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Mr. David Olson
U.S. Army Corps of Engineers
Attn: CECW-CO-R
441 G Street, NW
Washington, D.C. 20314-1000

Re: Comments in Response to Department of the Army, Corps of Engineers, Proposal to Reissue and Modify Nationwide Permits, Docket COE-2015-0017, 81 Federal Register 35,186 (June 1, 2016)

Dear Mr. Olson:

Please accept these comments on the above referenced proposed rule. We submit these comments on behalf of National Wildlife Federation, the North Carolina Coastal Federation, Restore America's Estuaries, the Coastal Conservation League, and One Hundred Miles.

Thank you for giving us the opportunity to comment on these important general permits. Please note that we have provided both paper and digital copies of the articles we reference and ask that they be made part of the administrative record. See enclosed list.

Sincerely,

William W. Sapp
Senior Attorney

cc: Jan Goldman-Carter, National Wildlife Federation
Todd Miller, North Carolina Coastal Federation
Jeff Benoit, Restore America's Estuaries
Dana Beach, South Carolina Coastal Conservation League
Megan Derosiers, One Hundred Miles

Table of Contents

Comments on Nationwide Permit 13 and Nationwide Permit B

Filed July 22, 2016

The Southern Environmental Law Center (SELC) submits these comments in response to the Corps of Engineers' (Corps) Proposal to Reissue and Modify Nationwide Permits (Proposed Rule). We have prepared these comments on behalf of the following organizations: the National Wildlife Federation, the North Carolina Coastal Federation, Restore America's Estuaries, the Coastal Conservation League, and One Hundred Miles**.** Most, if not all, of these organizations have considerable knowledge concerning the Corps' permitting program, and in particular, Nationwide Permit (NWP) 13. Thus, these comments are confined to NWP 13, which must be retired, and NWP B, which must be authorized.

I. Summary

Sea level rise and associated shoreline retreat are increasingly affecting the Southeast coast. In addressing this retreat, we should be guided by the following principles. In undeveloped or lesser developed areas, we should use planning as our first line of defense. For those coastal areas that are sufficiently fragile or dynamic, development simply should not occur. Where the environment is already built upon and erosion is occurring, we should pursue the least environmentally damaging alternative to curb that erosion. In doing so, we should work with natural processes, rather than against them.

In many low and middle energy environments, such as estuaries and tidal creeks, installation of "living shorelines" may be a viable and environmentally preferable alternative to hardened structures like bulkheads. Constructed with natural materials such as vegetation, fiber logs, and marsh sills, living shorelines can create nursery grounds for fish and shellfish, provide feeding areas for shorebirds and wading birds, and reduce water pollution by capturing sediment from upland runoff. They are also resilient against storms, and unlike traditional bulkheads, they allow shoreline ecosystems to migrate as water levels rise.

In high energy environments like ocean-facing beaches and inlets, living shorelines may not be an option. Any shoreline stabilization in these places may disrupt the natural processes that provide essential habitat. In such an environment, the best approach for human development may be retreat or "softer" solutions like beach nourishment.

In commenting on NWP 13 and NWP B, our goal is to reduce the regulatory barriers to people using the least environmentally damaging alternative, and to continue to fight those activities that could set a precedent for or be especially damaging to the coastal environment. Our approach to the effects of sea level rise on estuarine and ocean shorelines is grounded on the public interest in these areas and the public trust doctrine. The public trust doctrine dictates that, in general, our beaches, estuaries, submerged lands, and the wildlife dependent on them are public resources, managed by the government in trust for all citizens. This public trust should be paramount in the increasing tension between private property affected by sea level rise and shoreline retreat.

In our comments below, we show that if the Corps were to reauthorize NWP 13, it would be violating the Clean Water Act (CWA), the National Environmental Policy Act (NEPA), and the Endangered Species Act (ESA). We also demonstrate why the Corps must authorize NWP B. And we provide the science and legal arguments to support these positions.

II. Background

A. The Nationwide Permit reauthorization process

Under Section 404(e) of the CWA, no category of activities authorized under an NWP can have more than minimal adverse effects on the environment.[1] Because the regulatory and scientific landscape is continually changing, the Corps must revisit this minimal-effects determination every five years for each NWP.[2] If the Corps determines during the reauthorization process that a category of activities authorized under an NWP has more than minimal effects either individually or cumulatively, the Corps must modify or retire the NWP. If the Corps retires an NWP, the activities formerly authorized under the retired NWP must be processed under an individual permit going forward.[3] Considering that the Corps authorizes approximately 63,000 activities under NWPs each year, the minimal effects determinations are critical to the overall health of the Nation's waters—especially considering that the Corps receives no notice whatsoever for almost half of the activities authorized under NWPs.[4]

NWP 13 covers many forms of shoreline stabilization, including seawalls, bulkheads, and revetments.[5] While the Corps has changed other NWPs over the years to tighten the limits on those general permits, the Corps has done the reverse with NWP 13, consistently expanding its use over time, and thus, its adverse impacts on the environment. This has occurred at the same time that the scientific community has brought the adverse impacts of these structures into sharper and sharper relief.

Additionally, alternative approaches to erosion control, such as "living shorelines," have been developed and refined since the 1970s.[6] As their use has become more widespread, it has been shown that such shoreline stabilization projects are as effective at curbing erosion as bulkheads, are comparably priced, and have fewer adverse environmental impacts. In many cases, they actually enhance shoreline ecosystems. [7] In light of the harms associated with

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[1] 33 U.S.C. § 1344(e).
[2] *Id.*
[3] *Id.*
[4] Proposal to Reissue and Modify Nationwide Permits, 81 Fed. Reg. 35,186, 35,214 (proposed June 1, 2016).
[5] 81 Fed. Reg. at 35,199.
[6] C. Scott Hardaway, "*Living Shorelines" An Historical Perspective from Chesapeake Bay*, VA. INST. OF MARINE SCI. 2, **http://www.seagrant.sunysb.edu/Images/Uploads/PDFs/LivingShorelines0513-Presentations/2_NYSG_Living_Shorelines_Chesapeake.pdf** (last visited July 7, 2016).
[7] Rachel K. Gittman, *Living Shorelines Can Enhance the Nursery Role of Threatened Estuarine Habitats*, 26 ECOLOGICAL APPLICATIONS, 249-63 (2016); Steven B. Scyphers, *Natural Shorelines Promote the Stability of Fish Communities in an Urbanized Coastal System*, PLOS ONE 10:e0118580, 1-12 (Maura G. Chapman ed. 2015); Sarah M. Heerhartz et al., *Shoreline*

bulkheads and the presence of a practicable alternative, the Corps' continued use of NWP 13 violates the CWA. As a result, the Corps must retire NWP 13.

NWP B, which the Corps is proposing for the first time, would serve as a viable and environmentally preferable replacement for NWP 13 in many cases. NWP B is designed to cover shoreline stabilization projects that use natural techniques to curb erosion. We strongly support NWP B and believe that living shorelines will often qualify as the least environmentally damaging practicable alternative to shoreline hardening, which would otherwise proceed under NWP 13. Currently, there is considerable overlap between the two NWPs as drafted because the Corps has proposed language in NWP 13 that would encompass many living shoreline projects, as well as more traditional shoreline stabilization projects.[8]

In light of the overlap between NWP 13 and NWP B, it would be conceivable for the Corps to broaden the scope of NWP 13 still further and eliminate NWP B during the reauthorization process. It is important that NWP B survive. While NWP 13, as demonstrated below, authorizes activities that have more than minimal effects, NWP B would authorize activities that have impacts that are no more than minimal. Any attempt to comingle these activities would jeopardize the approval process for living shoreline projects in the event NWP 13 were subject to a legal challenge.

In the remainder of this background, we summarize the latest scientific research on the adverse effects of bulkheads, the benefits of living shorelines, and the effects of sea level rise.

B. Recent scientific research demonstrates that shoreline armament is having deleterious effects on shoreline ecosystems.

A comprehensive body of scientific research shows that when we armor our shorelines, we greatly reduce the function and resilience of highly productive and valuable ecosystems.[9]

Armoring in an Estuary Constrains Wrack-Associated Invertebrate Communities, 39 ESTUARIES & COASTS, 171-88 (2016); Sarah M. Heerhartz et al., *Effects of Shoreline Armoring on Beach Wrack Subsidies to the Nearshore Ecotone in an Estuarine Fjord*, 37 ESTUARIES & COASTS, 1256-68 (2014); Amanda S. Lawless et al., *Effects of shoreline stabilization and environmental variables on benthic infaunal communities in the Lynnhaven River System of Chesapeake Bay*, 457 J. OF EXPERIMENTAL MARINE BIOLOGY & ECOLOGY, 41-50 (2014); Jeffrey C. Jorgensen et al., *Combined Effects of Climate Change and Bank Stabilization on Shallow Water Habitats of Chinook Salmon*, 27 CONSERVATION BIOLOGY, 1201-11 (2013); R. D. Seitz et al., *Influence of Shallow-Water Habitats and Shoreline Development on Abundance, Biomass, and Diversity of Benthic Prey and Predators in Chesapeake Bay*, 326 MARINE ECOLOGY PROGRESS SERIES, 11–27 (2006); Susan L. Sargeant et al., *Shoreline Armoring Research Program: Phase II-Conception Model Development for Bank Stabilization in Freshwater Systems*, PREPARED FOR WA. ST. DEP'T OF TRANSP., 1-53 (2004); Maura G. Chapman, *Paucity of Mobile Species on Constructed Seawalls: Effects of Urbanization on Biodiversity*, 264 MARINE ECOLOGY PROGRESS SERIES, 21-29 (2003).

[8] 81 Fed. Reg. at 35,199.

[9] Carolyn Currin et al., *Shorelines Change in the New River Estuary, North Carolina: Rates and Consequences*, 31 J. OF COASTAL RES. 1069-77 (2015); J. E. Dugan et al., *8.02 Estuarine and*

Shoreline armoring, specifically the use of bulkheads, can steepen and shorten shallow intertidal habitat over time, resulting in the loss of foraging habitat for shore birds and commercially and recreationally valuable fishes and crustaceans.[10] Bulkheads ultimately destroy habitat in front of them; a vertical wall is no substitute for a natural shoreline.[11]

Bulkheads also provide less physically complex habitat as compared with natural shorelines, thus they support fewer species.[12] A recently completed meta-analysis of the peer-reviewed literature found that the bulkheads in the study supported 23 percent lower biodiversity and 45 percent fewer organisms than the natural shorelines examined.[13] Due to lack of structural complexity, bulkheads are less attractive to coastal fish communities.[14] In contrast to bulkheads, natural habitats that include such features as saltmarsh, oyster reefs, and submerged aquatic vegetation have the structural complexity that serves to provide superior habitat and nursery grounds for aquatic species.[15]

Because bulkheads are constructed landward of tidal wetlands, these structures also increase seaward scour during storm events and will prevent upslope migration of tidal wetlands as sea levels rise, leading to their eventual loss (termed "coastal squeeze").[16] These findings

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Coastal Structures: Environmental Effects, a Focus on Shore and Nearshore Structures, 8 TREATISE ON ESTUARINE & COASTAL SCI. 17-41 (Eric Wolanski and Donald McLusky eds. 2011); James G. Titus, *Rising Seas, Coastal Erosion, and the Takings Clause: How to Save Wetlands and Beaches Without Hurting Property Owners*, 57 MD. L. REV. 1279-1398 (1998); Thomas K. Ruppert, *Eroding Long-Term Prospects for Florida's Beaches: Florida's Coastal Management Policy*, SEA TURTLE GRANT PROGRAM, 1-157 (2008); U.S. ARMY CORPS OF ENGINEERS & YELLOWSTONE RIVER CONSERVATION DISTRICT COUNCIL, YELLOWSTONE RIVER CUMULATIVE EFFECTS ANALYSIS, 1-433 (2015).

[10] Megan N. Dethier et al., *Multiscale Impacts of Armoring on Salish Sea Shorelines: Evidence for Cumulative and Threshold Effects*, 175 ESTUARINE, COASTAL, & SHELF SCI., 106-17 (2016); J.E. Dugan et al., *Ecological Effects of Coastal Armoring on Sandy Beaches*, 29 MARINE ECOLOGY, 160-70 (2008).

[11] Karen F. Nordstrom, *Living with Shore Protection Structures: A Review*, 150 ESTUARINE COASTAL & SHELF SCI., 11-23 (2014).

[12] Gittman et al. *supra* note 7; Scyphers, *supra* note 7; Heerhartz et al., *supra* note 7; Heerhartz et al., *supra* note 7; Lawless et al., *supra* note 7; Jorgensen et al., *supra* note 7; Seitz et al., *supra* note 7; Sargeant et al., *supra* note 7; Chapman, *supra* note 7.

[13] Rachel K. Gittman et al., *Ecological Consequences of Shoreline Hardening: A Meta-Analysis* BIOSCIENCE, 1-51 *(in review)*.

[14] David L. Strayer et al., *Biodiversity in Hudson River Shore Zones: Influence of Shoreline Type and Physical Structure*, 74 AQUATIC SCIENCES, 597-610 (2012).

[15] Scyphers, *supra* note 7.

[16] Catherine M. Bozek & David M. Burdick, *Impacts of Seawalls on Saltmarsh Plant Communities in the Great Bay Estuary, New Hampshire U.S.A.*, 13 WETLANDS ECOLOGY & MGMT., 553-68 (2005); Nigel Pontee, *Defining Coastal Squeeze: A Discussion*, 84 OCEAN & COASTAL MGMT., 204-07 (2013); James G. Titus, *Rising Seas, Coastal Erosion, and the Takings Clause: How to Save Wetlands and Beaches Without Hurting Property Owners*, 57 MD. L. REV., 1279-1398 (1998).

suggest that as coastal development continues to increase, management policies and actions that influence the types of engineered shore structures used will greatly impact the habitat value and functioning (e.g., biodiversity,[17] nutrient uptake,[18] carbon sequestration,[19] and storm resilience[20]) of nearshore ecosystems.

By creating a definitive barrier between water and land, bulkheads truncate ecosystems and reduce productivity.[21] The bulkhead causes a loss of connectivity between landward and seaward habitats, disrupting inputs and exchange of material nutrients and prey resources.[22] This lack of connectivity ultimately disrupts the food web, inducing negative impacts for both aquatic and terrestrial invertebrates and fauna.[23]

Reductions in biodiversity have extensive cumulative impacts on shoreline ecosystems. Due to the intricacy of estuarine ecosystems, bulkhead construction can set off chain reactions that significantly reduce ecosystem services at the site of the bulkhead and in adjacent systems.[24]

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[17] Antonios D. Mazaris et al., *Evaluating the Impacts of Coastal Squeeze on Sea Turtle Nesting*, 52 OCEAN & COASTAL MGMT., 139-45 (2009); Christopher J. Patrick et al., *Effects of Shoreline Alteration and Other Stressors on Submerged Aquatic Vegetation in Subestuaries of Chesapeake Bay and the Mid-Atlantic Coastal Bay*, 37 ESTUARIES & COASTS, 1516-31 (2014); Strayer et al., *supra* note 15.

[18] Theresa O'Meara et al., *Effects of Shoreline Hardening on Nitrogen Processing in Estuarine Marshes of the US Mid-Atlantic Coast*, 23 WETLANDS ECOLOGY & MGMT., 385-94 (2015); Karl F. Nordstrom et al., *Effects of Bulkheads on Estuarine Shores: An Example from Fire Island National Seashore, USA*, 56 J. OF COASTAL RES., 188-92 (2009); J. L. Davis et al., *Artificial Armored Shorelines: Site for Open-Coast Species in a Southern California Bay*, 140 MARINE BIOLOGY, 1249-62 (2002).

[19] J. L. Davis et al., *Living Shorelines: Coastal Resilience with a Blue Carbon Benefit*, 10 PLOS ONE e0142595, 1-18 (2015).

[20] Katie K. Arkema et al., *Embedding Ecosystem Services in Coastal Planning Leads to Better Outcomes for People and Nature*, 112 PROC. OF THE NAT'L ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, 7390-95 (2015); Katie K. Arkema et al., *Coastal Habitats Shield People and Property from Sea-Level Rise and Storms*, 3 NATURE CLIMATE CHANGE, 913-18 (2013); Rachel K. Gittman et al., *Marshes with and without Sills Protect Estuarine Shorelines from Erosion Better than Bulkheads During a Category 1 Hurricane*, 102 OCEAN & COASTAL MGMT., 94-102 (2014); Robert Costanza et al., *The Value of Coastal Wetlands for Hurricane Protection*, 37 AMBIO, 241-48 (2008); Robert A. Dalrymple, *Shoring Up Coastal Engineering*, 71 CIVIL ENGINEERING, 52-53 (2001).

[21] Nordstrom, *supra* note 11.

[22] Heerhartz et al., *supra* note 7.

[23] *Id.*

[24] Moisés A. Aguilera et al., *Spatial Variability in Community Composition on a Granite Breakwater Versus Natural Rocky Shores: Lack of Microhabitats Suppresses Intertidal Biodiversity*, 81 MARINE POLLUTION BULL., 257-68 (2014); C. Heatherington & M. J. Bishop, *Spatial Variation in the Structure of Mangrove Forests with Respect to Seawalls*, 63 MARINE FRESHWATER RES., 926-33 (2012); Richard G. Balouskus & Timothy E. Targett, *Egg Deposition by Atlantic Silverside, Menidia menidia: Substrate Utilization and Comparison of Natural and*

By degrading habitats of various species, shoreline armoring compromises the food web and ultimately creates less functional ecosystems.[25] Additionally, recent studies indicate that seawalls and bulkheads create habitats conducive to the spread of invasive species.[26]

Many of the ecosystems adversely affected by shoreline armoring are home to endangered and threatened species, including turtles, birds, plants, and invertebrates. Intertidal flats and ponds provide crucial refuge for species such as the endangered Piping Plover.[27] Piping Plovers commonly select nesting sites adjacent to these microhabitats as the higher seasonal prey abundance and protection from waves foster an ideal location for raising chicks.[28] Man-made erosion structures such as seawalls and bulkheads, however, disrupt the natural ecosystem processes, degrading and inhibiting formation of such habitats.[29] One study described the

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Altered Shoreline Type, 35 ESTUARIES & COASTS, 1100-09 (2012); Gustavo M. Martins et al., *Influence of a Breakwater on Nearby Rocky Intertidal Community Structure*, 67 MARINE ENVTL. RES., 237-45 (2009); Christopher R. Mattheus et al., *Impact of Land-Use Change and Hard Structures on the Evolution of Fringing Marsh Shorelines*, 88 ESTUARINE, COASTAL & SHELF SCI., 365-76 (2010); Daniel Martin et al., *Ecological Impact of Coastal Defense Structures on Sediment and Mobile Fauna: Evaluating and Forecasting Consequences of Unavoidable Modifications of Native Habitats*, 52 COASTAL ENGINEERING, 1027-51 (2005).

