United States Department of the Interior
U.S. Geological Survey
Office of the Director
Reston, Virginia 20192

The Honorable Robert J. Wittman
Vice Chair, Committee on Natural Resources
U.S. House of Representatives
Washington, D.C. 20515

Dear Vice Chair Wittman,

This is in response to your letter dated February 21, 2025, requesting the U.S. Geological Survey (USGS) assist the Committee in better understanding osprey abundance in the United States, particularly in the Atlantic and Chesapeake Bay regions. The Committee requested a briefing from Tom O'Connell, Center Director, USGS Eastern Ecological Science Center; David Ziolkowski, Jr.; and Barnett Rattner. That briefing was held on April 16, 2025. The Committee also requested responses to the following questions:

1. Table 1 from Watts (2024),[8] reproduced below, demonstrates a decline in provisioning in terms of total fish per ten hours of foraging between the 1970s and 2020s, as well as illustrating the proportion of menhaden as a percentage of total diet increased between the 2006-07 study and the 2021 study. Could the decrease in nest deliveries of all prey fish suggest broader factors relating to the environment are impacting the availability of all types of fish or, alternatively, impacting male ospreys' ability to forage effectively? Can such causal factors be ruled out by Watts' research?

TABLE 1 Mean (± standard error) estimates of osprey reproductive rate, clutch size, brood size, nests monitored (N) and one-way ANOVA results from the lower Chesapeake Bay.

Parameter	1974-75	1985	2006-07	2021	F-statistic	p value
Nests (N)	75	68	132	68		
Clutch size	2.7 ± 0.08	3.0 ± 0.09	3.0 ± 0.27	2.7 ± 0.09	2.2	0.084
Reproductive Rate	1.7 ± 0.10	1.4 ± 0.11	0.8 ± 0.08	0.3 ± 0.11	34.9	<0.001
Brood Size	2.0 ± 0.10	1.8 ± 0.10	1.5 ± 0.09	1.2 ± 0.17	10.0	<0.001

Estimated reproductive rate required for a stable population within the Chesapeake Bay is 1.15.

Watts et al. (2024) presented their prey provisioning and diet results in Table 2, excerpted below, in which they reported significant reductions in prey provisioning rate, Menhaden provisioning rate, and percent of overall diet across time. Although the proportion of Menhaden as a percentage of total diet in 2021 is numerically larger than the 2006-07 value, the two values are bounded by overlapping error bars, and are thus not different in a biologically meaningful way.

TABLE 2 Mean (± standard error) estimates of osprey reproductive, provisioning and diet parameters, sample sizes (nests) and one-way ANOVA results from the lower Chesapeake Bay.

Parameter	1974-75	1985	2006-07	2021	F-statistic	p value
Nests (N)	8	7	8	4		
Provisioning (fish/10 hr)	5.3 ± 0.50	3.5 ± 0.30	2.7 ± 0.30	1.4 ± 0.50	15.6	<0.001
Menhaden rate (fish/10 hr)	-----	2.4 ± 0.32	0.7 ± 0.19	0.4 ± 0.32	17.9	<0.001
Menhaden (% of diet)	-----	67.3 ± 4.07	24.7 ± 4.90	30.2 ± 6.93	19.4	<0.001

Estimated productivity required for a stable population within the Chesapeake Bay is 1.15.

Adult Osprey capture a variety of fish species, and several studies have shown that Osprey diet composition differs in various regions of the Chesapeake (e.g., Table 5 in Lazarus et al. 2016). Preliminary observations made by USGS scientists during a 2024 Osprey nesting study in the vicinity of the Choptank River suggest Menhaden and Striped Bass may be the primary prey type there. Data collected there indicate the principal contributing factor to poor breeding performance was loss of young due to starvation. This was likely caused by limited prey capture and/or prey delivery to nests.

The published research of Watts and colleagues does not explore all the possible causes of nestling starvation. The amount of food delivered to young in a nest can be influenced by many factors, including prey abundance, access to prey, exposure to contaminants, incidence of disease, increased predation risk, parental condition, brood size, and adverse weather conditions. Ecological systems such as this are complex and occur at large scales that make it difficult and sometimes not possible to measure and accurately estimate the influence of all contributing factors. However, as described in more detail below, we have found no indications that disease or contaminant exposure are major contributing factors.

