UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930

March 19, 2026

Timothy Kelly, Chief
Operations Division
Philadelphia District
U.S. Army Corps of Engineers
1650 Arch Street
Philadelphia, PA 19103

RE: Beneficial Use of Dredged Material for the Delaware River - Delaware

Dear Mr. Kelly:

We have reviewed the final Feasibility Report and Integrated Environmental Assessment for the beneficial use of dredged material in Delaware. The primary objectives of the study were to 1) improve coastal storm risk management (CSRM) for people, property, and infrastructure along and adjacent to the Delaware shoreline from 2020 to 2070 and 2) increase the resiliency of coastal Delaware specifically along the Delaware Estuary and Delaware Inland Bay shoreline. Twenty-six CSRM sites were considered for targeted resiliency efforts using the addition of dredged material from various sources including confined disposal facilities, federal navigation channels, and the Buoy 10 open water disposal site. Two rounds of screening of the initial 26 problem areas were conducted to verify CSRM as the primary concern and to assess the feasibility of utilizing dredged material as a management measure.

In our letter, dated February 20, 2018, we provided comments on a draft Feasibility Report and Integrated Environmental Assessment, including a tentatively selected plan for dune and berm construction at eight dredged material placement locations in the southern reach of the study area spanning approximately 29 miles along the Delaware Bay. These areas include (from north to south): Pickering Beach, Kitts Hummock, Bowers Beach, South Bowers Beach, Big Stone Beach, Slaughter Beach, Prime Hook Beach and Lewes. The U.S. Army Corps of Engineers Philadelphia District (District) proposed sourcing dredged material from maintenance dredging projects in Lower Reach E (Miah Maull and Brandywine Ranges) of the Delaware River, Philadelphia to the Sea federal navigation channel (DPS). Buoy 10 was identified as a back-up source for sand if insufficient quantities of material were available to complete the desired CSRM initiatives. Our comments highlighted the outstanding information required for a complete essential fish habitat (EFH) assessment, identified sensitive species, life stages and habitats, and offered general recommendations to assist with project planning.

Ultimately, Big Stone Beach was excluded from the recommended plan included in the final Feasibility Report. The remaining seven aforementioned dredged material placement locations are targeted for CSRM initiatives using primarily sandy material sourced from Lower Reach E of the DPS. Nourishment volume required for completion of the proposed CSRM projects (1.3-million cubic yards) exceeds the projected quantity assumed to be available from each dredging

cycle. Therefore, the project has been split over two operations. Currently, Pickering, Kitts Hummock, Bowers, and Slaughter Beaches are proposed for nourishment in 2026, but in 2032, all seven sites will be on the same optimal six-year periodic renourishment cycle. The District has proposed that Buoy 10 serve as a back-up source of sand if a benthic habitat assessment and Supplemental Environmental Assessment are completed.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires federal agencies to consult with one another on projects such as this that may adversely affect EFH. In turn, we must provide recommendations to conserve EFH. These recommendations may include measures to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH resulting from actions or proposed actions authorized, funded, or undertaken by that agency. This process is guided by the requirements of our EFH regulation at 50 CFR 600.905, which mandates the preparation of EFH assessments and generally outlines each agency's obligations in this consultation procedure. The Fish and Wildlife Coordination Act (FWCA) also requires federal action agencies to consult with us "with a view to the conservation of wildlife resources by preventing loss of and damage to such resources as well as providing for the development and improvement thereof in connection with such water-resource development" (16 USC 662).

The selected CSRM beaches are designated EFH for Atlantic butterfish (*Peprilus triacanthus*), Atlantic herring (*Clupea harengus*), bluefish (*Pomatomus saltatrix*), black sea bass (*Centropristis striata*), scup (*Stenotomus chrysops*), summer flounder (*Paralichthys dentatus*), windowpane flounder (*Scophthalmus aquosus*), as well as several other species of finfish, sharks, and skates. Additionally, the waters surrounding the beaches to be nourished have been designated as habitat area of particular concern (HAPC) for sandbar shark (*Carcharhinus plumbeus*) and sand tiger shark (*Carcharias taurus*). HAPCs are a subset of EFH that are either rare, particularly susceptible to human-induced degradation, especially important ecologically, or located in an environmentally-stressed area.