[25]Cornelia Harris et al., *The Ecology of Freshwater Wrack Along Natural and Engineered Hudson River Shorelines*, 722 HYDROBIOLOGIA, 233-45 (2014); Tsung-Han Lee & Mei-Hui Li, *Intertidal Assemblages on Artificial Structures and Natural Rocky Habitats on Taiwan's North Coast*, 61 RAFFLES BULL. OF ZOOLOGY, 331-42 (2013); Sarah A. Morley et al., *Ecological Effects of Shoreline Armoring on Intertidal Habitats of a Puget Sound Urban Estuary*, 35 ESTUARIES & COASTS. 774-84 (2012); Melisa C. Wong et al., *Evaluating Estuarine Habitats Using Secondary Production as a Proxy for Food Web Support*, 440 MARINE ECOLOGY PROGRESS SERIES, 11-25 (2011); W. Christopher Long et al., *Effects of Anthropogenic Shoreline Hardening and Invasion by Phrasmites Australis on Habitat Quality for Juvenile Blue Crabs*, 409 J. OF EXPERIMENTAL MARINE BIOLOGY & ECOLOGY, 215-22 (2011); C. K.-C. Wen et al., *Effects of Habitat Modification on Coastal Fish Assemblages*, 77 J. OF FISH BIOLOGY, 1674-87 (2010); J. Moreira et al., *Seawalls Do Not Sustain Viable Populations of Limpets*, 322 MARINE ECOLOGY PROGRESS SERIES, 179-88 (2006).

[26] Nathan R. Geraldi et al., *Artificial Substrates Enhance Non-Native Macroalga and N2 Production*, 16 BIOLOGICAL INVASIONS, 1819-31 (2014); Guillermo Diaz-Agras et al., *Distribution and Population Structure of Patella Vulgata Linnaeus, 1758 (Gatropoda: Patellidae) on Intertidal Seawalls and Rocky Shores in the Ria de Ferrol*, 26 INTERNATIONAL J. OF MARINE SCIENCES, 79-91 (2010); Tim M. Glasby et al., *Nonindigenous biota on artificial structures: could habitat creation facilitate biological invasions?* 151 MARINE BIOLOGY, 887-95 (2007).

[27] James D. Fraser et al., *Prenesting use of intertidal habitats by piping plovers on South Monomoy Island, Massachusetts*, 69 J. OF WILDLIFE MGMT., 1731-36 (2005).

[28] *Id.*

[29] Anne Hecht & Scott M. Melvin, *Population trends of Atlantic Coast piping plovers, 1986-2006*, 31 WATERBIRDS, 64-72 (2009); Susan E. Cameron et al., *Compilation and Assessment of Piping Plover Wintering and Migratory Staging Area Data in North Carolina*, SYMP. ON WINTERING ECOLOGY & CONSERVATION OF PIPING PLOVERS, 1-5 (2005).

microhabitats as "essential to successful Piping Plover reproduction" and urged for the conservation of natural habitat formation processes.[30] Recent research published in the Journal of Coastal Conservation suggests that "restricting the building or fortifying of seawalls" is the best way to allow Piping Plover habitats to recover in coming decades.[31]

The endangered Roseate Tern faces similar threats associated with shoreline armoring. A FWS study determined "Roseate Terns are highly sensitive to disturbances and will desert a whole colony if they feel threatened," causing the human disruption of coastal armoring to pose serious threats to species survival.[32]

Other ecosystem disruptions caused by coastal armoring create indirect threats to endangered populations. For example, shoreline stabilization can sufficiently alter or completely eliminate the intertidal sand beach habitat for horseshoe crab spawning.[33] While species like the Atlantic Horseshoe Crab are only near-threatened, they are critical to the survival of shorebirds such as the Roseate Tern and Red Knot.[34] Another study found that shoreline stabilization efforts diminish Seabeach Amaranth plants, a crucial habitat for endangered shorebirds.[35]

In addition to disturbing shorebirds, coastal armoring disrupts sea turtle nesting and hatchling survival.[36] A study of Florida's beaches found that fewer turtles emerged onto beaches in front of seawalls, determining that the armoring of shorelines poses a significant threat to sea turtle populations.[37] Additionally, armoring structures increase clutch mortality and contribute to nesting habitat loss.[38]

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[30] David Rabon & Anne Hecht, *Beach Stabilization and Piping Plovers: Overview of Conservation Issues and Implications for ESA Section 7 Consultation,* PROC. OF THE SYMP. ON THE WINTERING ECOLOGY & CONSERVATION OF PIPING PLOVERS, 1 (2005).
[31] Susan A. Sims et al., *Room to move? Threatened shorebird habitat in the path of sea level rise—dynamic beaches, multiple users, and mixed ownership: a case study from Rhode Island, USA*, 17 J. OF COASTAL CONSERVATION, 339-50 (2013).
[32] U.S. FISH AND WILDLIFE SERVICE, ROSEATE TERN: NORTH AMERICAN SUBSPECIES (*STERNA DOUGALLI DOUGALLI)*, 1-2 (2011).
[33] Lawrence J. Niles et al., *Status of the Red Knot (Calidris canutus rufa) in the Western Hemisphere*, STUDIES IN AVIAN BIOLOGY NO. 36 *in* THE CONDOR, 1-185 (2008).
[34] Nancy L. Jackson et al., *Influence of configuration of bulkheads on use of estuarine beaches by horseshoe crabs and foraging shorebirds*, 74 ENVTL. EARTH SCIENCES, 5749-58 (2015).
[35] Johnny Randall, *Bringing Back A Fugitive*, ENDANGERED SPECIES BULLETIN 27.3, 16-18 (2003).
[36] Daniel W. Wood & Karen A. Bjorndal, *Relation of temperature, moisture, salinity, and slope to nest site selection in loggerhead sea turtles,* 2000 COPEIA, 119-28 (2000).
[37] Andrea E. Mosier & Blair E. Witherington, *Documented effects of coastal armoring structures on sea turtle nesting behavior*, PROC. OF THE TWENTIETH ANN. SYMP. ON SEA TURTLE BIOLOGY & CONSERVATION, 304-06 (2002).
[38] Carol E. Rizkalla & Anne Savage, *Impacts of Seawalls on Loggerhead Sea Turtle (Caretta caretta) Nesting and hatching Success,* 27 J. OF COASTAL RES., 166-73 (2010); B. Witherington et al., *Sea turtle responses to barriers on their resting beach*, 401 J. OF EXPERIMENTAL MARINE BIOLOGY, 1-6 (2011).

The continued construction of bulkheads also creates a spiraling need for increased anthropogenic intervention. Studies indicate that coastal armoring structures increase erosion on either side of barriers due to disruption of sediment transport and/or wave refraction.[39] Deflected wave energy from bulkheads creates a scouring effect, causing the loss of intertidal bottoms, loss of fringing marsh, and increased turbidity.[40] Scouring worsens erosion and ultimately destroys marsh by undercutting the roots of marsh plants.[41] Furthermore, bulkheads block marsh retreat as the sea level rises, destroying a natural form of erosion prevention.[42]

The erosion surrounding bulkheads not only impacts shoreline ecosystems, but it also jeopardizes the bulkheads themselves. Failure rates of coastal armoring from scour, undermining, outflanking, overtopping, and battery by storm waves are relatively high. Even large, well-engineered structures can experience overtopping by waves and catastrophic failure with risks not only to infrastructure but also to human safety.[43] Studies also demonstrate that bulkheads, unlike living shoreline projects, suffer significant damage from hurricanes. For example, a survey of the North Carolina coast following Hurricane Irene indicated that 76 percent of bulkheads were damaged by the hurricane while no visible damage was seen in living shoreline projects.[44]

Bulkhead vulnerability creates an ongoing and costly need to monitor, repair, and maintain such structures.[45] Additionally, as coastal erosion worsens due to bulkhead presence, more shorelines require stabilization, creating a dangerous cycle of increased shoreline armoring.

In addition to ecological impacts, bulkheads create numerous societal impacts. As the fisheries along the coast decline due to habitat degradation, the livelihoods of commercial and recreational fishermen are put at risk.[46] As the marsh disappears, so too does the aesthetic beauty of the coast and the tourism jobs that depend on showcasing it. In 2012, there were 249,000 ocean-related jobs in Virginia, North Carolina, South Carolina, and Georgia. The region's ocean economy paid $7.5 billion in wages and contributed $14.5 billion to the economies of the South

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[39] Dethier et al., *supra* note 10; Mattheus et al., *supra* note 24; U.S. ARMY CORPS OF ENGINEERS & YELLOWSTONE RIVER CONSERVATION DISTRICT COUNCIL, *supra* note 9; Scott L. Douglass & Bradley H. Pickel, *Tide Doesn't Go Out Anymore- The Effect of Bulkheads on Urban Bay Shorelines*, 67 SHORE & BEACH, 19-25 (1999).

[40] C. A. Currin, *Developing Alternative Shoreline Armoring Strategies: The Living Shoreline Approach in North Carolina*, PUGET SOUND SHORELINES AND THE IMPACTS OF ARMORING -PROC. OF A ST. OF THE SCI. WORKSHOP, 91-102 (2010).

[41] *Id.*

[42] Bozek & Burdick, *supra* note 16.

[43] Gittman et al., *supra* note 20.

[44] *Id.*

[45] Steven B. Scyphers et al., *Participatory Conservation of Coastal Habitats: The Importance of Understanding Homeowner Decision Making to Mitigate Cascading Shoreline Degradation*, 8 CONSERVATION LETTERS, 1-8 (2015).

[46] Rachel K. Gittman et al., *Engineering Away our Natural Defenses: an Analysis of Shoreline Hardening in the US*, 13(6) FRONT ECOL. ENVTL., 301-07 (2015).

Atlantic region. Tourism and recreation was the largest employment sector in 2012, with 171,159 jobs. This sector is also the largest contributor to the United States gross domestic product (GDP) and weighs in with a contribution of $6.050 billion. Ship and boat building is the second largest sector, and the living resources sector, which includes commercial fishing, accounts for $978.5 million in GDP.[47]

C. Scientific research has demonstrated that living shorelines can be as effective as shoreline armament in curbing erosion and can, in many cases, enhance shoreline ecosystems.

While the studies above reveal the deleterious effects of bulkheads, another substantial body of scientific literature demonstrates that the benefits of living shorelines are significant. As these studies show, living shoreline approaches are more effective at preventing erosion.[48] Additionally, as the threat of sea level rise increases, living shorelines are proving to be the most resilient shoreline stabilization approach.[49]

In regards to ecological benefits, living shorelines enhance coastal habitats by supporting higher abundances of biomass and greater diversity of marine organisms than bulkheads.[50] Living shorelines often provide more structurally complex refuges and foraging opportunities

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[47] Charles Colgan, *The Economic Effects of Outer Continental Shelf Oil and Gas Exploration and Development in the South Atlantic Region: Issues and Assessment,* MIDDLEBURY INST. OF INT'L STUDIES AT MONTEREY 2 (2015), **https://www.southernenvironment.org/uploads/audio/Center_for_the_Blue_Economy_Atlantic_Offshore_Drilling.pdf**.

[48] J. E. Manis et al., *Wave Attenuation Experiments Over Living Shorelines Over Time: A Wave Tank Study to Assess Recreational Boating Pressures,* 19 J. OF COASTAL CONSERVATION, 1-11 (2015); Gittman et al., *supra* note 20; Scyphers et al., *supra* note 45; S. Crooks & R. K. Turner, *Integrated coastal management: sustaining estuarine natural resources*, in 29 ADVANCES IN ECOLOGICAL RES., 241–289 (D. B. Nedwell and D. G. Raffaelli., eds. 1999); I. Möller et al., *Wave Attenuation over Coastal Salt Marshes under Storm Surge Conditions,* 7 NATURE GEOSCIENCE, 727-848 (2014); B. P. Piazza, *The potential for created oyster shell reefs as a sustainable shoreline protection strategy in Louisiana,* 13 RESTORATION ECOLOGY, 499-506 (2005); C. C. Shepard et al., *The Protective Role of Coastal Marshes: A Systematic Review and Meta-Analysis*, 6 PLOS ONE e27374, 1-11 (2011); S. Coleman et al., *Living Shorelines: Using Created Oyster Reefs and Science to Develop Better Erosion Control Structures for Coastal Georgia,* SAPELO ISLAND NAT'L ESTUARINE RES. RESERVE (2014), http://www.sapelonerr.org/wp-content/uploads/2014/04/Sapelo-LSSI-Cannons-Point-poster-final-2.pdf.

[49] Gittman, *supra* note 7; Harris et al., *supra* note 25.

[50] S. Sharma et al., *A Hybrid Shoreline Stabilization Technique: Impact of Modified Intertidal Reefs on Marsh Expansion and Nekton Habitat in Northern Gulf of Mexico,* 90 ECOLOGICAL ENGINEERING, 339-50 (2016); Lawless et al., *supra* note 7.

than bulkheaded shorelines.[51] A 2016 evaluation concluded that living shorelines "may represent a singular opportunity for habitat conservation in urban and developing estuaries." [52] The study confirmed living shorelines' ecosystem benefits and resilience to sea level rise, and urged for regulatory promotion of such practices. [53]

From an economic perspective, living shorelines also provide valuable ecosystem services. Research indicates that such shoreline efforts lead to enhanced fisheries, detoxification benefits, and improved health of nearby estuaries.[54] Specifically, one study concluded oyster reef restorations provide up to $99,000 per hectare in annual economic benefit.[55] Living shorelines also demonstrate strong erosion protection and high storm resilience, reducing maintenance and construction costs along the coast.[56] Overall, living shorelines prove to be a wise investment, by maintaining both the ecological and economic integrity of our nation's coasts.

In light of the benefits of living shorelines and the detriments of armored shorelines, some Corps districts such as the Mobile District have embraced living shoreline techniques. Before a permit applicant in coastal Alabama or coastal Mississippi can obtain a bulkhead permit, the applicant must demonstrate that a living shoreline is not feasible.[57] Another way to characterize this approach is that to secure a bulkhead permit, applicants must prove that the proposed bulkhead is the least damaging practical alternative. It is time that the Corps as a whole embraces this standard.

D. The Corps takes sea level rise into account in protecting government infrastructure on the coast; it cannot ignore sea level rise in its consideration of NWP 13.

Section 2 of Executive Order 13,653 requires that government agencies incorporate considerations of sea level rise and climate change into their decision-making.[58] In particular,

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[51] Gittman, *supra* note 7; J. R. Peters et al., *Comparison of Fish Assemblages in Restored and Natural Mangrove Habitats Along an Urban Shoreline*, 91 BULL. OF MARINE SCI., 1-15 (2015); Harris et al., *supra* note 25.
[52] D. M. Bilkovic et al., *The Role of Living Shorelines as Estuarine Habitat Conservation Strategies*, 44 COASTAL MGMT., 161-174 (2016).
[53] *Id.*
[54] Coleman et al., *supra* note 48; E. B. Barbier et al., *The Value of Estuarine and Coastal Ecosystem Services*, 81 ECOLOGICAL MONOGRAPHS, 169-93 (2011); Steven B. Scyphers et al., *Oyster Reefs as Natural Breakwaters Mitigate Shoreline Loss and Facilitate Fisheries*, 6 PLOS ONE E22396 1, 1-2 (2011); S. Sharma et al., *Do Restored Oyster Reefs Benefit Seagrasses? An Experimental Study in Northern Gulf of Mexico*, RESTORATION ECOLOGY, 1-8 (2016); GA. DEP'T OF NAT. RESOURCES, LIVING SHORELINES ALONG THE GEORGIA COAST: A SUMMARY REPORT OF THE FIRST LIVING SHORELINE IN GEORGIA, 1-54 (2013).
[55] J. H. Grabowski et al., *Economic Valuation of Ecosystem Services Provided by Oyster Reefs*, 62 BIOSICENCE, 900-09 (2012).
[56] Gittman et al., *supra* note 20.
[57] *See* Army Corps of Engineers, Mobile District, ALG10-2011 and ALG11-2011 (2011); *see* Army Corps of Engineers, Mobile District, MSGP-01 and MSGP-03 (2013).
[58] Exec. Order No. 13,653, 3 C.F.R. 13,653 (2013).

Executive Order 13,653 requires that the Corps: "remove or reform barriers" that discourage efforts to increase the "Nation's resilience to climate change"; and "identify opportunities to support and encourage smarter, more climate resilient investments by States . . . ."[59]

In response to Executive Order 13,653, the Corps developed the U.S. Army Corps of Engineers 2014 Climate Change Adaption Plan. In that plan, the Corps pledges to "encourage the transfer of knowledge between our partners and stakeholders at all levels to reduce vulnerability and improve resilience to the effects of climate and extreme weather."[60] In its 2015 update to that plan, the Corps states that it will "lead in developing and adopting resiliency concepts."[61] The Corps also announced in the 2015 Update that it has developed guidance on how the agency is to evaluate and adapt to sea level rise.[62] It goes on to identify living shorelines specifically as a risk reduction strategy available to improve community climate preparedness and resilience.[63] Finally, the Corps developed an Engineering Construction Bulletin with the objective of supporting the "incorporation of new science and engineering products" into its construction projects to make them more resilient.[64]

But this is nothing new for the Corps. As far back as 2009, the Corps drafted an internal guidance that states that the Corps must evaluate coastal projects in accordance with three different accelerated rates of sea-level rise and land movement, as projected by the IPCC, and a fourth hyper-accelerated rate of rise meant to account for rapid glacial melting, unaddressed by the IPCC.[65]

Yet despite Executive Order 13,653, the Climate Change Adaption Plan, the commitments that it has made, and its internal guidance, which all require the Corps to take sea level rise into account in its decision-making, in the Proposed Rule and in the Draft Decision Document, climate change and sea level rise receive no discussion whatsoever. It is as if sea level rise does not exist in the context of the NWPs.

