populations inland). That decrease appears to be more pronounced in the Maryland portion of the Bay, but it is a trend that has been seen all along the Atlantic Coast. (*See* Figure 1, below).
WATTS RESPONSE - The USGS did not present all that is known about the Bay osprey population. USGS has done minimal fieldwork with osprey in the Bay. They used breeding bird survey data (BBS) to examine regional trends. This metric is based on point counts conducted by citizens and is a poor representation of the population. It is not designed to examine fine-scale trends. Its use was not necessary in this case since we have population assessments for the Bay. Yes, it is true that the osprey population in the Bay has increased dramatically since the DDT era. As with virtually all osprey populations around the globe the Bay population declined by approximately 90% due to DDT. The population has recovered tenfold since the lows of the 1960s. We reached 3,500 pairs by 1995 and now are in the range of 10,000 pairs. However, we have seen dramatic spatial variation in recovery patterns. Pairs in lower salinity (<5 ppt) reaches have increased dramatically and this increase is continuing to present. These lower salinity subpopulations are driving the Bay-wide recovery. Subpopulations around the main stem of the Bay are either stable or declining since the mid-1990s. See Watts et al. 2004 – Status and distribution of osprey in the Chesapeake Bay. We are now seeing a hollowing out of populations along the main stem. The main stem of the Chesapeake Bay was considered a global stronghold for osprey during the DDT era and was a key population that supported the restoration of osprey populations across many states. This historic population is now suffering from an inadequate prey base.

Osprey populations are not declining along the entire Atlantic Coast. Your figure is from e-bird data which reflects reports of detections from birders. These should not be confused with systematic or benchmark surveys. What is going on in the Bay should not be conflated with what is going on elsewhere. The patterns we are seeing in the main stem of the Bay are specific to the main stem of the Bay.

OMEGA COMMENT - Importantly, the USGS does not know exactly what accounts for this trend. One of the scientists mentioned that it is not uncommon for recovering populations to increase levels past carrying capacity, though did not speculate that this is the cause of the general coastal decline in osprey populations. They did note likewise increasing trends for competitor species, such as bald eagles, cormorants, pelicans, gulls, etc. Competition can lead to intraspecific competition for nest sites and prey and depredation. Other things they identified include weather events which are becoming more frequent and severe with climate change, disease like the avian influenza epidemic currently underway,

environmental contaminants, and water quality. None of these have been specifically implicated in the current decline in breeding success seen along the Atlantic coast.
WATTS RESPONSE - There is no documented general coastal decline in osprey. Yes, there are many ways for an osprey nest to fail and these have been documented widely. The facts in this case which have been presented in several different ways and are unequivocal demonstrate that poor breeding performance in the main stem of the Bay is due to brood reduction via starvation. We have shown this in the 40+ year retrospective (see Watts et al. 2024) that indicates 1) reproductive rates have gone from surplus to deficit during the 1990s, 2) this decline is due to an increase in brood reduction (chicks starving in the nest) and 3) the brood reduction is the result of reduced provisioning rates with menhaden. We later demonstrated this deficit by conducting a food supplementation study (Academia and Watts 2023) and showed definitively that increases in menhaden provisioning will drive productivity back to surplus. The issue here is that there is not enough menhaden available to osprey to support a viable breeding population within the main stem of the Bay. In 2024, we worked throughout the main stem of the Bay and showed that 1) none of the 10 study areas broke even demographically and 2) low reproductive rates were attributed to brood reduction via starvation. Let me be clear that the issue of 1) reproductive rates for osprey in the main stem of the Bay are below that required to sustain a population and 2) the driving factor for the poor reproductive performance is brood reduction via starvation is settled. The debate needs to move on and plow new ground.

The issue of food competition continues to be brought up in this discussion. Yes, it is true that a number of species that depend on fish within the Bay have recovered from DDT lows including osprey, bald eagle, great blue heron, brown pelican, double-crested cormorants and others. However, to suggest that food competition between these birds is driving the poor reproductive performance in osprey shows no understanding of the basic metabolic demands for this community. It was shown in McLean and Byrd (1991) – (the diet of Chesapeake Bay ospreys and their impact on the local fishery) that consumption by osprey is trivial compared to harvest. Later modeling that I conducted in the 2000s showed that the entire bird community does not have the capacity to exert control on fish populations. All of the bird species combined represent a rounding error on both the commercial harvest and the estimated consumption by fish predators. The birds on their own do not have the capacity to undermine productivity. However, both the commercial harvest and the community of fish predators do.