Increases in turbidity associated with the suspension of sediment by beach nourishment activities can reduce reproductive success of fish through the masking of pheromones used by migratory species to reach their spawning grounds, create water quality barriers to migration, and can smother eggs and demersal juvenile fish (Auld and Schubel 1978; Breitburg 1988; Newcombe and MacDonald 1991; Burton, 1993; Nelson and Wheeler, 1997). Sediment plumes can also impair respiratory function and disrupt essential behaviors such as schooling and foraging (Chapman et al., 2014; Smith Christman & German, 2025). Additionally, noise associated with beach nourishment from pumps, boosters, and the abrasive transport of sediment through pipes generates chronic, low-frequency underwater noise that acts as a pervasive pollutant for aquatic life (Wenger et al., 2017). This persistent acoustic disturbance can mask crucial biological signals, effectively blinding fish to acoustic cues used for mating, territory defense, and predator avoidance (Slabbekoorn et al., 2010). Prolonged exposure to this industrial soundscape has been linked to elevated physiological stress and reduced foraging efficiency, which can compromise long-term population health (Slabbekoorn et al., 2010; Nichols et al., 2015; Lara & Vasconcelos, 2021).

Sandbar and Sand Tiger Shark HAPC

The Delaware Bay is one of two principal nursery grounds for the sandbar shark on the U.S. east coast (McCandless et al., 2007). Pregnant sandbar shark females occur in the area between late spring and early summer, give birth and depart shortly after, while neonates (young-of-year) and juveniles (ages one and over) occupy the nursery grounds until migration to warmer waters in the fall (Rechisky & Wetherbee 2003; Springer 1960). Neonates return to their natal grounds as juveniles and remain there for the summer. The Delaware Bay is also an important area for all life stages of the sand tiger shark. The Cooperative Atlantic State Shark Pupping and Nursery (COASTSPAN) survey conducted in Delaware and New Jersey state waters reports consistent, extensive seasonal use of Delaware Bay by all life stages of sand tiger shark from 2009 to 2014 (NOAA 2009-2014). Given the importance of the Delaware Bay to the life cycle of sandbar and sand tiger sharks, we recommend that no beach nourishment occur between May 1 and September 15.

Diadromous Fish

The Delaware Bay and its adjoining tributaries provide a migratory pathway, spawning habitat, and nursery habitat for diadromous fish such as American shad (*Alosa sapidissima*), river herring, inclusive of both alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*), hickory shad (*Alosa mediocris*), striped bass (*Morone saxatilis*), and American eel (*Anguilla rostrata*). These species are also known prey items for a number of federally managed species. Buckel and Conover (1997) in Fahay et al. (1999) reports that diet items of juvenile bluefish (Pomatomus saltatrix) include *Alosa* species. Juvenile *Alosa* species have also been identified as prey species for windowpane flounder (*Scophthalmus aquosus*) and summer flounder *(Paralichthys dentatus)* in Steimle et al. (2000). The EFH final rule states that prey species are an important component of EFH and that loss of prey may be an adverse effect on EFH and managed species. As a result, actions that reduce the availability of prey species, either through direct harm or capture, or through adverse effects to the prey species' habitat, may also be considered adverse effects on EFH.

Given their dependence on both freshwater and marine environments, diadromous fish face a unique set of challenges that have led to significant declines in their populations. Stocks of American shad and both species of river herring remain depleted after decades of investment in their recovery (ASMFC, 2020; ASMFC, 2024). Specific to the Delaware River, the 2020 American shad benchmark stock assessment found that the stock is experiencing unsustainable adult female mortality (ASMFC, 2020). American eel remain in a depleted stock status, with insufficient data to determine if they are experiencing overfishing (ASMFC, 2023). Therefore, we work to avoid and minimize disturbances to these species during the critical migratory and spawning season to ensure their survival in the mid-Atlantic region.

In our February 20, 2018, letter, we highlighted the proximity of the proposed beach nourishment areas to the entrances of rivers and creeks with known spawning runs of anadromous fish. However, based on our review of the 90% draft drawings, only the proposed nourishment activities at Bowers Beach are likely to adversely affect the migration and spawning success of diadromous fish due to the proximity of the site to the confluence of the Saint Jones River with the Delaware Bay. The other CSRM beaches are located far enough from the

entrances of any tributaries that we would not expect the localized increases in noise or turbidity associated with beach nourishment using sandy material to result in significant adverse effects to diadromous fish. Therefore, the typically recommended time-of-year restriction to minimize impacts to diadromous fish of March 1 - June 30 is only necessary for Bowers Beach.