Considering that the latest studies are predicting that the damage associated with sea level rise is going to arrive more quickly[66] and have more serious impacts than previously anticipated,[67] the Corps must take sea level rise into account in its reauthorization of the NWPs,

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[59] *Id.*
[60] UNITED STATES ARMY CORPS OF ENGINEERS CLIMATE CHANGE ADAPTATION PLAN, UPDATE TO 2014 PLAN, 8 (2015).
[61] *Id.* at 2.
[62] *Id.* at 8.
[63] *Id*. at 13.
[64] U.S. ARMY CORPS OF ENGINEERS, GUIDANCE FOR INCORPORATING CLIMATE CHANGE IMPACTS TO INLAND HYDROLOGY IN CIVIL WORKS STUDIES, DESIGNS, & PROJECTS, ENGINEERING & CONSTRUCTION BULL., No. 2014 1 (2014).
[65] *Id*. at 2.
[66] John Upton, *Study Reveals Stunning Acceleration of Sea Level Rise*, CLIMATE CENT. (Feb. 22, 2016), http://www.climatecentral.org/news/study-reveals-acceleration-of-sea-level-rise-20055.
[67] Erika Spanger-Siegfried, *Encroaching Tides, How Sea Level Rise and Tidal Flooding Threaten U.S. East and Gulf Coast Communities over the Next 30 Years*, 1-64 (2014)(increased coastal flooding); B.H. Strauss et al. *Unnatural Coastal Floods: Sea Level Rise and the Human*

especially NWP 13 and NWP B since much of the damage that will come from sea level rise will be along our shorelines. This is especially true considering that the Corps specifically recognizes living shorelines as a risk-reduction strategy that can be useful in increasing coastal resiliency.[68]

In short, the Corps is studying the scientific advances surrounding sea level rise and climate change in an effort to protect the structures it builds in tidal waters, yet it is making no attempt to apply that same information in the regulatory context. The Corps continues to expedite the permitting of bulkheads when scientific studies, as provided further below, have demonstrated that living shorelines fare far better than bulkheads in violent storms.[69] The Corps must apply the same science across the board. Executive Order 13,653, as well as its own Climate Change Action Plan, dictate that the Corps do so.

Five years ago, when NWP 13 was reauthorized, the Corps tried to escape considering sea level rise by claiming that the science was not yet conclusive so the Corps could ignore it.[70] The Corps can no longer ignore sea level rise, because the science is clear—the seas are rising. The only aspect that remains unclear is precisely the rate of rise in different areas of country. As the Department of Defense (DOD), of which the Corps is a component, stated in one of its recent publications:

> Because the projected rates of global mean sea-level rise (SLR) over the next century far exceed those observed in the past several thousand years, the potential exists for historically unprecedented impacts to the natural and built infrastructure occurring along coastlines. *Plausible, risk-based scenarios* estimate that global sea level could increase by roughly up to 2 meters by 2100 if Greenland ice sheet melt accelerates with regional and local effects adding to or subtracting from the global mean. SLR has the potential to affect existing coastal infrastructure critical to the Department of Defense . . . .[71]

Of course, such sea level rise also has the potential to affect the existing coastal infrastructure of individuals and communities as well. Thus, the Corps must take sea level rise into account in reauthorizing NWP 13 and NWP B.

But even if the extent of sea level rise were not as clear as it is, the Corps must still consider it in its decisionmaking. As the D.C. District Court explained in *Chlorine Chemistry Council v. E.P.A.*, "All scientific conclusions are subject to some doubt; future, hypothetical findings always have the potential to resolve the doubt."[72] Nonetheless, administrative agencies

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Fingerprint on U.S. Floods Since 1950, CLIMATE CENT. RES. REPORT,1-17 (2016)(climate change causes ¾ of coastal flooding).

[68] *Id*. at 13.

[69] Gittman et al., *supra* note 20.

[70] Decision Document § 1.4 (Army Corps of Engineers 2012).

[71] STRATEGIC ENVTL. RES. & DEV. PROGRAM, CLIMATE CHANGE & IMPACTS TO SEA LEVEL RISE, https://www.serdp-estcp.org /featured-initiatives/climate-change-and-impacts-of-sea-level-rise)(last visited June 24, 2016).

[72] *Chlorine Chemistry Council v. E.P.A.*, 206 F.3d 1286, 1291 (D.C. Cir. 2000).

are supposed to make the best decisions that they can based on the "best available evidence *at the time* of the rulemaking."[73]

And the Corps cannot claim that sea level rise is going away. One recent study reported in the Proceedings of the National Academy of Sciences of the United States of America concludes that about half of the increase in global temperatures are tied to human actions.[74] Thus, there is little likelihood that temperatures are going to fall any time soon. And our coastlines are going to suffer increasing harm. In a 2016 study of coastal flooding, the authors of the study determined that climate change had caused three fourths of the coastal flooding recorded in the U.S. from 2005 to 2014.[75] Another study from the Union of Concerned Scientists shows that coastal cities, particularly on the East Coast, are going to suffer from tidal flooding on a regular basis.[76] Such flooding is compounded by the fact that sea levels have already risen significantly. One study found that an area of the Chesapeake Bay has risen by a foot already and that globally the sea levels have increased by 4.5 inches.[77] One of the authors of the National Academy of Sciences study, Stefan Rahmstorf, commented that "[d]uring the past millennia, sea level has never risen nearly as fast as during the last century." He went on to say that new sea level data also "demonstrates that one of the most dangerous impacts of global warming, namely sea level rise, is well underway."[78]

In addition to threatening infrastructure, sea level also threatens to destroy coastal marsh, as well as other coastal ecosystems. One study of the New River Estuary revealed that with sea level rise, marsh can drown if it is denied sufficient sediment to raise the bottom elevation of the submerged lands under the marsh.[79] While bulkheads prevent sediment from the land reaching the water, living shorelines do not because they preserve the land water interface. Thus, at the end of the study, the authors called for the use of sustainable shoreline stabilization approaches such as living shorelines.[80] Living shorelines are also superior to bulkheads in the face of sea level rise because they facilitate the migration of the marsh as the sea level rises.[81] Yet, in a long-term study of the effects of shoreline armoring, the authors pointed out that as sea levels increase, property owners are going to look for the quickest and easiest way to protect their shorelines, which in most cases would be to construct a bulkhead.[82] Based on this study, if the Corps is interested in preserving the marsh along our coastlines, it should be encouraging the use of living shorelines instead of bulkheads.

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[73] *Id.*
[74] Robert E. Kopp, *Temperature-driven global sea-level variability in the Common Era*, PROC. OF THE NAT'L ACAD. OF SCI. OF THE U.S. of AMERICA, 113, no. 11 (Feb. 22, 2016), http://www.pnas.org/content/113/11/E1434.full.
[75] B.H. Strauss et al., *Unnatural Coastal Floods: Sea Level Rise and the Human Fingerprint on U.S. Floods Since 1950*, CLIMATE CENT. RES. REPORT, 1-17 (2016).
[76] Spanger-Siegfried, *supra* note 67.
[77] Benjamin Strauss, *The Human Fingerprints on Coastal Floods*, CLIMATE CENT. (Feb. 22, 2016), http://www.climatecentral.org/news/the-human-fingerprints-on-coastal-floods-20050.
[78] Upton, *supra* note 66.
[79] Currin et al., *supra* note 9.
[80] *Id.*
[81] Bozek & Burdick, *supra* note 16.
[82] Dethier et al., *supra* note 10.

Similarly, the Corps should encourage living shorelines over bulkheads, because living shorelines fare better during violent storms. One study found that while 75 percent of the bulkheads in a coastal area were damaged by a hurricane, the living shorelines in the same area suffered little if any damage. The main part of the study was conducted in Rodanthe, Waves, and Salvo, North Carolina. Living shorelines and bulkheads were inspected both before and after Hurricane Irene came through the area. The authors of the study surmised that some of this damage occurred when the storm surge retreated to sea. The other observation they made was that although the marsh sills were overtopped by the waves, they still provided some wave attenuation.[83]

Sea level rise is currently and will continue to stress and in many cases destroy many aspects of the coastal environment. Unless the Corps considers sea level rise in its reauthorization of the NWPs, the Corps' analysis will not be complete. And based on its references to climate change in its Draft Decision Document, that analysis is clearly not complete at this point. The Corps makes no mention of sea level or climate change whatsoever in the Proposed Rule. In the Draft Decision Document, the Corps makes only four passing references to climate change and sea level rise.

> During the period of 2004 to 2009, less than one percent of estuarine emergent wetlands were lost as a direct result of human activities, while other factors such as *sea level rise,* land subsidence, storm events, erosion, and other ocean processes caused substantial losses of estuarine wetlands.[84]
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> * * *
>
> Wetlands, streams, and other aquatic resources and the functions and services they provide are directly and indirectly affected by changes in land use and land cover, alien species introductions, overexploitation of species, pollution, eutrophication due to excess nutrients, resource extraction including water withdrawals, climate change, and various natural disturbances. Freshwater ecosystems such as lakes, rivers, and streams are altered by changes to water flow, climate change, land-use changes, additions of chemicals, resource extraction, and aquatic invasive species.[85]
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[83] Gittman et al., *supra* note 20.
[84] Draft Decision Document § 3.1 (Army Corps of Engineers 2016) (citation omitted) (emphasis added).
[85] *Id.* at § 4.3 (Army Corps of Engineers 2016) (citation omitted).

> Adverse effects to coastal waters are caused by habitat modifications, point source pollution, non-point source pollution, changes to hydrology and hydrodynamics, exploitation of coastal resources, introduction of non-native species, global climate change, shoreline erosion, and pathogens and toxins.[86]
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> * * *
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> The main causes of the decline of species to endangered or threatened status are habitat loss and degradation, introduction of species, overexploitation, disease, and climate change.[87]

These four references to sea level rise and climate change are completely insufficient in light of the dramatic effect sea level rise is currently having and will continue to have on our coastal environment. [88] Without more analysis on sea level rise and climate change, the Corps cannot legally reauthorize NWP 13. Executive Order 13,653, the Climate Change Adaption Plan, the commitments that it has made, and its internal guidance all require, if not directly, at least indirectly, the Corps to perform such analysis.

But more importantly, the 404(b)(1) Guidelines require such analysis too.[89] For example, the 404(b)(1) Guidelines require the Corps to determine the normal water fluctuations of an area as part of its analysis.[90] Unless the Corps considers the effects of sea level rise, it cannot determine what the "new normal" is and what it will be in the future. Similarly, it is likely that sea level rise will exacerbate the adverse impacts of bulkheads. As storms increase in intensity, the scouring effect in front of bulkheads will increase.[91] In light of this, the Corps must consider sea level rise in its determination of the cumulative impacts of activities that will be authorized under NWP 13.This inquiry is not optional; the Corps is required under the 404(b)(1) Guidelines to "collect information and solicit information from other sources about the cumulative impacts on the aquatic ecosystem [and] [t]his information shall be documented and considered during the decision-making process concerning the evaluation of . . . the issuance of a General permit." [92] It is of no moment that it is sea level rise that is causing the impacts of bulkheads to exceed the minimal effect level. It is precisely for this reason that the Corps is required to take a fresh look at all the NWPs every five years.

During the last reauthorization of the NWPs, the Corps said the following in response to two comments stating that the Corps was failing to consider sea level rise during the reauthorization process:

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[86] *Id.*
[87] *Id.* (citation omitted).
[88] *See e.g.*,Currin et al., *supra* note 9.
[89] 40 C.F.R. § 230.24.
[90] *Id*.
[91] Bozek & Burdick, *supra* note 16; Pontee, *supra* note 16; Titus, *supra* note 16.
[92] *Id*. at § 230.11(g)(2).

> At the present time, there is a considerable amount of uncertainty surrounding climate change, and any associated sea level rise that may occur as a result of climate change. To the extent there is reliable information about projected sea level rise during the reasonably foreseeable future in the vicinity of a proposed activity, the district engineer will take that information into account when determining whether a proposed NWP 13 activity will have minimal individual and cumulative adverse effects on the aquatic environment.[93]

As much as the Corps would like it to be, this is not a sufficient response to the issue of sea level rise.

III. If the Corps were to reauthorize NWP 13, it would violate the legal requirements of the Clean Water Act Section 404(b)(1) Guidelines.

A. Under the 404(b)(1) Guidelines, the Corps cannot authorize a NWP that would have more than minimal adverse effects on the aquatic environment both individually and cumulatively.

The 404(b)(1) Guidelines require that the Corps determine whether activities to be authorized by NWP 13 "will have only minimal cumulative adverse effects on water quality and the aquatic environment."[94] Cumulative effects are "the changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual discharges of dredged or fill material. Although the impact of a particular discharge may constitute a minor change in itself, the cumulative effect of numerous such piecemeal changes can result in a major impairment of the water resources and interfere with the productivity and water quality of existing aquatic ecosystems."[95] To predict these cumulative effects, the Corps must calculate the number of individual discharge activities that are likely to be authorized under NWP 13 until the permit's expiration.[96] In addition, the Corps has to "set forth in writing an evaluation of the potential individual and cumulative impacts of the category of activities to be regulated."[97]

First, the Corps must consider, for example, whether NWP 13 would jeopardize ESA-listed species or their habitat.[98] Second, the Corps has to consider whether NWP 13 "will cause or contribute to significant degradation of waters of the United States."[99] Significant degradation includes the "loss of fish and wildlife habitat."[100] Third, the Corps must "determine in writing the potential short-term and long-term effects" of NWP 13, including the consideration of various environmental effects.[101] Among them, the Corps has to "[d]etermine the nature and

[93] Decision Document § 1.4 (Army Corps of Engineers 2012).
[94] 40 C.F.R. § 230.7(a)(3).
[95] *Id.* § 230.11(g).
[96] *Id.* § 230.7(b)(3).
[97] *Id.* § 230.7(b).
[98] *Id.* § 230.10(b)(3).
[99] *Id.* § 230.10(c).
[100] *Id.* § 230.10(c)(3).
[101] *Id.* § 230.11–.61.

degree of effect that the proposed discharge will have individually and cumulatively on water, current patterns, circulation including downstream flows . . . [and] alterations of bottom contours, or other significant changes in the hydrologic regime."[102] And fourth, the Corps is required to consider "secondary effects" on the aquatic ecosystem.[103] In accordance with the 404(b)(1) Guidelines, this entire analysis must be "completed before any General permit is issued . . . ."[104] To comply with the Administrative Procedure Act, the Corps must explain its decision and establish a "rational connection" between the facts found and the conclusions made.[105]

B. NWP 13 cannot meet the minimal effects standard set forth in the 404(b)(1) Guidelines.

1. A 500-foot bulkhead has more than minimal effects.

Under NWP 13, the Corps considers a bulkhead that is up to 500 feet in length to have "minimal" effects on the aquatic environment. The scientific studies discussed above demonstrate that even the shortest bulkhead has more than minimal effects. In light of this body of research, there is no support for the Corps' claim that a vertical wall almost two football fields in length could have minimal effects. A structure of that size would have more than minimal effects if it were constructed in any ecosystem. Its impacts are compounded when it is inserted into a shoreline ecosystem that is highly diverse and productive.[106]

Furthermore, the Corps provides no basis for the 500-foot figure. Without a reasoned basis for concluding such a large structure has only minimal effects on the aquatic environment, the Corps' assessment fails. As the U.S. Supreme Court explained in *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, an "agency must examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made.'"[107] Unless the Corps can explain how it arrived at the 500-foot figure and why such a large bulkhead could have minimal effects on the aquatic environment, then it has not articulated a satisfactory explanation for setting this limit and thus has acted in an arbitrary and capricious manner.

Moreover, "minimal" is generally defined as "the least possible" or "very small or slight."[108] There is nothing very small or slight about a 500-foot long bulkhead. When it passed

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[102] *Id.* § 230.11(b).
[103] *Id.* § 230.11(h).
[104] *Id.* § 230.12(b); *see also id.* § 230.6(d).
[105] *See State Farm*, 463 U.S. at 43; 40 C.F.R. § 230.12(a)(3)(iv).
[106] Currin et al., *supra* note 9; Dugan et al., *supra* note 9; Titus, *supra* note 16; Ruppert, *supra* note 9; U.S. ARMY CORPS OF ENGINEERS & YELLOWSTONE RIVER CONSERVATION DISTRICT COUNCIL, *supra* note 9.
[107] *See* 463 U.S. 29, 43, (1983) quoting *Burlington Truck Lines v. United States*, 371 U.S. 156, 168 (1962).
[108] *See* Merriam Webster Dictionary (defining "*minimal*" as, *inter alia*, "the least possible" or "very small or slight"), http://www.merriam-

Section 404(e) in 1977 and authorized the Corps to develop general permits, Congress meant to reduce the Corps' workload, not put the environment in jeopardy. General permits were only intended to "eliminate unnecessary paperwork and delays in permit processing."[109] The photograph below depicts a bulkhead that is approximately 400 feet long and was authorized under NWP 13. It is unreasonable for the Corps to relinquish its oversight over such structures, much less one 100 feet longer, simply to reduce paperwork.

Furthermore, under the 404(b)(1) Guidelines the Corps must predict the cumulative effects of the activities that would be authorized under an NWP during its five-year term.[110] In the case of NWP 13, this is impossible because the Corps receives no notice of bulkheads 500 feet or less in length. A recent survey of all the bulkheads along the Georgia coast established that the average length of these Georgia coastal bulkheads is approximately 150 feet.[111] And only 4.7 percent of the bulkheads in the survey were more than 500 feet in length.[112] Because the Corps, under NWP 13, requires preconstruction notifications (PCN) only for bulkheads that are more than 500 feet in length, this survey reveals that the Corps is only aware of a small percentage of the bulkheads that are installed. In light of this, it is impossible for the Corps to determine whether the cumulative impacts of these bulkheads are not more than minimal.

Nevertheless, the Corps somehow estimates in the Draft Decision Document that NWP 13 will be used approximately 16,000 times over the 5-year permit period, having impacts on approximately 400 acres of waters of the United States, including jurisdictional wetlands. The Corps does not explain how it reached these numbers, or whether the 400 acres of impacts include direct, indirect, and cumulative impacts to jurisdictional waters. And particularly fatal to its 404(b)(1) Guidelines analysis is the lack of any explanation of how 16,000 projects having at least 400 acres of impacts is "minimal."