2. Given the 1,800+% increase in the osprey population of the Chesapeake Bay region since the 1960s[9], could density dependent impacts within the resource, either on their wintering grounds or during their migration North to build nests, cause the adults to be in less optimum biological condition to build nests, lay eggs, and forage successfully?

   Estimates of the magnitude of population growth differ by data source, but all indicate that the density of breeding pairs of Osprey in the Chesapeake has grown substantially since the 1970's (reviewed in Watts and Paxton 2007). Question #2 above has two parts. The first relates to a natural population regulation process wherein an increasingly dense population generally experiences an increase in competitive pressure, because more individuals/pairs are present over time and compete for limited resources, such as food, mates, or nesting sites. Such density dependent effects can influence the birth rate, death rate, or both. However, density dependent effects are not only an outcome of population growth, but they can also occur if a previously common resource becomes scarce.

   The second part of question #2 relates to carryover effects, which is when conditions or events in one season influence an individual's success in the following season. Carryover effects are difficult to measure in large migratory birds like Osprey. The density of individuals in these locations may be very different from one another and it is difficult to determine which resources are truly limiting and/or driving competition in each place. While it is possible that body condition on wintering grounds or in migration could influence an individual's performance during the breeding season, we have no direct data to suggest that carryover effects are causing Osprey to be in less-than-optimal biological condition to build nests, lay eggs, and forage successfully in the Chesapeake.

3. Has the average weight of ospreys arriving at their nesting sites declined from previous years, perhaps indicating some impacts either on the wintering grounds or during migrations? Have there been any studies on the conditions for returning osprey?

   We do not have or know of data documenting the condition or average weight of adult Osprey at the time of their arrival at nesting sites in the Chesapeake.

4. Has avian flu been detected in osprey populations? Has there been any research to identify whether various diseases are impacting osprey populations?

   To the best of our knowledge, the incidence of avian influenza in Osprey has not been rigorously studied throughout the Chesapeake Bay. The Virginia Department of Wildlife Resources submitted 3 dead Osprey specimens in August 2024 to the Southeastern Cooperative Wildlife Disease Study unit of the University of Georgia College of Veterinary Medicine for analysis, and these specimens tested negative for highly pathogenic avian influenza and West Nile virus. In addition, we have also obtained records of 158 Osprey admitted to 5 rehabilitation facilities in the vicinity of the Chesapeake in 2024. In the accession records, no infectious diseases are mentioned. Notably, 53 of the 158 accession records provide a diagnosis of "emaciated, debilitated, thin and/or starvation". Disease events (e.g., avian botulism, highly pathogenic avian influenza, West Nile virus), and harmful algal blooms have occasionally affected large numbers of waterbirds in the Chesapeake, but seemingly have not evoked significant mortality of Osprey (e.g., Watts and Paxton 2007; Lankton et al. 2022 and updated to cover the time period 2000 to 2025; Rattner et al. 2022; Southeastern Wildlife Cooperative Disease Study 2024). Notably, there are 210 highly pathogenic avian influenza infection positive cases for wild birds Maryland and Virginia (time period 2020 to 2025; 33 involved bald eagles) but none documented infection in Osprey (USDA Detections of Highly Pathogenic Avian Influenza database 2025).

5. Are populations of other nearshore piscivorous birds—like brown pelicans, cormorants, bald eagles, gannets, or others—experiencing the same population trend as ospreys? That is, a dramatic increase since the ban on DDT, followed by an apparent leveling off? Could competition for prey and other resources by piscivorous birds adversely impact osprey provisioning success?

   Most of the large fish-eating bird species that cohabitate the Chesapeake Bay ecosystem had experienced reproductive issues and eggshell thinning caused by DDT. Many of these species specialize in different aspects of their shared environment, such as using different habitats, water depths, fish species and size classes, and times of activity to reduce competition and to coexist. Gannets, in particular, are absent from Chesapeake waters during the Osprey breeding season. Populations of most of these fish-eating birds have rebounded since the ban of DDT. For example, from the 1970s to 2020, the Bald Eagle population in the Chesapeake Bay region increased from 60 pairs to about 3,000 breeding pairs (Watts et al. 2007; US EPA Chesapeake Bay Program 2025). During nearly the same time period, between 1973 and 2020, the Bay's Osprey population increased from 1,450 breeding pairs to about 10,000 breeding pairs (Watts and Paxton 2007; US EPA Chesapeake Bay Program 2025). While most of the Chesapeake's large fish-eating birds have shown an overall increasing trend across this time interval, the trajectory of each within this interval has not been the same because each experienced environmental pressures unique to their ecologies as they recovered.