Horseshoe Crabs

The Delaware Bay is one of the most important areas for horseshoe crabs (*Limulus polyphemus*) in the world, containing important habitats for spawning, staging, and rearing for various life stages. Horseshoe crabs also play a valuable ecological role in the food web within the Delaware Estuary. Horseshoe crab eggs are a vital food source for the red knot (*Calidris canutus*), a Delaware State-listed endangered species and a federally threatened species under the Endangered Species Act. Horseshoe crab eggs and larvae are a food source for a number of other species including striped bass, white perch (*Morone americana*), weakfish (*Cynoscion regalis*), American eel (*Anguilla rostrata*), silver perch (*Bairdiella chrysoura*), and summer flounder (Steimle et al. 2000). Given the importance of Delaware Bay beaches and nearshore habitats for spawning, rearing, and foraging of horseshoe crabs, we recommend that beach nourishment activities be avoided between April 15 and September 15 of each year.

Sabellaria Reefs

Sabellaria vulgaris, a tube building, annelid, polychaete worm is a food source for a number of federally managed species including summer flounder, winter flounder and scup (Steimle et. al. 2000). Aggregations or reefs of *Sabellaria* can be found in the vicinity of the beaches selected for nourishment. These reefs replicate functions of more widely known "ecosystem engineers" such as reef-forming oysters and corals and provide habitat to a variety of species, trap sediment, and attenuate wave energy (Dohner et al., 2019). Such large, multi-generational aggregations of *Sabellaria* are known only from the Delaware Bay despite their nearly ubiquitous range along the United States Atlantic Coast (Brown and Miller, 2011; Dohner et al., 2019). In our February 20, 2018, letter, we recommended that surveys of the nourishment areas be undertaken to determine the location and extent of *Sabellaria* reefs and that impacts to this important habitat be avoided, minimized, and offset to the maximum extent practicable. It is unclear if any surveys were conducted, but the nourishment activities at Pickering, Kitts Hummock, and Bowers Beaches generally end well above the mean low water line where *Sabellaria* aggregations are likely to be found. However, at Slaughter Beach, fill will extend nearly 100 feet channelward of the mean low water line over ~4,500 linear feet of shoreline. It is unclear how impacts to *Sabellaria* reefs at this location were considered. Therefore, we continue to recommend a survey to determine the location and extent of *Sabellaria* reefs within the impact area of Slaughter Beach. Additionally, post-implementation monitoring of recolonization should be conducted.

EFH Conservation Recommendations

Pursuant to Section 305 (b)(4)(A) of the MSA, we recommend the following EFH conservation recommendations be incorporated into the project to minimize adverse effects on EFH and federally-managed species due to beach nourishment.

1. Avoid beach nourishment activities between April 15 and September 15 of any given year to minimize adverse effects to spawning adult horseshoe crabs, their eggs, and early life stages.
2. Avoid beach nourishment activities between May 1 and September 15 of any given year to minimize adverse effects to sandbar shark pupping and early life stages.
3. Avoid beach nourishment activities at Bowers Beach between March 1 and June 30 of any given year to minimize adverse effects to diadromous fish migration and spawning in the Saint Jones River.
4. Conduct a survey to determine the location and extent of *Sabellaria vulgaris* reefs in the nearshore environment of Slaughter Beach.
    a. Share survey results with NOAA Fisheries Habitat and Ecosystem Services Division prior to beach nourishment at Slaughter Beach.
    b. Quantify the area of *Sabellaria* reefs that will be directly filled through the addition of sand to Slaughter Beach.
    c. If *Sabellaria* reefs will be filled, conduct annual monitoring for recolonization by this species over a period of three years.
5. Use BMPs to minimize the release of suspended sediments during beach nourishment activities, including placing the material on the beach above the spring high tide line and moving the material to the intertidal zone during low tide, where feasible.

While we recognize that this consultation request is solely for nourishment of the selected CSRM beaches, the associated dredging will adversely affect many of the species and habitats described above. In our January 26, 2024, letter to the District, we provided EFH conservation recommendations for the proposed DPS dredging across the Liston, Miah Maull, and Brandywine Ranges, including the disposal of dredged material at Buoy 10.

- Avoid dredging and placement activities from May 1 through September 15 to avoid impacts to sand tiger shark and sandbar shark pupping and nursery HAPC.
- Avoid dredging and placement activities during the overwintering blue crab season from December 1 through March 31.
- Should dredging be allowed during the aforementioned periods, no barge overflow should be permitted.
- The intakes on the dredge plant should not be turned on until the dredge head is in the sediment and should be turned off before being lifted to minimize larval entrainment in the dredge.