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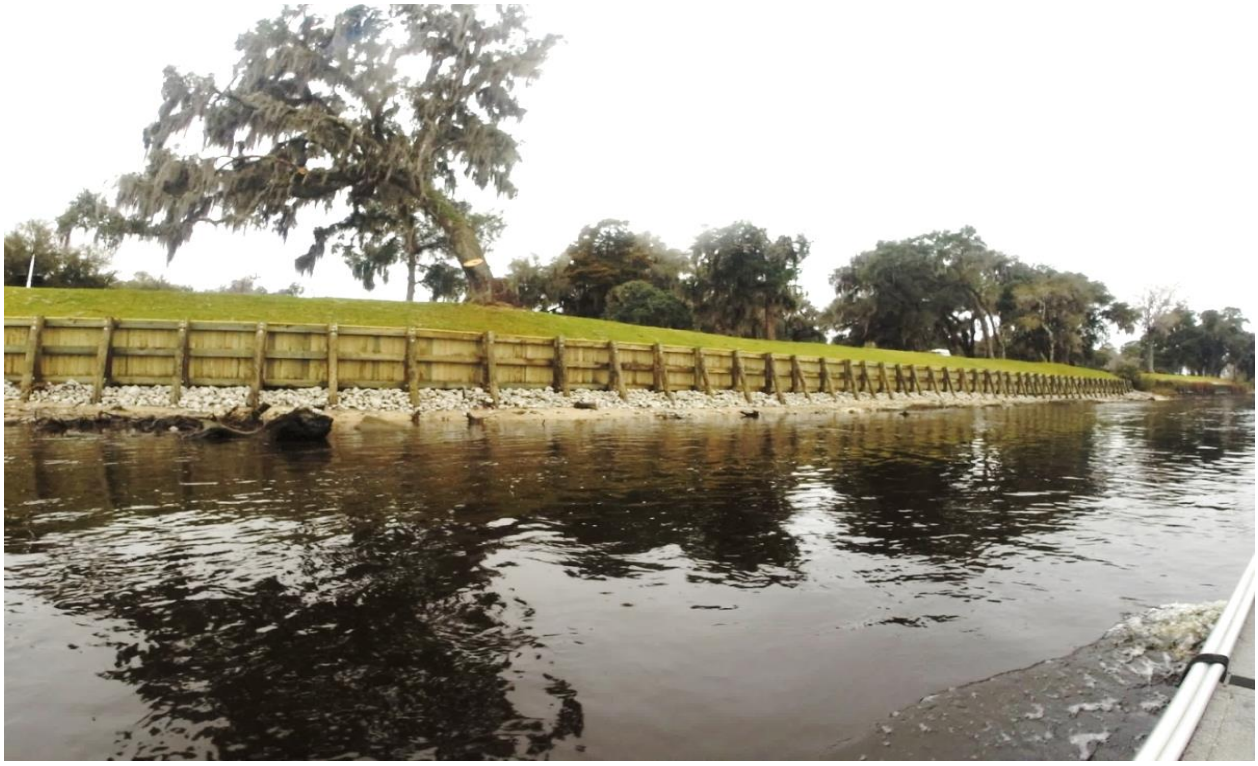
webster.com/dictionary/minimal?show=0&t=1302307512 (last visited June 26, 2016); Black's Law Dictionary (8th ed. 2004) (defining "minimum" as "[o]f, relating to, or constituting the smallest acceptable or possible quantity in a given case").

[109] *See* S. Rep. No. 95-370, at *75 (1977).

[110] *Id.* at § 230.7(3).

[111] Email message from Clark Alexander, Interim Executive Director Skidaway Institute of Oceanography, to Bill Sapp, Senior Attorney, Southern Environmental Law Center (June 21, 2016) (re: Clark Alexander, *EPA Wetlands Grant Final Report to Jan Mackinnon, CRD, GA-DNR*) (April 15, 2016).

[112] Email message from Clark Alexander, Interim Executive Director Skidaway Institute of Oceanography, to Bill Sapp, Senior Attorney, Southern Environmental Law Center (June 28, 2016) (re: Clark Alexander, *EPA Wetlands Grant Final Report to Jan Mackinnon, CRD, GA-DNR*) (April 15, 2016)(the survey did not include structures in Savannah Harbor).



400-foot-long bulkhead on the Ogeechee River near Richmond Hill, Georgia

The problems with NWP 13 do not end there. Under the Corps' regulations, a district engineer can determine that bulkheads of unlimited length have minimal impacts and can therefore be authorized under NWP 13.[113] Because this waiver provision has no performance standards, it has been frequently abused. For example, the Charleston District approved a sea wall under NWP 13 that was 2,700 feet long—over five times the 500-foot threshold.[114] Other district engineers have approved excessively long bulkheads. A survey the Corps conducted in 2010 revealed that districts regularly waive the 500-foot threshold.[115] One district used NWP 13 25 times with the average length of the bulkheads measuring 1,200 feet.[116] It is undeniable that such bulkheads have more than minimal impacts. And although the Corps claims that these impacts are cured through mitigation, there is nothing in the 404(b)(1) Guidelines that allows such an approach.

[113] *Id.* at 35,191.
[114] *See* Letter from Tina B. Hadden, Chief, Regulatory Division, Charleston District, U.S. Army Corps of Engineers to Patrick Rogers, Thomas and Hutton Engineering Co. (Apr. 4, 2008) (on file with author).
[115] U.S. ARMY CORPS OF ENGINEERS, NWP ANALYSIS (Nov. 29, 2010) (survey of NWP practices by Corps Districts).
[116] *Id*.

2. The Corps has not considered the significant degradation of the aquatic ecosystem that would be caused by NWP 13.

The 404(b)(1) Guidelines provide "no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States."[117] The Guidelines go on to state that findings of significant degradation shall be based on "appropriate factual determinations, evaluations, and tests . . . ."[118] A description of the several ways the Corps violates the significant degradation requirement follows.

a. Bulkheads have significant adverse effects on aquatic ecosystem diversity, productivity, and stability.

In the Draft Decision Document, the Corps lists some of the ways that bulkheads have significant adverse effects on the aquatic ecosystem. First, the Corps states bulkheads prevent sediment from reaching the aquatic ecosystem.[119] Second, the Corps mentions in the Draft Decision Document that bulkheads can alter the riparian zone, which in turn can "adversely affect populations of fish and other aquatic animals . . . ."[120] And third, the Corps explains one of the most deleterious effects of bulkheads when it states that: "Bulkheads, seawalls, and revetments can sever connectivity between nearshore estuarine and marine environments and adjacent uplands, preventing or inhibiting the ability of animals to move between these environments."[121] But after conceding that these effects occur, the Corps does little more than suggest that these impacts could be reduced if an applicant installed a revetment instead of a bulkhead.[122]

Although the Corps gives this connectivity effect short shrift, impacts of bulkheads can be profound throughout the food chain. As explained in more detail above, by altering the near-shore environment, bulkheads induce a cascading ecosystem effect. When compared to natural shores, artificial seawalls have smaller surface areas and few microhabitats.[123] Multiple analyses conclude this alteration reduces the benthic density of surrounding ecosystems.[124] Benthic density measures organisms living in or on the bottom of sediment and acts as a biological indicator to reflect the overall condition of an aquatic environment. Lack of benthic density impacts the food web, inducing a chain reaction that can threaten species throughout the ecosystem.[125]

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[117] *Id*. at § 230.11(c).
[118] *Id.*
[119] Draft Decision Document § 7.2.3(a) (Army Corps of Engineers 2016).
[120] *Id.* at § 7.2.3(h).
[121] *Id.* at § 7.2.3(a) (citations omitted).
[122] *Id.*
[123] Lam et al., *supra* note 188.
[124] Lawless et al., *supra* note 7; Morley et al., *supra* note 25; K. L. Sobocinski et al., *Effects of Shoreline Modifications on Supratidal Macroinvertebrate Fauna on Puget Sound, Washington Beaches,* 33 ESTUARIES & COASTS, 699-711 (2010); Patrick et al., *supra* note 17; Nordstrom et al., *supra* note 18.
[125] *Id.*

Several peer-reviewed analyses demonstrate these cumulative impacts, concluding that artificial seawalls suppress intertidal biodiversity.[126] For example, in a detailed survey of 29 armored-unarmored beach pairs in Puget Sound, Washington, the scientists conducting the study found that the shoreline armoring broke the connectivity between habitats on either side of it and prevented beach wrack from reaching the landward habitats. With no wrack reaching them, the number of high-shore invertebrates decreased markedly, which in turn caused prey animals to decline as the effects of the armoring went cascading through the ecosystem.[127] Another study revealed that bulkheads' alterations of intertidal shoreline significantly reduced nekton abundance and distribution of common taxa in salt marsh ecosystems. The scientists concluded that the alternations "eliminated or markedly reduced intertidal habitat … reducing biodiversity and sustainability of vital intertidal habitat types."[128]

Studies also indicate bulkheads encourage the expansion of non-native and invasive species. By changing the nearshore environment, bulkheads allow less diverse and productive organisms to prosper at the expense of the ecosystem's original inhabitants.[129] Scientists concluded that this process can cause degradation of wildlife habitat and further negative alteration of ecosystem processes.[130]

The ecosystem diversity disruptions ultimately threaten fish and invertebrate populations at the top of the food chain.[131] A survey of Puget Sound beaches concluded that, in comparison to natural beaches, armored beaches lack biogenic habitat. The study noted "armored beaches result in reduced nutrient supply at the base of the food web, which likely has consequences on invertebrate fauna."[132] A recent study in Taiwan also indicated that the replacement of natural habitats by concrete barriers induced "localized loss of specific species and corresponding declines in biodiversity.[133] Finally, a 2015 review of fish assemblages in natural mangrove habitats also asserted that hard structures threaten fundamental properties of fish habitat: "Species forming large schools . . . may be precluded from this habitat by the small size of the refuge space between rocks compared to large, open spaces in between mangrove prop roots, making riprap an unsuitable habitat."[134] This body of research indicates that bulkheads, under a wide variety of circumstances, cause ecosystem disruptions that negatively impact coastal habitat and species.

Not only do bulkheads affect aquatic habitats, they degrade terrestrial ecosystems. Bulkheads starve beaches of sand:

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[126] Aguilera et al., *supra* note 24; Geraldi et al., *supra* note 26; Harris et al., *supra* note 25; Glasby et al., *supra* note 26; Benfield & Downer, *supra* note 189.
[127] Heerhartz et al., *supra* note 7.
[128] Needles et al., *supra* note 195.
[129] Diaz-Agras et al., *supra* note 26; Glasby et al., *supra* note 26.
[130] Balouskus & Targett, *supra* note 24; Geraldi et al., *supra* note 26.
[131] Dugan et al., *supra* note 10; Bozek & Burdick, *supra* note 16.
[132] Heerhartz et al., *supra* note 7.
[133] Wen et al., *supra* note 25.
[134] Peters et al., *supra* note 51.

> Armoring marine shorelines can alter natural processes at multiple spatial and temporal scales; some, such as starving the beach of sediments by blocking input from upland bluffs may take decades to become visible, while others such as placement loss of armoring construction are immediate.[135]

This alteration of landward habitats such as beaches and wetlands yields further biodiversity concerns. Eighty percent of America's breeding bird population relies on coastal wetlands, 50 percent of the 800 species of protected migratory birds rely on coastal wetlands, and nearly all of the 190 species of amphibians in North America depend on coastal wetlands for breeding.[136] A 2008 study found that coastal armoring will "increase ecological impacts to sandy beach ecosystems on a scale that is unprecedented." [137] Specifically, the loss of habitat from coastal armoring was associated with two- to 36-fold impacts on beach zones, macro-invertebrates, foraging shorebirds, roosting gulls and seabirds on open coast beaches.[138]

Intertidal flats and beach strands provide critical refuge for endangered and threatened birds like the Piping Plover, Snowy Plover, and Least Turn.[139] Unfortunately, these delicate habitats are extremely susceptible to degradation by bulkheads.[140] With many bird species using these areas as breeding grounds, the declining condition of the flats and beaches poses direct threats to species survival.[141] Recent research published in the Journal of Coastal Conservation concluded that "restricting the building or fortifying of seawalls" is the best way to allow these habitats to recover in coming decades.[142]

Other ecosystem disruptions caused by coastal armoring create indirect threats to endangered populations. For example, shoreline stabilization can sufficiently alter or completely eliminate the intertidal sand beach habitat for horseshoe crab spawning.[143] While species like the Atlantic Horseshoe Crab are only near-threatened, they are critical to the survival of endangered

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[135] Dethier et al., *supra* note 10.
[136] Laura Whalen et al., *Practitioner's Guide: Shellfish-Based Living Shorelines for Salt Marsh Erosion Control and Environmental Enhancement in the Mid-Atlantic*, PARTNERSHIP FOR DEL. ESTUARY, 1-48 (2011).
[137] Dugan et al., *supra* note 10.
[138] *Id.*
[139] Fraser et al., *supra* note 27; *Prenesting use of intertidal habitats by piping plovers on South Monomoy Island, Massachusetts*, 69 J. OF WILDLIFE MGMT., 1731-36 (2005); Kelly Hornaday et al., *Recovery Plan for the Pacific Coast Population of the Western Snowy Plover (Charadrius alexandrines nivosus)* (2010), **http://www.westernsnowyplover.org/pdfs/WSP%20Final%20RP%2010-1-07.pdf**; FL. FISH & WILDLIFE CONSERVATION COMMISSION, SUPPLEMENTAL INFORMATION FOR THE LEAST TERN: BIOLOGICAL STATUS REV. REPORT (2011), http://myfwc.com/media/2273517/Least-Tern-Supplemental-Information.pdf.
[140] Hecht & Melvin, *supra* note 29; Cameron et al., *supra* note 29.
[141] Fraser et al., *supra* note 27.
[142] Sims et al., *supra* note 31.
[143] Niles et al., *supra* note 33.

shorebirds such as the Roseate Tern and Red Knot.[144] Another study found that shoreline stabilization efforts diminish Seabeach Amaranth plants, a crucial habitat for endangered shorebirds.[145] Finally, research has also linked bulkhead construction with habitat threats to endangered mammals such as the Hawaiian Monk Seal along with several species of beach mouse.[146]

In addition to disturbing shorebirds, coastal armoring disrupts sea turtle nesting and hatchling survival.[147] A study of Florida's beaches found that fewer turtles emerged onto beaches in front of seawalls, determining that the armoring of shorelines poses a significant threat to sea turtle populations.[148] Additionally, armoring structures increase clutch mortality and attribute to nesting habitat loss.[149]

Unfortunately, the adverse effects that bulkheads have on shoreline ecosystems are likely to increase. As discussed above, coastal armoring structures increase erosion on either side of them.[150] And they cause scouring in front of them, which leads to the loss of fringing marsh and increased turbidity.[151]

Specifically, one analysis of armoring impacts on the shorelines of the Salish Sea reveals that bulkheads cause reductions in beach width. Furthermore, the scientists concluded that the localized impacts of increased erosion have the potential to "scale-up" and have widespread cumulative effects.[152] Another study of the fringe marshes in North Carolina yielded similar results, concluding that the construction of bulkheads increases erosion in other areas, necessitating construction of further erosion prevention structures. The study also noted that the

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[144] Jackson et al., *supra* note 34.
[145] Randall, *supra* note 35.
[146] U.S. FISH & WILDLIFE SERVICE, *Alabama Beach Mouse (Peromyscus polionotus ammobates): Fact Sheet (2006)*, https://www.fws.gov/daphne/Fact_Sheets/ABM-Factsheet-3-17-06.pdf ; Annie Dziergowski, *Anastasia Island Beach Mouse, Southeastern Beach Mouse: Fact Sheet* (2005), https://www.fws.gov/northflorida/Species-Accounts/PDFVersions/Beach-Mice-2005.pdf; FL. FISH & WILDLIFE CONSERVATION COMMISSION, *Choctawhatchee beach mouse (Peromyscus polionotus allophrys): Fact Sheet*, http://myfwc.com/media/2211827/Choctawhatchee-beach-mouse.pdf; NOAA FISHERIES SERV., *Hawaiian Monk Seal: Fact Sheet (2010)*, http://www.fpir.noaa.gov/Library/PRD/Hawaiian%20monk%20seal/Fact%20Sheets/HMS-top_threats.MAY2010.pdf.
[147] Wood & Bjorndal, *supra* note 36.
[148] Mosier & Witherington, *supra* note 37.
[149] Rizkalla & Savage, *supra* note 38; Witherington et al., *supra* note 38.
[150] Dethier et al., *supra* note 10; Mattheus et al., *supra* note 24; U.S. ARMY CORPS OF ENGINEERS & YELLOWSTONE RIVER CONSERVATION DISTRICT COUNCIL, *supra* note 9; Douglass & Pickel, *supra* note 39.
[151] Currin, *supra* note 40.
[152] Dethier et al., *supra* note 10.

constant human intervention creates "shifting hotspots of erosion," making it even more difficult to manage coastal environments.[153]

b. Bulkheads have significant adverse effects on human health and welfare.