   It is possible that competition between species for prey could affect Osprey provisioning rates to nestlings, but we are unaware of data that suggest it. Osprey are dependent on live fish and generally capture and consume fish that are 6 to 13 inches in length. By contrast, Bald Eagles have a more diverse diet that includes live and scavenged fish, birds, small mammals,

amphibians, and reptiles. When eagles forage for live fish, they generally pursue larger prey (8 to 29 inches).

6. There are reports that bald eagles are particularly aggressive competitors of osprey. Can you explain the relationship between eagles and osprey and the trends in bald eagle populations in the Chesapeake Bay region?

   Bald Eagles establish territories during the breeding season and are known to be aggressive towards other eagles in defending their territories and nests. They have been observed harassing smaller raptors like Osprey to steal their prey (e.g., MacDonald 1994). However, while eagles are sometimes aggressive, they do not habitually prevent Osprey from accessing resources or territories (e.g., Ogden 1975), and they often coexist, so we would not characterize them as aggressive competitors. Over the past 50 years, Bald Eagle, Osprey and heron populations have jointly recovered in the Chesapeake (reviewed in Cruz et al. 2019). And importantly, in the case of birds of prey, although it might be expected that two large fish-eating species like Osprey and Bald Eagle should compete directly for food, it is possible that their interaction could have the opposite effect and benefit Osprey. For example, it is plausible that the Bald Eagle's consumption of a larger size class of fish, like Striped Bass, reduces the predation pressure on a smaller size class of fish, like Menhaden, which is a food source for Osprey, thereby possibly enhancing the availability of the smaller size class of fish as prey for Osprey.

   It is noteworthy that Bald Eagle density is about an order of magnitude greater in tidal fresh regions of the Bay where Osprey reproductive success is high compared to lower eagle density in the main stem of the Bay where Osprey reproduction is marginal or poor (Watts et al. 2006; Watts and Paxton 2007). However, the number and productivity of nesting Bald Eagles and of Osprey in various segments of the Bay have yet to be rigorously compared. Such a comparison could be undertaken to elucidate the possibility of inter-specific competition affecting Osprey productivity.

7. Could the osprey population reasonably be expected to grow indefinitely once DDT was banned, without regard to environmental limiting factors such as habitat constraints, competition with other species for food and other resources, or other density-dependent factors in its summer or winter habitat?

   No, populations cannot grow indefinitely because the resources they depend on are finite. Generally, a population of low abundance living in a place with high resource abundance will experience increased growth over time. Growth usually continues until the population reaches the maximum population size the environment can support (i.e., the carrying capacity), which can be increased or reduced depending on changes in resource availability.

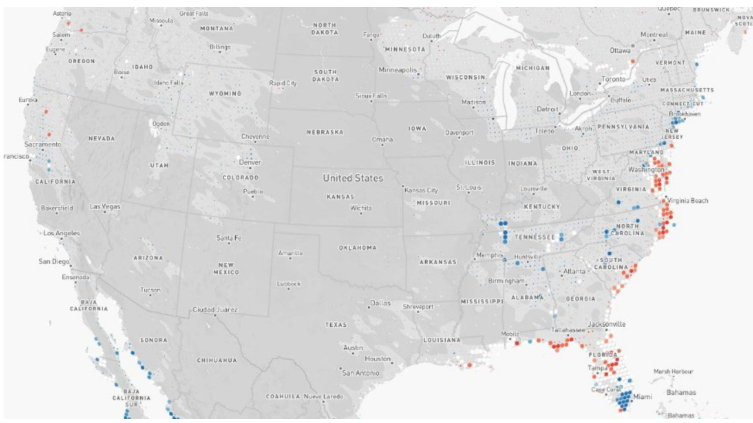
8. Noting that USGS has indicated striped bass are an important food source for osprey in parts of the Chesapeake Bay, could the many factors that impact the status of this stock—which the Atlantic States Marine Fisheries Commission has noted[10]—be impacting osprey's breeding success?

   The USGS has included Striped Bass among the list of prey species captured and consumed by Osprey at some Chesapeake study sites (e.g., Table 5 in Lazarus et al. 2016). Other captured prey species recorded from these sites include Atlantic Menhaden, Atlantic Croaker, Gizzard Shad, and catfish, which are important prey species of Osprey (Glass and Watts 2009, Lazarus et al. 2016). Prey delivered to Osprey nestlings is very much dependent on the salinity and fish species found in proximity to the nest. Many of the factors that affect the status of the Striped Bass stock in the Chesapeake could also have direct or indirect effects on Osprey reproduction.