Regarding our recommended time-of-year restrictions for dredging, the District responded that they can attempt to avoid dredging between December 1 to March 31 and May 1 to September 15 of any given year to the maximum extent practicable. However, the District noted that adherence to the allowable work windows which allow 3.5 months of discontinuous dredging is not sufficient to maintain safe navigation conditions within these lower reaches of the DPS. We continue to recommend that these time-of-year restrictions be followed to the greatest extent practicable to avoid and minimize impacts to HAPCs and blue crabs, the latter of which supports the most valuable commercial fishery in the Delaware Bay and provides prey for federally managed species. Regarding our recommendation regarding dredge plant operation, we understand that it may be operationally impracticable to entirely shut down dredge operations

while the intake is buried in the sediment. Therefore, we recommend that intake velocities be reduced when the dredge head is not actively in contact with the substrate to minimize larval entrainment.

Please note that Section 305 (b)(4)(B) of the MSA requires that you provide us with a detailed written response to our EFH conservation recommendations, including the measures you have adopted to avoid, mitigate, or offset the impact of the project on EFH. In the case of a response that is inconsistent with our recommendations, Section 305 (b)(4)(B) of the MSA also indicates that you must explain your reasons for not following the recommendations. Included in such reasoning would be the scientific justification for any disagreements with us over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate or offset such effect pursuant to 50 CFR 600.920 (k).

Please also note that a distinct and further EFH consultation must be reinitiated pursuant to 50 CFR 600.920 (j) if new information becomes available, or if the project is revised in such a manner that affects the basis for the above EFH conservation recommendations.

Endangered Species Act

Threatened or endangered species under the jurisdiction of NOAA Fisheries may be present in the project area. The federal action agency will be responsible for determining whether the proposed action may affect listed species. If you determine that the proposed action may affect a listed species, they should submit their determination of effects, along with justification and a request for concurrence to the attention of the Section 7 Coordinator, NMFS, Greater Atlantic Regional Fisheries Office, Protected Resources Division, 55 Great Republic Drive, Gloucester, MA 01930 or nmfs.gar.esa.section7@noaa.gov.

Conclusion

Thank you for providing the final Feasibility Report and Integrated Environmental Assessment for the beneficial use of dredged material as a CSRM strategy along the Delaware Bayshore. We look forward to continued coordination with your office as this project progresses. Should you have any questions or wish to discuss our conservation recommendations, please contact Rob Bourdon in our Annapolis field office at 410-205-6055 or robert.bourdon@noaa.gov.

Sincerely,



Louis A. Chiarella
Assistant Regional Administrator
for Habitat and Ecosystem Services

cc: USACE - R. Cauffman, S. Allen, D. Kelly
NOAA HESD - K. Greene
NOAA PRD - C. Vaccaro
USFWS - S. Eyler
EPA - M. Finocchiaro
DNREC - J. Clark, E. Stetzar, R. Wong
MAFMC - C. Moore
NEFMC - C. O'Keefe
ASMFC - R. Beal

Literature Cited

ASMFC, 2020. American Shad Benchmark Stock Assessment and Peer Review Report. Arlington, VA: Atlantic States Marine Fisheries Commission.

ASMFC, 2022. Atlantic Striped Bass Stock Assessment Update. Arlington, VA: Atlantic States Marine Fisheries Commission.

ASMFC, 2023. American Eel Benchmark Stock Assessment and Peer Review Report. Arlington, VA: Atlantic States Marine Fisheries Commission.

ASMFC, 2024. River Herring benchmark Stock Assessment and Peer Review Report. Arlington, VA: Atlantic States Marine Fisheries Commission.

Auld, A.H. and Schubel, J.R., 1978. Effects of suspended sediment on fish eggs and larvae: a laboratory assessment. *Estuarine and Coastal Marine Science*, 6(2), pp.153-164.

Breitburg, D.L., 1988. Effects of turbidity on prey consumption by striped bass larvae. *Transactions of the American Fisheries Society*, 117(1), pp.72-77.

Brown, J.R. and Miller, D.C., 2011. Persistence and distribution of temperate intertidal worm reefs in Delaware Bay: a comparison of biological and physical factors. *Estuaries and coasts*, 34(3), pp.583-596.