In this category the 404(b)(1) Guidelines include impacts to "fish, shellfish, wildlife, and special aquatic sites."[154] As described above, bulkheads have a myriad of impacts on all of these features of the aquatic ecosystem. The Corps also explains that in the context of a stream, bank stabilization can increase erosion elsewhere and by doing so destroy fish habitat and spawning areas.[155]

While the impacts of bulkheads begin at a microscopic ecosystem level, the effects degrade human health and welfare on a large scale. Scientists have established key habitat-fishery linkages—as fish habitat degrades so too does the productivity of our fisheries.[156] A study of development impacts in the Chesapeake Bay found that "fish community integrity was lowest along shorelines with bulkheads."[157] Furthermore, the study indicated that fish communities have a notably low ecological threshold, meaning even small amounts of coastal armoring significantly impact fisheries.[158]

In some cases, bulkheads not only degrade fishery-linked habitats, they destroy them altogether. Bulkheads prevent salt marsh from migrating upslope as sea levels rise, resulting in a loss of marsh habitat.[159] Such habitat losses have immediate negative impacts on fisheries.[160] One study explained, "Salt marsh ecosystems also serve to maintain fisheries by boosting the production of economically and ecologically important fishery species, such as shrimp, oysters, clams, and fishes."[161]

The health of coastal fisheries is integral to our national economy. In 2012, recreational anglers took 70 million trips with customers.[162] Additionally, commercial fishermen landed 9.6

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[153] Mattheus et al., *supra* note 24.
[154] *Id.*
[155] Draft Decision Document § 7.2.3(h) (Army Corps of Engineers 2016).
[156] Barbier et al., *supra* note 54; Dugan et al., *supra* note 9.
[157] D. M. Bilkovic & M. M. Roggero, *Effects of coastal development on nearshore estuarine nekton communities*, 358 MARINE ECOLOGY PROGRESS SERIES, 27-39 (2008).
[158] *Id.*
[159] Wong et al., *supra* note 25; James G. Titus, *Does the U.S. Government Realize That The Sea Is Rising? How To Restructure Federal Programs So That Wetlands and Beaches Survive*, 30 GOLDEN GATE U. L. REV., 717-86 (2000).
[160] Charles H. Peterson & John F. Bruno, *Fisheries Impacts of Marsh Sills (Living Shorelines) as a Shoreline Stabilization/Restoration Alternative to Bulkheads*, COASTAL RECREATIONAL FISHING LICENSE FINAL REPORT, 1-36 (2012).
[161] *Id.*
[162] NOAAFISHERIES OF THE U.S., 2012: A STATISTICAL SNAPSHOT OF THE 2012 FISH LANDINGS (2012).

billion pounds of seafood valued at $5.1 billion.[163] On a smaller scale, the recreational fishing value of a single acre of salt marsh in Florida is estimated to be $6,471.[164] Given that 50 percent of all salt marshes are already lost or degraded due to human activity, we cannot afford to lose more of this valuable habitat to bulkheads.[165]

In addition to sustaining fisheries, salt marshes and natural shores provide many ecosystem services essential to humans.[166] Unaltered shores provide water filtration services threatened by the construction of bulkheads. One analysis found marsh grasses reduce nutrient pollution by over 90 percent and provide over $6,000 in nutrient reduction services per acre in eastern Florida annually.[167] By continuing to construct bulkheads and degrading salt marshes, we diminish these ecologically and economically valuable services.

The avoidance of bulkheads and preservation of natural shorelines also provides valuable stabilization and storm protection services for our coastlines. While bulkheads were once preferred, recent studies prove non-hardened shorelines are the more effective way to protect our shores. By maintaining natural shoreline dynamics and sand movement, we reduce wave energy and increase absorption of storm surge and flood waters.[168] The coastal wetlands provide such benefits and offer an estimated $23.2 billion a year in storm protection services.[169]

Recent studies indicate that bulkheads are not resilient in the face of storms. Post-hurricane damage surveys revealed that over one third of the 20 km of bulkheads along the Outer Banks shorelines were damaged or collapsed completely during storms. Meanwhile, natural shorelines provided more resilient and effective erosion protection during storm events.[170]

c. Bulkheads have significant adverse effects on recreational, aesthetic, and economic values.

NWP 13 activities can have significant adverse effects on recreational, aesthetic, and economic values. While the Corps admits that bulkheads, sea walls, and revetments cause indirect effects that result in losses or narrowing of beaches," and reduce sediment transport to other beaches,[171] the impacts extend further. All of these features can cause considerable scouring as the Corps alludes to in the Draft Decision Document.[172]

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https://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus12/FUS_2012_factsheet.pdf.

[163] *Id.*

[164] Barbier et al., *supra* note 54.

[165] *Id.*

[166] Dugan et al., *supra* note 9.

[167] GA. DEP'T OF NAT. RESOURCES, *supra* note 54.

[168] Bhaskaran Subramanian et al., *Living Shorelines Projects in Maryland in the Past 20 Years*, PROC. OF THE LIVING SHORELINES SUMMIT, 35-40 (2006).

[169] Costanza et al., *supra* note 20.

[170] Peterson & Bruno, *supra* note 160.

[171] Draft Decision Document § 7.2.3(a) (Army Corps of Engineers 2016).

[172] *Id.* at § 7.2.3(a).

The combination of increased armoring and rising sea levels has led to the destructive coastal squeeze phenomenon mentioned above.[173] One scientist expressed his concerns on the matter, explaining, "Ever-increasing erosion, coastal development, armoring, storms, and rising sea level threaten to create the perfect storm capable of squeezing Florida's beaches until they disappear between armoring and the rising sea."[174] Beyond Florida, beaches and marshes are narrowing at an alarming rate due to coastal squeeze.[175] Additionally, beaches that are not "squeezed" by this process are still negatively impacted by bulkheads.

Shoreline armoring also degrades the aesthetic value of coastal areas. One individual described her feelings about a recent bulkhead project:

> NWP 13 structures impair my use and enjoyment of the Savannah River basin. Aesthetically, these structures are very obvious and do not blend in with the natural landscape. . . . Because of the unsightly appearance of NWP 13 structures, I tend to avoid kayaking, sailing, and swimming in areas where I know NWP 13 structures exist. When I do visit such areas, the bulkheads lessen my enjoyment of these activities.[176]

Diminishing beaches and coastal environments means declining opportunities and revenues from coastal tourism. Beaches are the leading tourist destination in the United States with 72 percent of Americans expressing a favorable opinion of going to the beach for summer vacation.[177] Coastal states receive about 85 percent of tourist-related revenues in the U.S., allowing beaches to contribute more than $225 billion annually to the national economy (over 7 times that of the national parks).[178] Beach tourism in Florida alone annually contributes an estimated $60 billion to the state's economy.[179] In 2012, there were 171,159 ocean-related tourism and recreation jobs in Virginia, North Carolina, South Carolina, and Georgia. As a whole, the region's ocean economy paid $7.5 billion in wages and contributed $14.5 billion to the economics of the South Atlantic Region.[180]

As American beaches degrade, however, the U.S. loses its competitive advantage as a coastal tourism destination. The U.S. share of the global travel market declined over six percent

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[173] O'Meara et al., *supra* note 18.
[174] Ruppert, *supra* note 9.
[175] Pontee, *supra* note 16.
[176] Brief for Plaintiffs at 3, *National Wildlife Federation v. U.S. Army Corps of Engineers et al.*, (D.C. Dist. Ct. 2016)(quoting various standing witnesses who state that they avoid boating on rivers that have bulkheads on them because seeing the bulkheads reduces their enjoyment of recreating on the rivers near their homes.)
[177] James R. Houston, *The economic value of beaches—a 2013 update*, 81 SHORE & BEACH, 3-10 (2013).
[178] *Id* at 5.
[179] *Id*.
[180] Colgan, *supra* note 47.

in the last decade, and evidence indicated tourists are choosing international destinations over declining American beaches.[181]

3. The Corps has not considered the secondary effects of bulkheads.

The 404(b)(1) Guidelines require that the Corps consider the secondary effects of any discharge of dredged or fill material that it authorizes.[182] "[S]econdary effects" are "effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material."[183] Two examples of the secondary effects that bulkheads and riprap revetments cause are the undercutting of marsh grasses[184] and the destruction of intertidal areas.[185] Both of these examples are driven by the scouring that occurs on the seaward side of bulkheads. [186]

The most adverse effect of a bulkhead is how it creates a solid barrier between the land and water. As described above, this barrier destroys the shoreline ecosystem. Bulkheads reduce the complexity of natural landforms, truncating important habitats and eliminating ecosystem diversity.[187] One study explained the domino effect, "Vertical artificial seawalls have smaller surface areas and few microhabitats, in turn supporting lower species diversity."[188] Numerous studies have found that this divide and loss of complexity causes significant changes and disruptions in species compositions, ultimately reducing ecosystem services.[189]

A study of coastal armoring structures in the Puget Sound explained, "Shoreline armoring imposes a barrier within the gradient of the intertidal zone and thus can significantly alter ecotone dynamics at the interface between land and sea."[190] These disruptions included lower

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[181] Houston, *supra* note 177.
[182] 40 C.F.R. § 230.11(h).
[183] *Id.* at § 230.11(h)(1).
[184] Currin et al., *supra* note 40.
[185] Dethier et al., *supra* note 10; Dugan et al., *supra* note 10.
[186] Currin et al., *supra* note 40.
[187] Nordstrom, *supra* note 11; Carolyn A. Currin et al., *Utilization of a citizen monitoring protocol to assess the structure and function of natural and stabilized fringing salt marshes in North Carolina*, WETLANDS ECOLOGICAL MGMT., 1-22 (2007).
[188] N. W. Y. Lam et al., *Variations in Intertidal Assemblages and Zonation Patterns Between Vertical Artificial Seawalls and Natural Rocky Shores: A Case Study From Victoria Harbour, Hong Kong*, 48 ZOOLOGICAL STUDIES, 184-95 (2009).
[189] Aguilera et al., *supra* note 24; Geraldi et al., *supra* note 26; Wong et al., *supra* note 25; Balouskus & Targett, *supra* note 24; M. C. Benfield & R. G. Downer, *Spatial and Temporal Variability in the Nearshore Distributions of Postlarval Farfantepenaeus aztecus along Galveston Island, Texas*, 52 ESTUARINE, COASTAL & SHELF SCI., 445-56 (2001); Maura G. Chapman, *Intertidal Seawalls as Habitats for Molluscs*, 72 J. OF MOLLUSCAN STUDIES, 247-57 (2006); Glasby et al., *supra* note 26; Lee & Li, *supra* note 25; Moreira et al., *supra* note 25.
[190] Heerhartz et al., *supra* note 7.

elevations of marine-terrestrial transition, reduced abundance and altered composition of beach wrack, reduced nutrient supply at the base of the food web, and overall habitat degradation.[191]

Such negative ecosystem impacts from bulkheads are not uncommon. For example, one analysis found that hardened shorelines supported substantially reduced egg densities of the Atlantic silverside. The solid divide between land and sea degraded the species' spawning habitat, setting off a chain reaction felt throughout the food web.[192] Another study along the Iberian Coast demonstrated that seawalls altered intertidal assemblages and led to a loss in biodiversity. Additionally, scientists found that the alterations in composition assemblages could facilitate the spread of invasive species and have a negative impact in survival of local species.[193]

A recent study that examined the quality of juvenile blue crab habitat also determined that seawalls destroy habitat and ecosystem function. The analysis explained, "Bulkheads substantially reduce the habitat value of shallow water areas through a reduction in prey density, with concurrent decrease in the habitat carrying capacity, and, in the case of bulkheads, the removal of refuge from predation. This adds to the growing evidence that anthropogenic shoreline hardening can substantially reduce the ecosystem services provided by the habitat."[194]

Two other studies reached a similar conclusion. The first, noted that bulkheads reduce nekton abundance along with size distributions of common taxa in salt marsh ecosystems. The scientists concluded that these "many small-scale alterations can have larger cumulative impacts reducing biodiversity and sustainability of vital intertidal habitat type."[195] The second study found that bulkheads cause localized losses in biodiversity but noted that these negative impacts "may become even more apparent if sampling is increased to include the full range of intertidal habitats."[196]

Additionally, in a 2015 report, the National Oceanic and Atmospheric Administration (NOAA) concluded that the damaging divides created by bulkheads are not necessary in the fight against erosion. The administration clearly states, "Shoreline stabilization does not need to create a barrier between land and water, as happens with hard shoreline stabilization structures like seawalls and bulkheads."[197] In short, the secondary effects caused by bulkheads are avoidable.

Yet despite the overwhelming evidence that bulkheads cause secondary impacts, in the entire Draft Decision Document, the Corps does not even mention the words "secondary effects" much less provide any analysis of how bulkheads cause such effects. As the 404(b)(1)

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[191] *Id.*
[192] Balouskus & Targett, *supra* note 24.
[193] Diaz-Agras et al., *supra* note 26.
[194] Long et al., *supra* note 25.
[195] Lisa A. Needles et al., *Managing Bay and Estuarine Ecosystems for Multiple Services*, 38 ESTUARIES & COASTS, 35-48 (2013); F. Bulleri et al., *Patterns of Movement of the Limpet Cellana Tramoserica on Rocky Shores and Retaining Seawalls*, 281 MARINE ECOLOGY PROGRESS SERIES, 121-29 (2004).
[196] Wen et al., *supra* note 25.
[197] NOAA, GUIDANCE FOR CONSIDERING THE USE OF LIVING SHORELINES 1-35 (2015).

Guidelines explain, secondary effects must be considered by the Corps "prior to the time final section 404 action is taken by permitting authorities."[198] Thus, Corps headquarters cannot simply leave it up to its field offices to conduct this analysis.

4. The Corps has not determined in writing the cumulative short- and long-term effects of NWP 13 on the hydrologic regime.

While the Corps does admit that shoreline stabilization structures can cause the narrowing of beaches, can reduce sediment transport,[199] and can cause scouring,[200] the Corps does not go far enough to examine the short- and long-term effects of these impacts on the hydrologic regime as required by the 404(b)(1) Guidelines. As discussed above, the deflected wave energy from bulkheads can cause scouring that can destroy the marsh or intertidal areas in front of them.[201] Similarly, coastal armoring can increase erosion on either side of the hardened area.[202] Yet the Corps has made no attempt to quantify the severity of these impacts. Until it does, the Corps has no means to assess the cumulative effects of these impacts. Similarly, the Corps has no means to determine the short- and long-term effects of bulkheads authorized under NWP 13.

[198] 40 C.F.R. § 230.11(h)(1).
[199] Draft Decision Document § 7.2.3(a) (Army Corps of Engineers 2016).
[200] *Id.* at § 7.2.3(a).
[201] C. A. Currin, *Developing Alternative Shoreline Armoring Strategies: The Living Shoreline Approach in North Carolina*, PUGET SOUND SHORELINES AND THE IMPACTS OF ARMORING -PROC. OF A ST. OF THE SCI. WORKSHOP, 91-102 (2010).
[202] Dethier et al., *supra* note 10; Mattheus et al., *supra* note 24; U.S. ARMY CORPS OF ENGINEERS & YELLOWSTONE RIVER CONSERVATION DISTRICT COUNCIL, *supra* note 9; Scott L. Douglass & Bradley H. Pickel, *Tide Doesn't Go Out Anymore- The Effect of Bulkheads on Urban Bay Shorelines*, 67 SHORE & BEACH, 19-25 (1999).

Such analysis is critical because the rate of shoreline armament continues to increase. As mentioned above, a recent study confirmed that 14 percent of the United States coastline has been armored with bulkheads and that if the current armament trend continues, 30 percent of our coastlines will be armored by 2100.[203] Unfortunately, many estuaries in this country surpassed the 30 percent threshold decades ago. For example, by 1997, a third of the Mobile Bay's shoreline in Alabama was armored.[204] Mobile Bay is not alone. Some parts of the Chesapeake Bay in Virginia and Maryland, as well as parts of Barnegat Bay in New Jersey, are now 50-percent armored.[205] In San Diego Bay, California, 74 percent of the total shoreline is now armored with artificial hard substrate. [206] Excessive bank armoring occurs on rivers as well. For example, the banks of the Yellowstone River below Gardiner, Montana, are armored for over 136 miles.[207]

Other studies have demonstrated that bulkheads have cumulative impacts that are more than minimal. As one scientific study concluded, "Although the effect of a single bulkhead on the adjacent habitat complex may be comparatively small, the cumulative impact of multiple bulkheads can result in significant habitat degradation with associated ecosystem effects."[208] Another recent study found that "armoring was consistently associated with reductions in beach width, riparian vegetation, numbers of accumulated logs, and amounts and types of beach wrack and associated invertebrates."[209] This study showed that local adverse impacts of shoreline armoring scale-up to have cumulative, negative effects on coastal ecosystems.[210]

Coastal researcher James G. Titus specifically critiqued the Corps' lack of cumulative impact recognition, noting, "Environmental regulators routinely grant permits for shore protection structures (which block wetland migration) on the basis of a federal finding that these structures have no cumulative environmental impact. Our results suggest that shore protection does have a cumulative impact."[211]

Again, the Corps shirks its duty under the 404(b)(1) Guidelines and ignores science and the wide and growing array of studies showing the short- and long-term adverse cumulative effects of bulkheads.

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[203] *Id.*
[204] Douglass et al., *supra* note 39.
[205] Dugan et al., *supra* note 9; *see also* Fabio Bulleri & Maura G. Chapman, *The Introduction of Coastal Infrastructure as a Driver of Change in Marine Environments*, 47 J. OF APPLIED ECOLOGY, 26-35 (2010) (50 percent of some developed coastlines in California, Virginia, and Maryland have been armored).
[206] Davis et al., *supra* note 18.
[207] U.S ARMY CORPS OF ENGINEERS & YELLOWSTONE RIVER CONSERVATION DISTRICT COUNCIL, *supra* note 9.
[208] Currin, *supra* note 40.
[209] Dethier et al., *supra* note 10.
[210] *Id.*
[211] James G. Titus et. al., *State and Local Governments Plan for Development of Most Land Vulnerable to Rising Sea Level Along the US Atlantic Coast*, 4 ENVIRON. RES. LETT., 1-7 (2009).