OMEGA COMMENT - The USGS team did indicate, however, that a study is currently underway to investigate historical and present-day availability of prey for osprey. Those results are expected at the end of 2025. It would be prudent to postpone any such management actions until that study is complete.
WATTS RESPONSE - The study that USGS is referring to is mine. The intent is to compile data from osprey monitoring efforts along the entire Atlantic Coast (dozens of efforts some of which date back several decades). This includes hundreds of thousands of nest checks. Once the dataset has been compiled, we would be in a position to relate population and demographic metrics for osprey to menhaden indices over time. The amount of effort expected to collect, compile and make the monitoring data usable is significant. To date, there has been no funding made available to support this work. Without funding this effort will not be completed by the end of 2025. This project has the potential to unlock the relationship between osprey and menhaden and I encourage AMFC to provide funding to support it.

OMEGA COMMENT - Beyond the lack of scientific information to inform any management action, another reason to avoid a narrow focus on the menhaden fisheries is that it is far from the only or even most important food source for osprey. USGS presented information that only in the large mid-Bay region, where salinity is about 8-13 parts per million, do menhaden comprise a significant portion of ospreys' diet. And in that region, osprey are even more dependent on striped bass, an overfished population currently subject to a rebuilding program. In the southern portion of the Chesapeake Bay, where the reduction fishery is concentrated, menhaden comprise only about 24% of osprey diet, with spotted sea trout being the dominant forage fish.
WATTS RESPONSE - This statement is nonsensical. Ospreys nesting in waters of the Chesapeake Bay that are >10ppt (including all the way to the mouth) are menhaden-dependent. This is a very large swath of the Chesapeake and includes the lower reaches of major tributaries. Within these waters menhaden appear to be a keystone species. Historically, menhaden accounted for more than 70% of the diet and Chesapeake Bay osprey were considered from the 1960s to 1980s to be menhaden specialists. Osprey are not more dependent on striped bass which represents

a minor diet component. The importance of menhaden in the diet since the 2000s has declined to below 30% and this is why we believe that productivity has declined. I have no idea where the comment comes from about dietary percentages in the lower Bay.

Globally and within the Chesapeake, osprey take a wide range of fish species. However, all of these species are not equal. I would ask why is it that Omega does not run the reduction operation on spot or trout? It is because these species do not have the same energy density (lipid content) and they do not school in the same way. The same is true for osprey. Osprey depend on the energy density and the schooling behavior of menhaden to break even. They do not do well with a diet dominated by species with low energy density.

OMEGA COMMENT - If the primary factor in recent declines is lack of forage, then the Working Group should focus on the full suite of forage available to osprey, which, of course, are generalists when it comes to feeding. Indeed, it would be responsible to look at whether environmental factors, such as water temperature, salinity, and dissolved oxygen levels during breeding season may be influencing fish availability.
WATTS RESPONSE - Osprey are not generalists when it comes to feeding. As indicated above, menhaden are a keystone species for osprey and for other piscivores in the Bay. Their characteristics of high energy density and dense schooling make them unique in the Bay to predators.

OMEGA COMMENT - There is only one study that purports to identify the menhaden fishery as the culprit in the lack of nesting success in one small portion of the Chesapeake Bay. That report, "Food supplementation increases reproductive performance of ospreys on the lower Chesapeake Bay," authored by master's candidate Michael H. Academia and Bryan D. Watts, director of the College of William & Mary's Center for Conservation Biology ("CCB"), focuses on observed low rates of reproductive success among osprey inhabiting Mobjack Bay, an area along the western side of the lower Chesapeake Bay. The study found that providing fish to nests improves survival of the young birds.
WATTS RESPONSE - This is not the only study focused on the issue. See Watts et al. 2024 that examines a range of reproductive metrics across more than 40 years and concludes that changes in menhaden abundance and the most likely explanation for shifts in reproductive rates, provisioning rates, brood reduction, nest failure, etc.

The food supplementation study shows that not only are supplemented nests more productive than control nests but reproductive rates were pushed above maintenance levels which has implications at the population level.