9. Has Chesapeake Bay water transparency decreased to the point, even just sporadically after severe rainfalls, that forage success by ospreys that rely on sight feeding could become impaired?

   As described by Harding and colleagues (2019), Secchi depth has shown consistent, decreasing trends for the Chesapeake mainstem oligohaline (upper Bay), mesohaline (middle Bay), and polyhaline (lower Bay) zones from 1967 to 2015 as percent changes, "with the exception" of the oligohaline zone that showed an increasing trend in spring. There are no data to support or refute if the overall trend is impairing Osprey foraging success.

10. The two trend maps from Cornell University's eBird data portal (below) show the near-term coastal decline in osprey is widespread along the coast, suggesting this phenomenon is not localized. Is it more likely that there are common factors (*e.g.,* climate change, carrying capacity, competition, disease, adverse conditions in winter feeding grounds, etc.) that are contributing to this near-term decline or that regional subpopulations are being impacted by unique localized conditions, each with independent adverse effects?



Source: eBird data from 2012-2022. https://science.ebird.org/en/status-and-trends/species/osprey/trends-map

Osprey populations live in a rapidly changing landscape that includes many opportunities and stressors. While some factors like habitat loss, climate change, and pollution could be common drivers of population change across large scales, the specific threats and their relative importance to local Osprey populations can vary markedly depending on local conditions and stressors present. In our August 6 presentation to the Atlantic States Marine Fisheries Commission Menhaden Board, we stated that there are many stressors that can affect Osprey reproduction in the Chesapeake and elsewhere. The list of stressors in order of priority was suggested to be limited food availability, depredation, intra-specific competition for prey or nest sites, inter-specific competition, disease, inexperienced breeders, weather events, environmental contaminants, and water depth and clarity.

Various processes and stressors, such as habitat loss, competition between species, disease, predation, toxicants, and invasive species, can cause declines in bird populations, and in some instances Chesapeake Bay Osprey have been or may be vulnerable to these stressors. Environmental contaminants (e.g., DDT and metabolites, PCBs), that were at one time observed to be substantially suppressing reproductive rates of Osprey in the Chesapeake, no longer seem to be adversely affecting populations (Watts and Paxton 2007; Lazarus et al. 2015, 2016). Disease events (e.g., avian botulism, highly pathogenic avian influenza, West Nile virus) and harmful algal blooms have occasionally affected large numbers of waterbirds in the Chesapeake, but seemingly have not evoked significant mortality events in Osprey (e.g., Watts and Paxton 2007; Lankton et al. 2022; Rattner et al. 2022; Southeastern Wildlife Cooperative Disease Study 2024). Other anthropogenic hazards and activities (e.g., electrocution,

collisions with building and vehicles, shooting, discarded fishing tackle) have affected individual Osprey but without apparent consequence to their population.

Biological carryover effects (e.g., adverse non-lethal events at the wintering sites that affect reproductive performance at nesting sites in the Chesapeake) could potentially contribute to poor Osprey reproductive performance in the Chesapeake, although there are no data to support or refute this hypothesis.

There are many natural structures, duck blinds, and manmade platforms suitable for nesting Osprey in the Chesapeake, and nesting structures are now at a surplus. Notably, in some areas of the Bay, a fraction (~10%) of the manmade Osprey nest platforms (e.g., Choptank River in 2024) are being used by Canada geese (Rattner and Day 2024).

It is certainly possible that reduced prey availability, exposure to environmental contaminants, disease and inter-specific competition could all be contributing to impaired Osprey reproduction and productivity in parts of the Chesapeake. However, based on existing information, limited prey availability, their capture or their delivery to nests is seemingly the principal driver of poor reproductive success experienced in the USGS 2024 study area (Rattner and Day 2024).

Should you have any further questions or require additional information, please do not hesitate to reach out through the USGS Congressional Liaison, Mr. Tommy Elms at telms@usgs.gov.

Sincerely,

Digitally signed by SARAH RYKER
Date: 2025.05.02 11:31:45 -04'00'

Sarah J. Ryker
Acting Director

Identical Letter Sent to:

The Honorable Harriet M. Hageman
Chair, Subcommittee on Water, Wildlife, and Fisheries
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