5. Government agencies, including Corps Districts, have highlighted the cumulative impacts of bulkheads.

During the comment period for the current NWP 13, several federal and state agencies voiced their discontent with this general permit. The Corps' Buffalo District stated that the:

> Hardening of stream and river banks and lake shorelines with concrete and/or rip rap has many detrimental impacts to the aquatic environment and the system as a whole. Although it may be true that bank stabilization may decrease erosion in the immediate project area, it often serves to exacerbate erosion upstream and or downstream, thereby transferring the problem to other properties.[212]

The District went on to explain that bank stabilization structures increase erosion, and therefore, "*[c]umulatively,* this has the potential to create adverse impact to these systems and increasing the need for more bank stabilization."[213]

Because of the secondary erosion that bulkheads cause, the Corps' Los Angeles District recommended that the Corps "eliminate the use of [NWP 13] for seawalls due to neighboring impacts and other issues associated with littoral transport."[214] The United States Environmental Protection Agency also expressed "strong concerns" with NWP 13 stating "it is well-documented [that] the use of hard structures can affect wave energy and direction, affect sediment and other material transport, and cause accelerated erosion and/or scouring."[215] In its comments, the U.S. Department of Interior, citing to three studies, informed the Corps that "[b]ank stabilization stops natural processes that form and maintain functioning riverine habitat" and "precludes the establishment of natural streamside vegetation that is important to streambank integrity and healthy fish habitat."[216]

State wildlife agencies echoed these concerns on NWP 13 projects. The Texas Parks and Wildlife Department expressed concerns that NWP 13's vague restriction on the amount of fill "needed for erosion protection . . . potentially allows this nationwide permit to have cumulative impacts on important fish and wildlife habitat."[217] Thus, it recommended that the Corps require an individual permit for bank stabilization projects within special aquatic sites—including wetlands, marsh, and mudflats.[218] Montana Fish, Wildlife & Parks urged more restrictive permit

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[212] Letter from the Buffalo District, U.S. Army Corps of Engineers, to the U.S. Army Corps of Engineers 1 (Apr. 1, 2010) (Comments on Proposal to Reissue and Modify Nationwide Permits).
[213] *Id.*
[214] Letter from Los Angeles District, U.S. Army Corps of Engineers, to U.S. Army Corps of Engineers 2 (Apr. 9, 2010) (Comments on Proposal to Reissue and Modify Nationwide Permits).
[215] Letter from U.S. Environmental Protection Agency to U.S. Army Corps of Engineers 14 (Nov. 29, 2010) (Comments on Proposal to Reissue and Modify Nationwide Permits).
[216] Letter from U.S. Dept. of the Interior to U.S. Army Corps of Engineers 7 (May 11, 2011) (Comments on Proposal to Reissue and Modify Nationwide Permits).
[217] Letter from Texas Parks & Wildlife to the U.S. Army Corps of Engineers 5 (Apr. 15, 2011) (Comments on Proposal to Reissue and Modify Nationwide Permits).
[218] *Id.*

conditions and requested that any "hard armor" project over 100 feet be required to submit a PCN to the Corps.[219]

The Washington State Department of Natural Resources also expressed pointed concerns with NWP 13, stating that "500 feet of stabilization is not a small project but rather very large especially for shoreline's (sic) which are already incredibly impacted."[220] Citing to four studies, WDNR states that the current information "suggests that the cumulative impacts of multiple hardened shorelines further impacts the biological and ecological functions of the freshwater systems and Puget Sound."[221] The New York Department of Environmental Conservation warned that NWP 13 projects have the "potential to negatively affect high quality riparian habitat."[222] And the Michigan Department of Environmental Quality went so far as to say that "new vertical bulkheads or seawalls" should not be authorized under NWP 13 at all.[223]

Commenting on the current NWP 13, the National Wildlife Federation (NWF) highlighted the negative impact of bank stabilization activities on endangered species. NWF raised concerns over the well-documented impact of NWP 13 on ESA-listed species—namely the harm of coastal armoring on endangered sea turtles and their nesting habitat and on shorebirds.[224] Accelerated erosion resulting from shoreline armoring decreases the extent and suitability of endangered sea turtle nesting sites.[225] In examining loggerhead sea turtle habitat in Georgia, the Fish and Wildlife Service found that sea walls and other structures "cause[] changes in, and additional loss of, or impact to the remaining sea turtle habitat."[226] As the NWF informed the Corps, FWS has found that "[v]irtually all shoreline engineering is carried out to save structures, not dry sandy beaches, and ultimately results in environmental damage."[227] FWS and the NMFS have also determined that "'beachfront armoring . . . greatly impacts nesting opportunities and hatching success.'"[228]

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[219] Letter from Montana Fish, Wildlife & Parks to U.S. Army Corps of Engineers 1 (Apr. 15, 2011) (Comments on Proposal to Reissue and Modify Nationwide Permits).
[220] Letter from the Washington State Dept. of Natural Resources to U.S. Army Corps of Engineers 5, (Apr. 10, 2011) (Comments on Proposal to Reissue and Modify Nationwide Permits).
[221] *Id*.
[222] Letter from New York State Dept. of Environ. Conservation to U.S. Army Corps of Engineers 2 (Apr. 18, 2011) (Comments on Proposal to Reissue and Modify Nationwide Permits).
[223] Letter from Michigan Dept. of Environ. Quality to U.S. Army Corps of Engineers 2 (Apr. 18, 2011) (Comments on Proposal to Reissue and Modify Nationwide Permits).
[224] Letter from National Wildlife Federation to U.S. Army Corps of Engineers 75 (Apr. 18, 2011) (Comments on Proposal to Reissue and Modify Nationwide Permits).
[225] *Id.* at 79-80.
[226] *Id.* at 80.
[227] *Id.* at 79; (NMFS & FWS, LOGGERHEAD SEA TURTLE *(CARRETA CARETTA)* 5-YEAR REVIEW: SUMMARY AND EVALUATION, 1-65 (2007).
[228] National Wildlife Federation, *supra* note 224.

6. The Corps improperly defers critical decisions on cumulative impacts to its field offices.

The Corps only conducts cumulative impacts analysis at the headquarters level that it considers "reasonable and practicable." [229] It defers all other decisions regarding cumulative impacts to the field offices. As described below, this approach violates the 404(b)(1) Guidelines. In the Proposed Rule, the Corps describes the approach it uses to determine whether an activity can be permitted under a general permit such as NWP 13:

> In their supplemental decision documents, division engineers will evaluate cumulative effects of each NWP at the scale of a Corps district, state, or other geographic area, such as a watershed or ecoregion. If the division engineer is not suspending or revoking an NWP in a particular region, a supplemental decision document for an NWP includes a statement finding that the use of that NWP in the region will cause only minimal individual and cumulative adverse environmental effects.[230]

In short, under this approach, Corps headquarters is making an improper delegation of responsibility concerning final determinations about cumulative impacts to the division and districts. This approach violates the 404(b)(1) Guidelines for the following reasons:

First, deferring the cumulative impact analysis to the divisions does not comport with the 404(b)(1) Guidelines. The 404(b)(1) Guidelines are clear on this point—the Corps must "set forth in writing an evaluation of the potential . . . cumulative impacts of the category of activities to be regulated under the General permit" and "*the evaluation must be completed before any General permit is issued*, and the results must be published with the final permit." [231] In other words, before reauthorizing NWP 13, the Corps has to demonstrate, based on information before it, that the projects to be authorized would have only minimal cumulative impacts. The 404(b)(1) Guidelines do not allow the Corps to finish its cumulative impact analysis at the project level after NWP 13 is issued. The Corps must adapt to the structure of the 404(b)(1) Guidelines, not the other way around.

Second, although the 404(b)(1) Guidelines require the Corps to do what is "reasonable and practicable"[232] in performing its cumulative impact analysis, the Corps interprets this provision too liberally. And the Corps fails to conduct this "reasonable and practicable" analysis at the headquarters level. For instance, aside from the Corps' estimate of the number of activities that would be authorized by NWP 13 over the next five years if NWP 13 were reauthorized, the record is devoid of any analysis of past NWP 13 authorizations and their cumulative impacts. Such a retrospective examination is precisely the type of "reasonable and practicable" analysis that could be performed at the headquarters level, and it could be very informative on the types of cumulative impacts NWP 13 projects might have.

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[229] 40 C.F.R. § 230.11(g)(2).
[230] 81 Fed. Reg. at 35,187.
[231] *Id.* at 35,187 (emphasis added).
[232] 40 C.F.R. § 230.11(g)(2).

And third, Corps headquarters must be able to make a decision about cumulative impacts whether the field offices weigh in or not. If it cannot, then the NWP threshold the Corps set is too high, especially considering that the field offices receive notice of a fraction of the bulkheads authorized under NWP 13. The Corps delegation approach does not pass muster and must be tossed out along with NWP 13.

C. The 404(b)(1) Guidelines provide that the Corps cannot authorize any discharge unless it is the least environmentally damaging practicable alternative.

Under the 404(b)(1) Guidelines, the Corps cannot permit any discharge of dredged or fill material if there is a "practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences."[233] "[P]racticable alternatives include, but are not limited to: (i) [a]ctivities which do not involve a discharge of dredged or fill material into the waters of the United States or ocean waters [and] (ii) [d]ischarges of dredged or fill material at other locations in waters of the United States or ocean waters[.]"[234] An alternative is "practicable" under the 404(b)(1) Guidelines if it is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."[235] And if a discharge is proposed for a special aquatic site, it is presumed, under the 404(b)(1) Guidelines that any practicable alternative that does not involve a discharge into a special aquatic site is "presumed to have [a] less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise."[236] As shown below the Corps cannot comply with this legal standard.

D. If the Corps were to reauthorize NWP 13, it would violate the 404(b)(1) Guidelines because bulkheads are not the least environmentally damaging practical alternative.

In violation of the 404(b)(1) Guidelines, the Corps does not take practicable alternatives into account during the reauthorization process. If it were to do so, it could not reauthorize NWP 13 because bulkheads, except in limited instances, are not the least environmentally damaging practicable alternative for addressing shoreline retreat. In most cases, living shorelines are.

As scientific studies reveal, the ecological benefits of living shorelines over bulkheads are considerable. As one study explained, living shorelines, with or without a hardened element such as a sill, "provide clear ecological advantages over traditional armouring [sic] of the shore, such as increased primary productivity, improved water quality or enhancement of habitats for

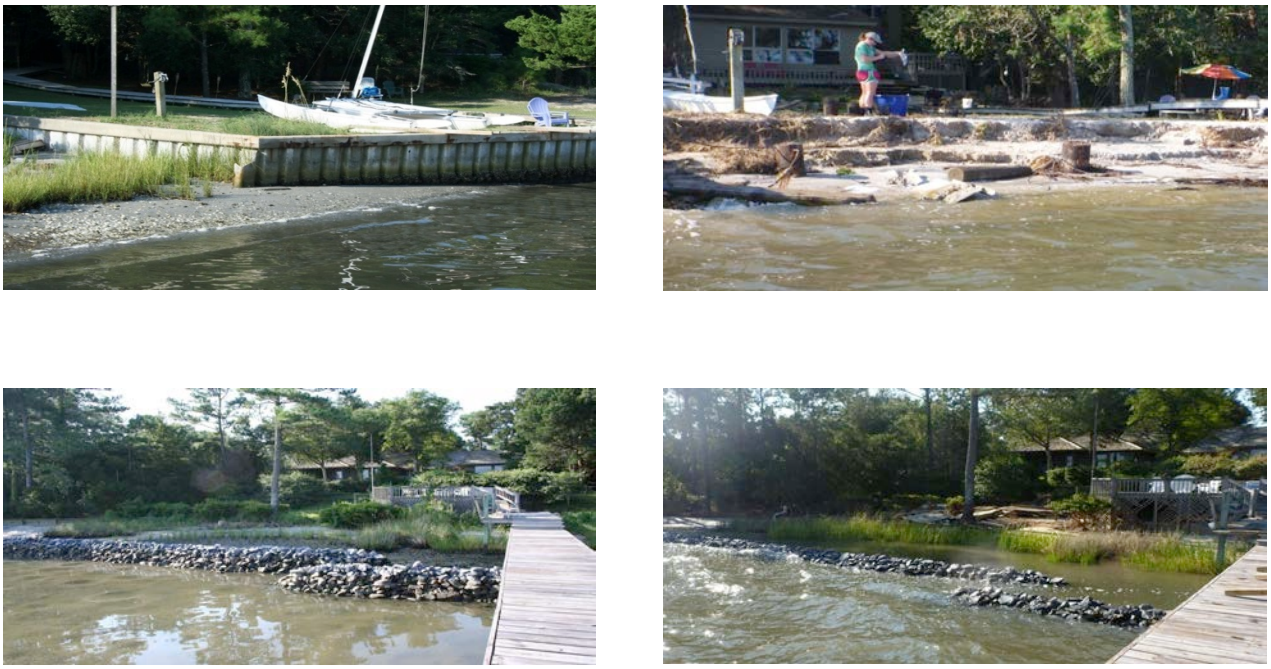
[233] 40 C.F.R. § 230.11(a).
[234] *Id.*
[235] *Id*.
[236] *Id*.

birds, amphibians and crabs."[237] As the study concluded, "In general, there was a demonstrative benefit in constructing a marsh-sill . . . instead of a riprap revetment in terms of the presence of intertidal infauna with a diversity of ecological roles."[238] The same is true of breakwaters.[239] Another benefit of living shorelines is that they can be designed to incorporate fringe marshes along the shoreline. These fringe marshes can "provide a tremendous return in ecosystem services." [240]

Based on such studies, the authors of a recent report on the regulation of shoreline stabilization projects concluded that "[s]ince it is now clear that living shorelines are generally the least damaging management alternative, hard stabilization should not be used if living shoreline methods are practical; that is, they provide equal or better erosion control and are cost-effective, considering the real total cost over time."[241]

Living shorelines also tend to fare better than bulkheads during storms. On study found that 75 percent of the bulkheads surveyed both before and after Hurricane Irene suffered damage, while the living shorelines surveyed suffered little if any damage. Bulkheads were the only type of shoreline protection structure that exhibited any damage from the hurricane. The authors of the study surmised that some of this damage occurred when the storm surge retreated to sea.[242] The photographs below were part of the study. They depict a bulkhead that was located approximately 100 yards from a living shoreline. The photographs were taken both before and after Hurricane Irene made landfall on the North Carolina coast. The results are telling. The top two photographs are before and after shots of the bulkhead, whereas the bottom two shots are before and after shots of the living shoreline.

[237] Bulleri & Chapman, *supra* note 205; *see also*, D. M. Bilkovic & M. M. Mitchell, *Ecological Tradeoffs of Stabilized Salt Marshes as a Shoreline Protection Strategy: Effects of Artificial Structures on Macrobenthic Assemblages*, 61 ECOLOGICAL ENGINEERING, 469-81 (2013).
[238] Bilkovic & Mitchell, *supra* note 237.
[239] Steven B. Scyphers et al., *Ecological Value of Submerged Breakwaters for Habitat Enhancement on a Residential Scale*, ENV. MGMT.,1-9 (Nov. 4, 2014).
[240] Currin et al., *supra* note 40.
[241] RESTORE AMERICAS ESTUARIES, LIVING SHORELINES: FROM BARRIERS TO OPPORTUNITIES, 1-54 (2015).
[242] Gittman et al., *supra* note 20.



The two sites are located on Bogue Sound in Pine Knoll Shores, North Carolina. The photographs on the left were taken in May 2011. The photographs on the right were taken in September 2011 three days after Hurricane Irene struck the coast.

The storm surge that accompanied the hurricane destroyed the bulkhead, while it left the living shoreline unscathed. These photographs tell a powerful story and provide an example of why living shorelines are a practicable alternative to bulkheads in many situations.

A review of living shorelines approaches in the Chesapeake Bay yielded similar positive results. The project-implemented marsh sills and nonstructural erosion prevention measures, finding that 83 percent of banks inspected were stable and 74 percent of the marshes exhibited minimal or no erosion. Overall, 32 out of 35 of the living shoreline projects analyzed were ranked "good" or "improved" from initial conditions.[243]

Several other studies within recent years also concluded that such living shoreline approaches are an effective mechanism for deterring shoreline erosion.[244] Furthermore, the National Oceanic and Atmospheric Administration (NOAA) recently endorsed living shorelines, stating, "Living shorelines provide an innovative approach to reducing damage and erosion while simultaneously enhancing coastal community resilience by providing additional social, economic, and ecological benefits."[245] And living shorelines are comparably priced to

[243] Bhaskaran Subramanian et al., *Current Understanding of the Effectiveness of Nonstructural and Marsh Sill Approaches*, PROC. OF THE LIVING SHORELINES SUMMIT, 35-40 (2006).
[244] Manis et al., *supra* note 48; *Wave Attenuation Experiments Over Living Shorelines Over Time: A Wave Tank Study to Assess Recreational Boating Pressures,* 19 J. OF COASTAL CONSERVATION, 1-11 (2015); Marcia Berman et al., *The Stability of Living Shorelines- An Evaluation, Report to National Oceanic and Atmospheric Administration,* CENTER FOR COASTAL RESOURCES MGMT., VA. INST. OF MARINE SCI., 1-37 (2007); Gittman, *supra* note 7.
[245] NOAA, *supra* note 197.

bulkheads.[246] Considering that in a substantial number of cases, bulkheads will not be the least environmentally damaging practical alternative, the Corps cannot reauthorize NWP 13. As the 404(b)(1) Guidelines provide, if there is a practicable alternative to a proposed project, the Corps *must* deny the permit.[247] In the event that the Corps were to violate the 404(b)(1) Guidelines and reauthorize NWP 13, its field offices would not be able to perform any practical alternatives analysis on any bulkheads below the PCN threshold. They would have no notice that they are even being constructed. For this reason too, the Corps must retire NWP 13.

IV. If NWP 13 is not retired altogether, as it should be, then it must be modified to include a requirement that any applicant for a bulkhead must demonstrate that the bulkhead, rather than a living shoreline, is the least environmentally damaging practicable alternative.

In light of the benefits of living shorelines and the detriments of armored shorelines, the Mobile District has embraced living shorelines. Before a permit applicant in coastal Alabama or coastal Mississippi can obtain a bulkhead permit, the applicant must demonstrate that a living shoreline is not feasible.[248] Stated another way, and using language from the 404(b)(1) Guidelines, before building a bulkhead, an applicant must demonstrate that the bulkhead is a less damaging practicable alternative than a living shoreline. If the Corps feels compelled to reauthorize NWP 13 in violation of the 404(b)(1) Guidelines, then it could potentially come into compliance with the Guidelines if it were to adopt approach similar that the one adopted by the Mobile District.

Below is language that would accomplish what we propose. It is modeled after the Mobile District language. It would be inserted at the beginning of the NWP 13 requirements;

NATIONWIDE PERMIT 13

Bank and Shoreline Stabilization. This permit covers bank and shoreline stabilization activities necessary for erosion prevention, provided the activity meets all of the following criteria:

1) The proposed bank stabilization project, rather than a living shoreline, is the least environmentally damaging practicable alternative. A living shoreline may not be practicable if the site exhibits excessive erosion, high energy conditions, excessive water depths, or navigational problems.

If the applicant could not make this showing, the applicant would either have to install a living shoreline or decide not to address the erosion problem at all. Of course, this approach would only work if the Corps were to require PCNs for all bulkhead projects regardless of their size. The

[246] Ed Hoffman, The Real Costs of Shoreline Stabilization (July 22, 2016)(unpublished report, on file with the comment author).
[247] 40 C.F.R. § 230.10(a).
[248] *See* Army Corps of Engineers, Mobile District, ALG10-2011 and ALG11-2011 (2011); *see* Army Corps of Engineers, Mobile District, MSGP-01 and MSGP-03 (2013).

