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July 6, 2011

Environmental Resources Branch, Philadelphia District
US Army Corps of Engineers
Wanamaker Building, 100 Penn Square East
Philadelphia, PA 19107

Re: 2011 Draft EA for Delaware River Main Channel Deepening Project
Philadelphia

Dear Army Corps,

The Delaware Riverkeeper Network submits this comment in response to the June 6, 2011 call for public comment on the Delaware River Main Channel Deepening Project.

The Deepening Project threatens the health of the River and the ecosystems that are vitally important to the economies, communities, culture, recreation, quality of life and beauty of our region.

The Delaware Riverkeeper Network believes that the information contained in and missing from the Draft Environmental Assessment, Delaware River Main Channel Deepening Project, dated June 2011 (2011 Draft EA) clearly demonstrates the need for an up-to-date Supplemental Environmental Impact Statement (SEIS) for the Delaware River Deepening Project. The 2011 Draft EA cannot, on its own or in combination with the 2009 Environmental Assessment (2009 EA) issued for the Deepening Project, support a Finding of No Significant Impact as that term is defined in the National Environmental Policy Act (NEPA).

The Delaware Riverkeeper Network operates throughout the entire length and breadth of the Delaware River watershed, speaking and working for both its protection and its restoration. Delaware Riverkeeper Network's major programs include: Advocacy to protect water quality and habitats, Awareness-to-Action to organize local communities into activists to protect local streams, Habitat Restoration to restore damaged streams and ecosystems, River Resources Law Clinic to enforce environmental laws and train the next generation of environmental attorneys, River Tech to provide the technical expertise necessary for citizens to understand and address complex watershed issues, and Waterway

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Watch to monitor the health of the River and its tributaries with the assistance of experts and volunteers. Since 1988 the Delaware Riverkeeper Network has been working in the four states of the Delaware River Watershed to protect, defend and restore the River, its tributaries and habitats. Our membership includes residents from all of the four watershed states as well as folks that live outside the boundaries of the watershed but appreciate, enjoy and benefit from the natural resources of the watershed; this comment is submitted on their behalf.

Since the Army Corps' 1997 SEIS, there have been significant findings, scientific research, and agency determinations that demonstrate, unquestionably, the need for an updated Environmental Impact Statement. Neither the 2009 EA (which was never released in draft form or subjected to public or agency comment) nor the 2011 Draft EA fully, properly, or in many instances at all, considers, addresses, or properly responds to this information about the harms that the Delaware River Main Channel Deepening Project will cause. The US Fish and Wildlife Service (USFWS) (*Attached Letter 11*), DNREC (*Attached Letter 25*), Delaware Riverkeeper Network (*Attached Letter 26*), and others have, on the record, requested and supported the need for an SEIS pursuant to NEPA. In addition, in an April 16, 2009 letter to the Army Corps submitted post-2009 EA, the National Marine Fisheries Service (NMFS) clearly called for an evaluation of cumulative effects. (*Attached Letter 14*). Since the release of the 2009 EA, even more science and information has come to light that clearly defines the need for an up-to-date SEIS, information not addressed in the 2011 Draft EA.

The Delaware Riverkeeper Network, in this comment, will provide substantiation undeniably demonstrating the need for an up-to-date SEIS before this project can be said to have fulfilled the legal or informational requirements of NEPA.

A. The Law, Science, and Facts Clearly Mandate a New SEIS.

The National Environmental Policy Act, 42 U.S.C. § 4321 *et seq.*, requires that the Army Corps of Engineers create a “detailed statement” evaluating the environmental impacts of the Main Channel Deepening Project (Deepening Project), which qualifies as a major federal action. A central purpose of NEPA is to assure that federal decision-makers consider the environmental consequences of their actions before a decision to act is made. 42 U.S.C. § 4332(C); 40 C.F.R. § 1501.1. The implementing regulations state that “NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA.” 40 C.F.R. § 1500.1(b).