OMEGA COMMENT - Going beyond the evidence, the authors conclude that the Chesapeake Bay menhaden fishery—specifically the reduction, and not the bait, fishery—could cause osprey populations to "decline precipitously, threaten population stability, and eventually lead to widespread population collapse." They call for a return to the 1980s levels of menhaden in the Bay to be accomplished by further reducing or eliminating the reduction fishery's Bay harvest. These recommendations are not supported by the study's findings. In fact, as shown below, it is highly unlikely that the fishery has any impact on foraging issues facing osprey in this small area.
WATTS RESPONSE - As indicated above, the food stress experienced by osprey pairs and the resulting poor breeding performance extends throughout the main stem of the Bay and is not restricted to Mobjack Bay.

OMEGA COMMENT - There is reason to suspect that foraging success by adult osprey in Mobjack Bay has declined based on CCB provisioning studies over the years. But nothing suggests that menhaden abundance is a cause. For example, compared to the last study in 2007, **menhaden comprised a higher percentage of fish delivered to nests in 2021**. So, while the amount of forage fish caught by or available to osprey (which are generalists when it comes prey) may be lower than years past, menhaden are *relatively* more abundant than other stocks compared to 2007.
WATTS RESPONSE - Everything in the patterns we have collected suggests that menhaden abundance is the cause of the lower provisioning rates and poor reproduction. Provisioning overall and with menhaden has declined dramatically. If you look at the energy content of the diet it has declined by 50% due to the lack of menhaden. The data we have indicates that the change in reproductive performance occurred during the 1990s and likely the late 1990s. If you don't believe the osprey in terms of menhaden declines in Mobjack Bay then listen to both the bait and reduction fisheries. During the partnership meeting in the summer of 2023, both Omega and the bait companies indicated that they used to fish for menhaden in Mobjack but have not since about 2000. Given that they are using spotter planes the

clear implication is that there are now not enough menhaden in Mobjack to make it worth their while to fish there. Their own fishing behavior suggests that there has been a change in menhaden within Mobjack Bay.

OMEGA COMMENT - Beyond that, overall menhaden biomass has been high for decades. In 2021, the year of the study, it was at its second highest level since 1961. Within the Chesapeake Bay, the menhaden young-of-the-year index for the two mid-Bay rivers, the Choptank and Patuxent, were at their highest and fifth highest levels in 2021, meaning there were abundant small menhaden in this region. For the Bay overall, recruitment of menhaden was the highest in the late 1970s and into the 1980s when environmental conditions were favorable and the striped bass population had crashed. As striped bass recovered menhaden recruitment declined, suggesting that osprey may be competing with that stock.
WATTS RESPONSE - Typical osprey fish size is 10-12 inches but will take smaller and larger fish. Most of the menhaden taken by osprey are likely in the year 2-4 classes. I do not know of any menhaden data that will help to resolve the spatial variation in menhaden abundance at the consumer level. If such data existed it would be a simple matter to relate osprey reproductive success at the subestuary level with menhaden abundance.

OMEGA COMMENT - Finally, the Chesapeake Bay menhaden fishery is currently at its lowest sustained levels on record due to decreases in the Bay reduction fishery cap and actions by Omega Protein and Ocean Harvesters to reduce their Bay footprint and minimize user conflicts. Importantly, this fishery has been prosecuted in the Chesapeake Bay since the 1850s. For most of that time, menhaden removals from the Bay have been three or more times higher than currently. More importantly, the only reduction fishing that occurred during the study period in May 2021 when most nests failed was north of Mobjack Bay and thus had no impact on that area.
WATTS RESPONSE - These comments are reminiscent of those made during the 1940s before the loss of the Pacific sardine fishery. The gross take is not the issue but rather the take relative to what the stock can sustain. Since we have no independent data on the abundance of menhaden in the Bay, we have no way of independently assessing if the current take is sustainable. Omega is the only entity that has the data to evaluate trends in menhaden over time. Release the flight logs and the catch data so that we can evaluate the trend in catch per unit search over time. Since this is the only dataset capable of resolving trends over time, without using it we will continue to twist in the wind and have unproductive debates.