Corps would also have to monitor any bulkheads that are constructed over the life of the reauthorized NWP 13. This approach would only comply with the 404(b)(1) Guidelines if at the end of the monitoring period the bulkheads that were authorized under the reauthorized NWP 13, had no more than minimal cumulative effects on the aquatic environment.

V. The Draft Decision Document fails to take a "hard look" at the environmental impacts of proposed NWP 13 and does not support a finding of no significant impact under NEPA.

Congress enacted the National Environmental Policy Act (NEPA) to "promote efforts which will prevent or eliminate damage to the environment . . . ."[249] To achieve this goal, NEPA requires federal agencies to consider fully and to disclose the environmental consequences of an agency action before proceeding with that action.[250] If the proposed agency action has a significant effect on the quality of the human environment, the agency must prepare an Environmental Impact Statement (EIS).[251] Where agencies cannot readily discern how significant the environment effects of a proposed action may be, they may prepare an Environmental Assessment (EA) to establish the project's level of impact.[252]

An EA must provide "sufficient evidence and analysis for determining whether to prepare an environmental impact statement or finding of no significant impact."[253] Accordingly, an EA must take a "hard look" at the environmental impacts of the proposed action, including the direct, indirect, and cumulative impacts of the proposed action.[254] As used in NEPA, the terms "impacts" and "effects" are synonymous and include ecological, aesthetic, historic, cultural, economic, social, and health effects.[255] "The hallmarks of a 'hard look' are thorough investigation into environmental impacts and forthright acknowledgement of potential environmental harms."[256]

A. The Draft Decision Document fails to take a "hard look" at the direct and indirect effects of proposed NWP 13.

The Draft Decision Document does not adequately identify and analyze the specific direct and indirect environmental effects caused by the types of bank stabilization projects authorized by proposed NWP 13.[257] In fact, the Impact Analysis section (Section 4.2) of the

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[249] 42 U.S.C. § 4321.
[250] 42 U.S.C. § 4332(2)(C); 40 C.F.R. §§ 1501.2, 1502.5.
[251] 42 U.S.C. § 4332(2)(C).
[252] 40 C.F.R. §§ 1501.4(b), 1508.9(a)(1).
[253] 40 C.F.R. § 1508.9(a)(1).
[254] 40 C.F.R. § 1508.9(b); *see also TOMAC, Taxpayers of Mich. Against Casinos v. Norton*, 433 F.3d 852, 861 (D.C. Cir. 2006).
[255] 40 C.F.R. § 1508.8
[256] *Nat'l Audubon Soc'y v. Dep't of Navy*, 422 F.3d 174, 187 (4th Cir. 2005).
[257] 40 C.F.R. § 1508.8 ("Direct effects" are those effects that "are caused by the action and occur at the same time and place." "Indirect effects" are effects that "are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects

Draft Decision Document fails to identify any impacts of proposed NWP 13 activities and contains absolutely no analysis.[258] Rather, the Impact Analysis section simply acknowledges that preconstruction notices are required under certain circumstances and that division and district engineers are authorized to further condition or prohibit the use of NWP 13 to minimize impacts.[259] Relying on PCNs and division and district engineers to ensure minimal impacts is not a permissible substitute for a true NEPA impact analysis.

Although the sections of the Draft Decision Document concerning the Clean Water Act Public Interest Factors and 404(b)(1) Guidelines (Sections 5.1, 7.2.3) describe some of the direct and indirect impacts of bank stabilization projects, the discussion therein falls far short of the requirements of NEPA. These sections acknowledge that bank stabilization projects may impact certain factors, such as economics, aesthetics, wetlands, water circulation, and aquatic organisms. And for each individual factor, the Draft Decision Document concludes that the proposed permit's General Conditions and/or compensatory mitigation will minimize impacts.[260] But the document fails to identify particularly important impacts and ignores recent scientific research demonstrating the significant adverse direct and indirect impacts of bank stabilization projects.[261]

The bulk of scientific research cited in the Draft Decision Document concerns the affected environment or ecosystem restoration; only a small handful of articles actually discuss the impacts of bank stabilization projects.[262] And an even smaller subset of that scientific literature was published in the last five years. NEPA requires the Corps to rely on "high quality" environmental information and "[a]ccurate scientific analysis" to justify its conclusions.[263] As previously discussed in this comment letter, recent scientific research demonstrates that bank stabilization projects have significant adverse direct and indirect impacts on the environment. For example, hard structures like bulkheads prevent upslope migration of tidal wetlands as sea levels rise, leading to the ultimate loss of those important ecosystems.[264] Examples of other notable impacts include the following:

- Bulkheads reduce abundance and diversity of intertidal organisms (e.g. nekton, wrack) in coastal ecosystems.[265]

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may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.")

[258] Draft Decision Document § 4.2 (p. 22–23).

[259] Draft Decision Document § 4.2 (p. 22–23).

[260] Draft Decision Document §§ 5.1, 7.2.3 (p. 32–40, 52–58).

[261] *See* discussion *supra* Background section, Section I (discussing recent scientific research).

[262] Draft Decision Document § 9.0 (p. 59–65).

[263] 40 C.F.R. § 1500.1(b).

[264] Pontee, *supra* note 16; Bozek & Burdick, *supra* note 16; Titus, *supra* note 16.

[265] Dethier et al., *supra* note 10; Heerhartz et al., *supra* note 7; Needles et al., *supra* note 195; Lee & Li, *supra* note 25; Heerhartz et al., *supra* note 7; Aguilera et al., *supra* note 24; Harris et al., *supra* note 25; Patrick et al., *supra* note 17.

- Seawalls reduce the complexity of natural habits, negatively effecting nearshore ecosystem biodiversity.[266]
- Bulkheads eliminate intertidal habitats through a process called coastal squeeze. During the process, the high water mark becomes fixed by the hardened structure (e.g., bulkhead) and the low water mark begins to migrate landward, reducing intertidal habitat.[267]
- Shoreline armoring creates a problematic barrier between land and sea, creating a loss of connectivity between habitats landward and seaward of the structure.[268]
- Bulkheads cause erosion downstream, ultimately leading to the need for additional bank stabilization structures at downstream sites.[269]
- Shoreline hardening can facilitate spread of non-native and invasive species.[270]
- Bulkheads have been shown to reduce marsh width, significantly reducing the resilience of coastal systems to nutrient loading.[271]

Also missing from the Draft Decision Document is a true analysis of whether all of the direct and indirect impacts of bank stabilization projects combined result in a significant impact on the quality of the human environment. What the Draft Decision Document does instead is assert, with very little analysis, that each individual impact is minimal. The lack of a comprehensive direct and indirect impacts analysis is insufficient to support a finding of no significant impact under NEPA. Furthermore, if one considers all of the direct and indirect impacts that a single, 500-foot bulkhead may have on the environment, the only possible conclusion is that these projects have a significant effect, which requires the preparation of an EIS (discussed in more detail below).

B. The Draft Decision Document fails to take a "hard look" at the cumulative environmental impacts of proposed NWP 13.

Cumulative impact is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."[272] The Draft Decision Document's cumulative impact analysis under NEPA is flawed in two critical ways. First, the cumulative impact analysis does not include the type of expansive review that is contemplated by NEPA. Second, much of the cumulative impact analysis has been improperly delegated to division and district engineers.

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[266] Nordstrom, *supra* note 11.
[267] Needles et al., *supra* note 195; Jorgensen et al., *supra* note 7; Heerhartz et al., *supra* note 7; Pontee, *supra* note 16; O'Meara et al., *supra* note 18; Gittman et al., *supra* note 46.
[268] Heerhartz et al., *supra* note 7; NOAA, *supra* note 245.
[269] U.S ARMY CORPS OF ENGINEERS & YELLOWSTONE RIVER CONSERVATION DISTRICT COUNCIL, *supra* note 10; EPA, COASTAL WETLANDS INITIATIVE: GULF OF MEXICO REVIEW, 1-73(2013), https://www.epa.gov/sites/production/files/2015-04/documents/gulf-of-mexico-review.pdf.
[270] Geraldi et al., *supra* note 26; Patrick et al., *supra* note 17.
[271] O'Meara et al., *supra* note 18.
[272] 40 C.F.R. § 1508.7.

1. The Corps conducted an inadequate cumulative impact analysis.

As an initial matter, the Draft Decision Document impermissibly narrows the scope of the cumulative impacts review to activities having impacts on "the Nation's wetlands, streams, and other aquatic resources,"[273] rather than the "environment,"[274] as required by NEPA. The Draft Decision Document attempts to justify this narrower scope of review by asserting it relied on guidance issued by the Council on Environmental Quality in 1997. However, that CEQ guidance actually directs federal agencies to focus on *each* affected resource (e.g., fisheries), ecosystem (e.g., wetlands), and human community in the cumulative impacts analysis.[275] The CEQ guidance also notes that EAs "tend to underestimate the cumulative effects of their projects" and that "adequate consideration of cumulative effects requires that EAs address them fully."[276] In spite of this direction, the Cumulative Effects section (Section 4.3) ignores important affected resources, such as fisheries, and includes absolutely no discussion of impacts on human communities.[277] To comply with NEPA, the scope of review should include those resources, ecosystems, and human communities directly and indirectly affected by bank stabilization activities, and the cumulative impacts analysis should then discuss past, present, and reasonably foreseeable future activities that affect those same resources, ecosystems, and human communities.

Even assuming for the sake of argument that the Cumulative Effects section identifies all relevant past, present, and reasonably foreseeable future activities having impacts on the affected environment, the document never analyzes the incremental impact of bank stabilization activities *when added to* the impacts of those other activities. This is readily apparent, for example, when reviewing the cumulative effects discussion on threats to species. According to the Draft Decision Document, numerous studies have concluded that the most significant threats to species are habitat loss, habitat degradation, and habitat fragmentation.[278] Notably, bank stabilization projects directly and indirectly cause habitat loss, habitat degradation, and habitat fragmentation.[279] Given that bank stabilization projects cause the type of impacts that pose the most significant threats to species, an adequate cumulative impact analysis should discuss how bank stabilization projects under proposed NWP 13 would impact species' habitat when

[273] Draft Decision Document § 4.3 at 24.
[274] 40 C.F.R. § 1508.7.
[275] COUNCIL ON ENVIRONMENTAL QUALITY, CONSIDERING CUMULATIVE EFFECTS UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT vii, 2 (Jan. 1997).
[276] COUNCIL ON ENVIRONMENTAL QUALITY, CONSIDERING CUMULATIVE EFFECTS UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT, 4 (Jan. 1997).
[277] Although fisheries and other resources are discussed in the CWA Public Interest Factors and 404(b)(1) Guidelines sections of the Draft Decision Document, the document fails to discuss how other past, present, and reasonably foreseeable future activities impact those resources. Accordingly, those sections of the Draft Decision Document may not be used to satisfy NEPA's cumulative-impact-analysis requirement.
[278] Draft Decision Document § 4.3 at 28–29.
[279] Dethier, *supra* note 11; Dugan, *supra* note 11; Hecht & Melvin, *supra* note 30; Cameron, *supra* note 30.

combined with other past, present, and reasonably foreseeable future activities that also impact habitat. Instead, the Draft Decision Document merely concludes that bank stabilization activities authorized under this NWP will contribute minimally to the cumulative effects to wetlands, streams, and other aquatic resources because they are just one of many activities that affect those resources.[280] This is insufficient under NEPA.

Also missing from the cumulative impacts analysis is a discussion of the present impacts of past activities. The U.S. Court of Appeals for the Sixth Circuit recently held that an "environmental assessment that omits consideration of past impacts, followed by a conclusory suggestion that past impacts did not matter, cannot be in conformance. *This is especially true where the reviewing agency reauthorizes a nationwide permit involving the same type of [] activities that cause the same type of environmental impacts*."[281] The Draft Decision Document never discusses the present impacts of past bank stabilization projects. Although it purports to have done so in the Affected Environment section (Section 3.0), a review of that section reveals no explanation of how bulkheads, sea walls, revetments, and other bank stabilization projects have impacted and continue to impact the environment.[282] The only way the Draft Decision Document uses past NWP 13 projects is to forecast the number of anticipated future activities.[283] But a "reviewing agency [must] 'distinguish' the use of past impacts to forecast future impacts *from* the use of past impacts to assess cumulative impacts."[284] A proper NEPA analysis must "combine the two to gauge the *cumulative* impact of reauthorizing" NWP 13.[285]

Because the Draft Decision Document does not include a complete and adequate cumulative impacts analysis under NEPA, it cannot justify a finding of no significant impact.

2. The Corps improperly delegated cumulative impact analysis to its field offices.

As discussed above in the context of the 404(b)(1) Guidelines, the Corps improperly delegates key cumulative impact analysis to its fields offices. Although the problem is the same, the analysis under NEPA is different. The Draft Decision Document asserts that the cumulative impacts of bank stabilization activities are difficult to assess, national-level information is scarce, it is not practical or feasible to provide quantitative data on the cumulative impacts to the environment, and it is not possible to quantify the relative contributions of all the various

[280] Draft Decision Document § 4.3 at 31.
[281] *Kentucky Riverkeeper, Inc. v. Rowlette*, 714 F.3d 402, 410 (6th Cir. 2013) (emphasis added).
[282] Draft Decision Document §§ 3.0 (discussing the affected environment), 4.3 at p. 24 (asserting that present effects of past NWP 13 activities are discussed in section 3.0).
[283] Draft Decision Document § 7.2.2 (p. 48). And as discussed previously in this letter, the Draft Decision Document does not explain how it actually estimated the number of anticipated projects. This is particularly troubling, because the vast majority of projects authorized under the permit do not require preconstruction notification. How can the Corps estimate how many projects will be completed when it has no idea how many projects have already been authorized and completed under the prior version of the permit?
[284] *Rowlette*, 714 F.3d at 410.
[285] *Id.*

activities that affect wetlands, streams, and other aquatic resources and the services they provide.[286] It comes as no surprise, then, that the document delegates the cumulative impact analysis to division and district engineers. The document recognizes that the cumulative adverse environmental effects of activities authorized by proposed NWP 13 will be more than minimal in certain watersheds and geographic areas, and it directs division and district engineers to conduct more detailed cumulative effects assessments for those watersheds or geographic areas.[287] This approach is contrary to NEPA.

NEPA requires the Corps to conduct a cumulative impact analysis at the national level. Although NEPA contemplates tiered environmental review in certain situations, those situations do not apply here, where division and district engineers are *not required* to conduct separate NEPA analyses.[288] A complete NEPA cumulative impact analysis is a prerequisite of reauthorizing NWP 13.[289] Any consideration of cumulative impacts at the division or district level is too late, because "these additional assessments occur *after* the reauthorization of the nationwide permit."[290]

Although division engineers may conduct the regional conditioning process concurrently with the nationwide permitting process, in practice, division and district engineers do not finalize regional conditions and supplement nationwide permits' decision documents until *after* the nationwide permit has been finalized. During the last nationwide permitting process, numerous Corps field offices conducted their cumulative impact analyses and finalized their supplemental decision documents after the final decision document for NWP 13 was signed, contrary to NEPA.[291] Moreover, division engineers' review involves the more limited Clean Water Act requirement to ensure that, pursuant to the Section 404(b)(1) Guidelines, cumulative adverse impacts on water quality and the aquatic environment are minimal.[292] Division and district engineers do not have to consider whether the nationwide permit will have a significant effect on the quality of the human environment, the requirement under NEPA.

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[286] *E.g.*, Draft Decision Document § 4.3 at 25, 29, 31.
[287] Draft Decision Document § 4.3 at 32.
[288] *See* 40 C.F.R. §§ 1502.21, 1508.28 (explaining when tiered NEPA review is appropriate).
[289] *Rowlette*, 714 F.3d at 409.
[290] *Id.*
[291] *E.g.*, Los Angeles District, U.S. Army Corps of Engineers, Supplement to the Decision Document for Nationwide Permit 13, at 2 (2012) (stating "After the publication of the final NWPs, the Los Angeles District considered the need for regional conditions for this NWP" (emphasis added)), **http://www.spl.usace.army.mil/Portals/17/docs/regulatory/Permit_Process/Sup%20Doc/NWP%2013%20TS.pdf** (last visited July 11, 2016); Todd Semonite, Major General, Wilmington District, Memorandum for Commander, Wilmington District (Mar. 29, 2012) (determining, after review of final NWPs and supplemental decision documents, that NWPs will result in minimal cumulative adverse effects on the aquatic environment), **http://www.saw.usace.army.mil/Portals/59/docs/regulatory/regdocs/NWP2012/SAD_Approval_Memo-RCs_signed_Gen-3-29-12.pdf** (last visited July 11, 2016).
[292] 33 U.S.C. § 1344(e); 40 C.F.R. § 230.7(a)(3).

Given the difficulty in assessing cumulative impacts at the national level and the reliance on lower level engineers to conduct additional assessments, one must ask: why have a nationwide permit at all? If the Corps cannot adequately assess the cumulative impacts of proposed NWP 13 at the national level, then it should allow NWP 13 to expire and leave it up to division and district engineers to create regional or district level permits or require individual permits for bank stabilization structures.

C. The Corps must prepare an EIS.

NEPA requires federal agencies to prepare an Environmental Impact Statement (EIS) on any "major Federal action significantly affecting the quality of the human environment."[293] An agency's refusal to prepare an EIS is arbitrary and capricious if the proposed federal action "*might* have a significant environmental impact."[294] NEPA regulations provide that "significantly," as used in the statute, requires considerations of both context and intensity.[295] Factors to be considered in determining intensity include whether the action may have cumulatively significant impacts and the degree to which the action may adversely affect endangered or threatened species.[296] Any "one of these factors may be sufficient to require preparation of an EIS in appropriate circumstances."[297]

As discussed previously, the Draft Decision Document fails to take a "hard look" at the direct, indirect, and cumulative environmental impacts of proposed NWP 13 projects and cannot make a convincing case for a finding of no significant impact. Consequently, any decision by the Corps to forgo an EIS based on this draft will be arbitrary and capricious.[298] Moreover, ample evidence demonstrates that bank stabilization projects have cumulatively significant impacts on the human environment and may have serious adverse effects on endangered and threatened species, necessitating the preparation of an EIS.