Buckel, J.A. and Conover, D.O., 1997. Movements, feeding periods, and daily ration of piscivorous young-of-the-year bluefish, *Pomatomus saltatrix*, in the Hudson River estuary. *Fishery Bulletin*, 95(4), pp.665-679.

Burton, W.H., 1993. Effects of bucket dredging on water quality in the Delaware River and the potential for effects on fisheries resources. Columbia, MD: Versar, Inc.

Chapman, J.M., Proulx, C.L., Veilleux, M.A.N., Levert, C., Bliss, S., André, M.E., Lapointe, N.W.R. and Cooke, S.J., 2014. Clear as mud: A meta-analysis on the effects of sedimentation on freshwater fish and the effectiveness of sediment-control measures. *Water Research*, 56, pp.190-202.

Dohner, S.M., Stockwell, C.L., Miller, D.C. and Trembanis, A.C., 2020. Characterization of worm reefs (*Sabellaria vulgaris*) in Delaware Bay, United States. In *Seafloor geomorphology as benthic habitat* (pp.163-174). Elsevier.

Fahay, M.P., Berrien, P.L., Johnson, D.L., and Morse W.W. 1999. Essential Fish Habitat Source Document: Bluefish, *Pomatomus saltatrix* life history and habitat characteristics. U.S. Dep. Commer., *NOAA Technical Memorandum* NMFS-NE-144.

Lara, R.A. and Vasconcelos, R.O., 2021. Impact of noise on development, physiological stress and behavioural patterns in larval zebrafish. *Scientific Reports*, 11.

McCandless, C.T., H.L. Pratt, Jr., N.E. Kohler, R.R. Merson, and C.W. Recksiek. 2007. Distribution, localized abundance, movements, and migrations of juvenile sandbar sharks tagged in Delaware Bay. Pages 45-62 In C.T. McCandless, N.E. Kohler, and H.L. Pratt, Jr. editors.

Nelson, D.A. and Wheeler, G.L., 1997. The influence of dredging - Induced turbidity and associated contaminants upon the hatching success and larval survival of winter flounder, *Pleuronectes americanus: A laboratory study*. Final Report on Grant CWF #321-R to State of Connecticut, Dept. of Environmental Protection.

Newcombe, C.P. and MacDonald, D.D., 1991. Effects of suspended sediments on aquatic ecosystems. *North American Journal of Fisheries Management*, 11(1), pp.72-82.

Nichols, T.A., Anderson, T.W. and Širović, A., 2015. Intermittent noise induces physiological stress in a coastal marine fish. *PLOS ONE*, 10, p.e0139157.

NOAA. 2009 - 2014. Stock assessment and fishery evaluation (SAFE) report for Atlantic highly migratory species. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division, Silver Spring, MD.

Rechisky, E.L. and B.M. Wetherbee. 2003. Short-term movements of juvenile and neonate sandbar sharks, *Carcharhinus plumbeus*, on their nursery grounds in Delaware Bay. Envir. Bio. of Fishes. 68:113-128.

Slabbekoorn, H., Bouton, N., van Opzeeland, I., Coers, A., ten Cate, C. and Popper, A.N., 2010. A noisy spring: The impact of globally rising underwater sound levels on fish. *Trends in Ecology & Evolution*, 25(7), pp.419-427.

Smith Christman, N.N. and German, D.P., 2025. Left in the dust: Suspended sediment is an acute stressor for the gill, a chronic stressor for the gut of zebrafish. *Comparative Biochemistry and Physiology Part B: Biochemistry and Molecular Biology*. [In preparation; dissertation published by University of California, Irvine].

Springer, S. 1960. Natural history of the sandbar shark, *Eulamia milberti*. Fish. Bull. 61:1-38.

Steimle, F.W., Pikanowski, R.A., McMillan, D.G., Zetlin, C.A. and Wilk, S.J., 2000. Demersal fish and American lobster diets in the Lower Hudson-Raritan Estuary. NOAA Technical Memorandum NMFS-NE-161. Woods Hole, MA.

Wenger, A.S., Harvey, E., Wilson, S., Rawson, C., Newman, S.J., Clarke, D., Saunders, B.J., Browne, N., Travers, M.J., Mcilwain, J.L. and Erftemeijer, P.L., 2017. A critical analysis of the direct effects of dredging on fish. *Fish and Fisheries*, 18(5), pp.967-985.