OMEGA COMMENT - The researchers never asked why there are fewer forage fish of all types in Mobjack Bay, such as whether its environmental conditions have become less favorable. Given that osprey are declining all along the east coast, it appears broader forces are at work.
WATTS RESPONSE - I have been asking about fisheries data since the early 2000s. It is clear that the fisheries data is inadequate to address the questions. This is why in 2021 we did a supplementation study. If the menhaden data were available at a scale that is relevant to the consumer it would have been a simple matter to relate the two. There is no indication that osprey are declining along the entire south Atlantic. I would say that along the Atlantic north of the Chesapeake where menhaden have shown recent recovery, osprey are producing very well.

OMEGA COMMENT - The timing and location of the menhaden fishery do not suggest that it could have had an impact on the availability of menhaden in Mobjack Bay. At the recent meeting of the Ecological Reference Point Working Group meeting, Dr. Watts indicated that the highest number of nest failures in 2021 occurred in May. However, that month, none of Ocean Harvester's vessels made all of its sets above the study area, indicating that menhaden had entered the Bay, but apparently did not choose to enter Mobjack Bay in significant numbers. Likewise in June, no sets were made anywhere near the nesting sites.
WATTS RESPONSE - To suggest that the only way that harvest can impact the distribution and availability of fish is when the fleet is removing them is far too limited a perspective. It is hard to know how repeated harvest over a long time period will influence distribution. In terms of water quality, development pressures, etc. may have on menhaden in Mobjack we will never know since the menhaden data do not exist. However, poor performance across the 10 study areas monitored in 2024 which vary in many respects suggest that this is not solely a localized cause. One of the more interesting findings in 2024 was that Lynnhaven River and Eastern Shore study areas did marginally better than the other sites. These two areas are near where Omega operated during the year which may indicate that menhaden were more available in those areas. Again, we have no direct menhaden data.

OMEGA COMMENT - It is important to keep in perspective the current levels of menhaden fishing effort in the Chesapeake Bay. Due both to management action (the Bay Reduction Cap) and efforts by Ocean Harvesters to minimize its footprint in this estuary, current harvest levels are about a third of those during the 1980s when the first big osprey feeding habits study was conducted. It is also worth bearing mind that this fishery has been in operation since the mid-1800s and over most of that time, the reduction fishery in the Chesapeake Bay and coast-wide landed far more menhaden than it does today.
WATTS REPONSE - There is no question that menhaden abundance was adequate to support osprey during the 1980s. Again, the gross take is not the issue but rather the take relative to what the stock can sustain. Since we have no independent data on the abundance of menhaden in the Bay, we have no way of independently assessing if the current take is sustainable. Omega is the only entity that has the data to evaluate trends in menhaden over time. Release the flight logs and the catch data so that we can evaluate the trend in catch per unit search over time. Since this is the only dataset capable of resolving trends over time, without using it we will continue to twist in the wind and have unproductive debates.

COMMENT - The Chesapeake Bay Working Group has been given a task greater in difficulty than that of the Ecological Reference Point Working Group. Specifically, it has been asked to determine the needs of all predatory fish and birds at each life-stage and time of the year, and then to develop a highly calibrated system of time/area closures and catch levels throughout the Chesapeake Bay such that the "need" for menhaden among the full suite of predators is fully met.
RESPONSE - This is not my understanding of the charge of the working group.

COMMENT - Any pretense of an impartial, science-driven process would be informed by basic information that is simply not available. These include: dietary demands of all predators in the region relative to the time-varying amount of migratory menhaden within the Bay and biomass of all other prey species; the impact on populations of interest (*e.g.*, osprey, striped bass) of competition not only among avian predators, or among species of predatory fish, but of competition between birds, fish, terrestrial and marine mammals, etc., and humans for a fixed set of resources in specific locations and times of the year; and, of course, a basic understanding of the patterns of movement of menhaden and other prey species within the Chesapeake Bay throughout the year, along with the environmental factors favoring or disfavoring their abundance in a particular area.
RESPONSE - I would argue that policy related to harvest has never been science-driven. Aside from the ecosystem issues, how are you able to evaluate impacts of harvest levels on the stock itself without an independent measure of the Chesapeake Bay stock and a reasoned assessment of risk to the stock which we have never had. The answer is you can't. In lieu of such an independent assessment, you have set harvest limits based on the past five years of harvest. I don't believe that meets anyone's standard of science-driven. In short, decisions about harvest have been based on political influence rather than biological data.