Under NEPA, "[s]ignificance exists if it is reasonable to anticipate a cumulatively significant impact on the environment."[299] For years the Corps has known, or should have known, that bank stabilization projects may have cumulatively significant impacts. During the 2012 nationwide permitting process, the Corps' own Buffalo District office explained in comments on the proposed permit that bank stabilization activities increase erosion in the areas surrounding those activities, and "[c]umulatively, this has the potential to create adverse impact

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[293] 42 U.S.C. § 4332(C).
[294] *State v. FAA*, 957 F.2d 1125, 1131 (4th Cir. 1992) (emphasis added).
[295] 40 C.F.R. § 1508.27.
[296] *Id.* § 1508.27(b).
[297] *Ocean Advocates v. U.S. Army Corps of Eng'rs*, 402 F.3d 846, 864 (9th Cir. 2005); *see also North Carolina v. Fed. Aviation Admin.*, 957 F.2d 1125, 1131 (4th Cir. 1992) (holding that agencies' refusal to prepare EIS "is arbitrary and capricious if its action *might* have a significant environmental impact").
[298] *TOMAC, Taxpayers of Mich. Against Casinos v. Norton*, 433 F.3d 852, 861 (D.C. Cir. 2006); *see also* 5 U.S.C. § 706(2)(A).
[299] 40 C.F.R. § 1508.27(b)(7).

to these systems and increasing the need for more bank stabilization."[300] The Washington State Department of Natural Resources informed the Corps that, according to four scientific studies, "the cumulative impacts of multiple hardened shorelines further impacts the biological and ecological functions of [] freshwater systems."[301] And the National Oceanic and Atmospheric Administration pointed to the cumulative impact of NWP 13 projects when combined with rising seas, warning that the "failure to consider [the Corps'] actions in terms of future [sea level] conditions could jeopardize life and property as well as ecosystem resilience."[302] The Department of the Interior perhaps stated it best, noting that bank stabilization structures simply "do not qualify as a minimal effect activity."[303]

Recent scientific research also highlights the cumulative impacts concerns associated with bulkheads and other bank stabilizing structures. Multiple studies have found that bulkheads reduce abundance and diversity of intertidal organisms in coastal ecosystems, which leads to negative cumulative effects on ecosystem diversity.[304] And scientists generally agree that the cumulative impacts of shoreline armoring are greater than previously forecasted.[305]

An EIS is also required because bank stabilization activities may have serious adverse impacts on endangered or threatened species.[306] Numerous studies, as well as numerous comments on prior versions of this nationwide permit, demonstrate that bank stabilization activities destroy species' nesting and feeding grounds and generally have detrimental impacts on threatened and endangered species. For example, the Fish and Wildlife Service informed the Corps during the 2012 nationwide permitting process that bank stabilization projects "ultimately result[] in environmental damage" and "greatly impact[] nesting opportunities and hatching success" of threatened and endangered sea turtles.[307] Yet the Draft Decision Document fails to consider or disclose those impacts. Instead, the document notes that General Condition 18 requires district engineers and permittees to take actions at the project level to ensure that any given project will not affect listed species. Reliance on the General Condition is insufficient for the NEPA analysis. And General Condition 18 even acknowledges that proposed projects under the nationwide permits "may affect" listed species or critical habitat and that Section 7 consultation may be required.

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[300] Buffalo District, U.S. Army Corps of Engineers, *supra* note 212.
[301] Washington State Dept. of Natural Resources, *supra* note 220.
[302] NOAA's National Marine Fisheries Service, NOAA Fisheries Request for Clarification Regarding Response to Comments on the U.S. Army Corps of Engineers Nationwide Permit 48, 2 (Jan. 13, 2012).
[303] U.S. Dept. of the Interior, *supra* note 216.
[304] Dethier et al., *supra* note 10; Heerhartz et al., *supra* note 7; Needles et al., *supra* note 195; Lee & Li, *supra* note 25; Heerhartz et al., *supra* note 7; Aguilera et al., *supra* note 24; Harris et al., *supra* note 25; Patrick et al., *supra* note 17.
[305] Dethier et al., *supra* note 10; Stuart H. Munsch et al., *Effects of Seawall Armoring on Juvenile Pacific Salmon Diets in an Urban Estuarine Embayment*, 535 MARINE ECOLOGY PROGRESS SERIES, 213-29 (2015).
[306] *See* 40 C.F.R. § 1508.27(b)(9) (requiring agency to consider degree to which action may adversely affect ESA listed species)
[307] National Wildlife Federation, *supra* note 224, at 79.

In conclusion, because bank stabilization activities under proposed NWP 13 may have significant impacts on the quality of the human environment, the Corps must prepare an EIS that fully considers and discloses the environmental consequences of the permit in order to comply with NEPA.

VI. If the Corps fails to consult with the FWS and the NMFS before reauthorizing the NWPs, including NWP 13, the Corps will violate the ESA.

A. The ESA mandates that the Corps enter into programmatic consultation on the NWPs, including NWP 13.

The U.S. Supreme Court has called the Endangered Species Act (ESA) the "most comprehensive legislation for the preservation of endangered species ever enacted by any nation."[308] According to the Court, the "plain intent of Congress in enacting [the ESA] was to halt and reverse the trend toward species extinction, whatever the cost."[309] Section 7(a)(2) is "the heart of the ESA."[310] It requires federal agencies to "insure" that the actions they fund, authorize, or undertake "[are] not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification" of those species' designated critical habitat.[311]

In fulfilling this duty, "each agency shall use the best scientific and commercial data available."[312] If a proposed action "may affect" an ESA-listed species, federal agencies are required to formally consult with the NMFS or the FWS.[313] Thus, § 7(a)(2) imposes both a procedural and substantive duty on agencies. As the District Court for the District of Columbia explained in *Defenders of Wildlife v. Jackson*, "[s]ubstantively, [the ESA] requires that agencies ensure that their actions are not likely to jeopardize the existence of an endangered species," and "[p]rocedurally, it requires adequate consultation between the [a]gency and the FWS" to ensure that the substantive protections are met.[314]

Formal consultation is required if an agency action "may affect listed species or critical habitat."[315] Agency "action" is defined broadly to include "*all* activities or programs of any kind authorized . . . in whole or in part, by Federal agencies."[316] The Corps' issuance of an NWP is

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[308] *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 180 (1978).
[309] *Id*. at 184.
[310] *Karuk Tribe of Cal. v. U.S. Forest Serv.*, 681 F.3d 1006, 1019 (9th Cir. 2012)(internal citations omitted).
[311] 16 U.S.C. § 1536(a)(2).
[312] *Id*.
[313] 50 C.F.R. § 402.14(a); FWS is primarily responsible for terrestrial species and NMFS is responsible for marine species. 16 U.S.C. § 1532(15); 50 C.F.R. § 402.01.
[314] 791 F. Supp. 2d 96, 113 (D.D.C. 2011).
[315] 50 C.F.R. § 402.14(a).
[316] 50 C.F.R. § 402.02 (emphasis added).

clearly an "action" within the meaning of the ESA.[317] The "may affect" threshold in the ESA regulations is very low. FWS's ESA consultation handbook defines "may affect" as "the appropriate conclusion when a proposed action may pose *any* effects on listed species or designated critical habitat."[318] An agency may avoid consultation only if the "agency determines, with written concurrence of [FWS or NMFS], that the proposed action is not likely to adversely affect any listed species . . . ."[319]

Following formal consultation, FWS (or NMFS) must provide the action agency with a biological opinion, "explaining how the proposed action will affect the species or its habitat."[320] The biological opinion must determine whether the agency's "action, taken together with cumulative effects, is likely to jeopardize the continued existence of listed species,"[321] and must include measures to minimize and monitor impacts to species that are likely to occur.[322]

B. The Corps does not intend to consult with either the FWS or NMFS on the NWPs in violation of the ESA.

In response to this consultation requirement, the Corps has historically asserted that it did not have to engage in programmatic consultation on all the NWPs at once, but could conduct its consultation on a project by project basis. But in 2005, the District Court for the District of Columbia held in *National Wildlife Federation v. Brownlee*,[323] that such an approach did not comply with the ESA. In *Brownlee*, the Corps had failed to consult with FWS on four nationwide permits.[324] Although the Corps acknowledged that the permits "may affect" the endangered Florida panther, it argued that it could satisfy the ESA's § 7(a)(2) requirement by consulting with FWS on individual projects authorized under the four NWPs.[325]

The *Brownlee* court disagreed and cited ESA regulations that state "any request for formal consultation may encompass . . . a number of similar individual actions within a geographical area or a segment of a comprehensive plan [and that] [t]his does not relieve the Federal agency of the requirements for considering the effects of the action as a whole."[326] As the *Brownlee* court explained, "overall consultation for the NWPs is necessary to avoid piece-meal destruction of panther habitat through failure to make a cumulative analysis of the program as a whole."[327]

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[317] *Nat'l Wildlife Fed. v. Brownlee*, 402 F. Supp. 2d 1, 10–11 (D.D.C. 2005).
[318] U.S. FISH & WILDLIFE SERV. & NAT'L MARINE FISHERIES SERV., ENDANGERED SPECIES CONSULTATION HANDBOOK: PROCEDURES FOR CONDUCTING CONSULTATION AND CONFERENCE ACTIVITIES UNDER SECTION 7 OF THE ESA XVI (Mar. 1998) (emphasis in original).
[319] 50 C.F.R. 402.14(b)(1).
[320] *Bennett v. Spear*, 520 U.S. 154, 158 (1997).
[321] 50 C.F.R. § 402.14(g)(4).
[322] *Id*. § 402.14(i).
[323] 402 F. Supp. 2d 1 (D.D.C. 2005).
[324] 402 F. Supp. 2d at 10.
[325] *Id*.
[326] *Id*. (quoting 50 C.F.R. § 402.14(c)).
[327] *Id*.

In response to the *Brownlee* decision, the Corps agreed that it had a legal duty to engage in consultation for the NWPs. It commenced consultation for the 2007 NWPs but did not complete consultation before the NWPs were issued. For the 2012 NWPs, the Corps continued consultation with both FWS and NMFS. NMFS eventually issued a jeopardy opinion.[328] The Corps failed to conclude its consultation with the FWS.

In this jeopardy opinion, NMFS determined that the Corps had "failed to insure that activities that would be authorized by the [NWPs] are not likely to jeopardize the continued existence of endangered or threatened species under the jurisdiction of NMFS."[329] The Corps, according to NMFS, did not have sufficient information "to know or reliably estimate the general and particular effects of the activities that would be authorized," to determine the effect of those activities on water quality or listed species, or to take action necessary to prevent direct or cumulative degradation of water quality and habitat.[330] Although the Corps did agree to certain changes in its NWP procedures as a result of its consultation with NMFS, it is immaterial at this point because the Corps is unwilling to engage in any consultation with either agency at the national level concerning the proposed NWPs.

In the Proposed Rule, the Corps states emphatically that the action of authorizing or reauthorizing the NWPs does not involve any activity that would trigger consultation. For those activities that "may affect" a threatened or endangered species, consultation will be performed on the project level by the Corps districts.[331] In those cases where there is no PCN requirement, the Corps has left it up to the applicant to determine, under General Condition 18, whether consultation is necessary.[332]

This approach, however, goes against the *Brownlee* decision, as well as others. These cases make clear that ESA consultation over an action may not be postponed for the purpose of segmenting that action into smaller actions and consulting over the smaller actions.[333] With the reauthorization of the NWPs, the Corps is attempting to improperly segment the impacts of the NWPs into 52 different types of activities and then again into all the individual impacts of the activities authorized under any particular permit. This is not allowed under the ESA.

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[328] *See* NAT'L MARINE FISHERIES SERV., ENDANGERED SPECIES CONSULTATION BIOLOGICAL OPINION ON U.S. ARMY CORPS OF ENGINEERS' NATIONWIDE PERMIT PROGRAM (Feb. 2012), http://www.nmfs.noaa.gov/pr/pdfs/consultations/biop_acoe_permits2012.pdf (last visited April 20, 2015).
[329] *Id.* at 221.
[330] *Id*. at 223.
[331] 81 Fed. Reg. at 35,193.
[332] *Id.*
[333] *See, e.g., Lane County Audubon v. Jamison,* 958 F.2d 290, 294 (9th Cir. 1992) (holding management guideline governing timber sales was an agency action, and therefore postponing ESA consultation to individual sales was prohibited); *Conner v. Burford,* 848 F.2d 1441, 1454 (9th Cir. 1988) (holding that the agency violated the ESA by refusing to consult on effects of oil and gas plan and that consultation at individual lease stage is insufficient).

VII. NWP B must be authorized to encourage the use of living shorelines.

We strongly support Nationwide Permit B. It is essential that living shoreline projects have an NWP that is specifically designed to cover such activities. In order for this more natural approach to shoreline stabilization to succeed, it must be encouraged by the Corps through its regulatory process. Below we provide specific comments on NWP B.

A. NWP B modifies the NOAA definition for living shorelines, which is a reasonable approach.

In NWP B, the Corps adopts the NOAA definition for living shorelines and adds a final sentence at the end. In its most recent guidance document on living shorelines, NOAA defines a living shoreline as follows:

> Living shoreline is a broad term that encompasses a range of shoreline stabilization techniques along estuarine coasts, bays, sheltered coastlines, and tributaries. A living shoreline has a footprint that is made up mostly of native material. It incorporates vegetation or other living, natural "soft" elements alone or in combination with some type of harder shoreline structure (e.g. oyster reefs or rock sills) for added stability. Living shorelines maintain continuity of the natural land–water interface and reduce erosion while providing habitat value and enhancing coastal resilience.[334]

The Corps definition adds the following sentence to the end of this definition: "Living shorelines must have a substantial biological component, either tidal or lacustrine fringe wetlands or reef structures."[335]

In short, the Corps definition limits the use of living shorelines to mid- to low energy areas. It stresses the use of natural components. It allows for the use of soft and hard elements. It requires a living component. And it requires that living shorelines maintain the water/land interface. This definition is reasonable for NWP B. The Corps, however, should clarify whether an oyster reef, by itself, could serve as the biological element of a living shoreline. We would support a decision that it could.

B. The NWP B conditions, for the most part, appear reasonable.

1. The 500-foot limit

Condition (b) provides, "The activity is no more than 500 feet in length along the bank, unless the district engineer waives this criterion by making a written determination concluding that the activity will result in no more than minimal adverse environmental effects[.]"

Because living shoreline techniques are still developing in some parts of the country, this limit is appropriate.

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[334] NOAA, *supra* note 245.
[335] Draft Decision Document Nationwide Permit B, § 1.0.

2. Discharges of fill material

Condition (e) provides, “Discharges of dredged or fill material into waters of the United States, and reef structures in navigable waters, must be the minimum necessary for the establishment and maintenance of the living shoreline[.]”

The Corps should make it clear that when it refers to reef structures that it means oyster reefs.

3. Water movement

Condition (f) provides, “The activity must be designed, constructed, and maintained so that it has no more than minimal adverse effects on water movement between the waterbody and the shore and the movement of aquatic organisms between the waterbody and the shore[.]”

The movement of water behind living shoreline oyster reefs and sills is extremely important. If an applicant is proposing a project that would compromise that flow of water, the applicant should seek an individual permit.

4. Special aquatic sites

Condition (g) provides, “The activity does not involve discharges of dredged or fill material into special aquatic sites, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in no more than minimal adverse environmental effects[.]”

It is appropriate to ban the use of living shorelines in special aquatic sites. To the extent that NWP 13 is not retired entirely, the Corps must also ban any bulkhead permitted under NWP 13 that would impact wetlands. In the case of living shorelines, it could, in certain circumstances, be appropriate for the district engineer to waive this requirement because living shorelines often have positive impacts on the shoreline environment. Such a waiver is not appropriate for NWP 13.

C. Terms and conditions

In the terms and condition section, 1.3.2, the Corps states that “None of the NWPs authorize the construction of artificial reefs.” Since some of the living shorelines do include reefs, the Corps should clarify what it means by “artificial reefs.”

D. Impact Analysis

In section 4.2 of the Draft Decision Document for NWP B, the Corps states that a pre-construction notification is required for all activities authorized under NWP B. We agree with this requirement, but only if the same requirement is applied to all activities authorized by NWP 13. As the scientific studies in the comments above demonstrate, living shorelines often have

positive effects on the environment, whereas bulkheads, regardless of their size, have adverse impacts.

E. Additional Suggestions

1. Breakwaters and groins

Although NWP B does not contain the terms "groin," it appears throughout the NWP B Draft Decision Document. Since groins can have very negative impacts on the shoreline environment, it would not be appropriate to authorize such structures under an NWP or under any permit whatsoever. The term "breakwater" does appear in NWP B and the Draft Decision Document. Because it also describes structures that can have negative impacts and that come in many different sizes, the Corps should not include breakwaters in NWP B.

2. Non-native oysters

The Corps should include a condition on NWP B that explicitly states that applicants cannot use non-native oysters as part of their living shorelines because of the negative impacts such oysters can have on shoreline ecosystems.

VIII. Conclusion

Sea level rise and the effects that it is having on our coastal environment cannot be overstated. Cities and counties will have to engage in better land use planning to address this worsening problem. They must cordon off fragile regions and leave them in their natural state. To the extent that local governments must protect buildings and infrastructure, they must employ the least environmentally damaging practicable alternative to curb any erosion, and require property owners to do the same.

In our bays, rivers, and estuaries where wave energy is in the low to medium range, living shorelines will often prove to be that alternative. On ocean-facing beaches and along inlets where wave energy is high, retreat may be the only viable option for local governments and property owners alike. In other high-energy areas, beach nourishment may be appropriate. Regardless of the location, however, the indiscriminant construction of more bulkheads is not the solution.

Throughout these comments we have stated that no bulkhead should be permitted under an NWP because these structures, regardless of their size, have more than minimal impacts. For this reason, we call upon the Corps to retire NWP 13. If the Corps is not willing to do so, even though it is legally required, it is critical that the Corps adopt the practicable alternative language set forth above. By including this language in NWP 13, the Corps would at least be adopting an approach that would help stem the tide of shoreline armament, and, with proper monitoring, could result in minimal cumulative effects to the aquatic environment. It would also lead applicants to an alternative erosion solution that could enhance, rather than destroy, critical shoreline ecosystems.

Thank you for giving us the opportunity to comment on these important general permits. Please note that we have provided both paper and digital copies of the articles we reference and ask that they be made part of the administrative record. See attached list. For questions concerning these comments, please contact Bill Sapp, Senior Attorney, Southern Environmental Law Center.

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