An Environmental Impact Statement (EIS) under NEPA must include a “full and fair discussion of significant environmental impacts” and their “reasonable alternatives [.]” 40 C.F.R. § 1502.1. The EIS must take a “hard look” at the environmental consequences of the proposed action and undertake a thorough analysis of the potential environmental impacts, including all foreseeable direct and indirect impacts.

40 C.F.R. § 1508.27 defines the use of the term “significantly” in NEPA, which requires considerations of both context and intensity. Of direct relevance to the Deepening Project are intensity factors 4 (the Deepening Project is highly controversial), 5 (the Deepening Project will have highly uncertain/unique or unknown risks), 7 (the Deepening Project will have cumulatively significant impacts), 8 (the Deepening Project may result in the loss or destruction of significant scientific, cultural, or historic resources), 9 (the Deepening Project will have adverse effects on listed species under ESA), and 10 (the Deepening Project will violate Federal, state, or local laws or requirements imposed for protection of the environment).

Council on Environmental Quality (CEQ) and Army Corps regulations implementing NEPA require the Army Corps to prepare a Supplemental Environmental Impact Statement (SEIS) if there are “substantial changes in the proposed action that are relevant to environmental concerns” or “there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts,” 40 C.F.R. §§ 1502.9 (c)(1)(i), (ii). *See also* 33 C.F.R. § 230.13(b) (Corps regulation on SEIS requirement).

A federal agency is under a “continuing duty to gather and evaluate new information relevant to the environmental impact of its actions even after release of an EIS.” *Enos v. Marsh*, 769 F.2d 1363, 1373 (9th Cir. 1985). When confronted with new information, “it is incumbent on [the agency] to evaluate the existing EIS to determine whether it require[s] supplementation.” *Friends of the Clearwater v. Dombeck*, 222 F.3d 552, 558 (9th Cir. 2000)(citing *Marsh v. Oregon Natural Resources Council*, 490 U.S.360, 374 (1989)). As the Supreme Court stated in *Marsh*: “It would be incongruous . . . with the Act’s manifest concern with preventing uninformed action, for the blinders to adverse environmental effects, once unequivocally removed, to be restored prior to the completion of agency action simply because the relevant proposal has received initial approval.” *Id.* at 371.

In determining whether to supplement an existing EIS because of new information, the Army Corps must consider “the extent to which the new information presents a picture of the likely environmental consequences associated with the proposed action not envisioned by the original EIS. . . . The change need not be strictly environmental, however; the test is whether the new information so alters the project’s character that a new ‘hard-look’ at the *environmental consequences* is necessary.” *Sierra Club v. Froehlke*, 816 F.2d 205, 210 (5th Cir. 1987) (internal quotations omitted; emphasis in original). “A hard look should involve a discussion of adverse impacts that does not improperly minimize negative side effects.” *Earth Island Institute v. U.S. Forest Service*, 442 F.3d 1147, 1159 (9th Cir. 2006). The Army Corps must “undertake a thorough environmental analysis before concluding that no significant environmental impact exists.” *Id.*

An EIS must include “high-quality information and accurate scientific data.” 40 C.F.R. § 1500.1(b). That is the only way an agency can take the required “hard look” at the environmental effects of the proposed action and alternatives to it. If

information is incomplete or unavailable, the agency must not only identify such missing information but also assess the importance of missing information and obtain it for inclusion in the EIS. The CEQ's NEPA regulations – to which courts accord “substantial deference” -- state unequivocally that if “incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives,” then “the agency *shall* include the information” in an EIS. 40 C.F.R. § 1502.22(a) (emphasis added). The Army Corps may only proceed to analyze potential impacts in an EIS in the face of incomplete information if it makes a finding that the incomplete information “cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known.” 40 C.F.R. § 1502.22(b).

The Army Corps is obligated under NEPA to respond to comments that raise significant scientific uncertainties and reasonably support that such uncertainties exist, no matter whether the Army Corps itself identified the issues raised as meriting consideration. See 40 C.F.R. §§ 1502.9(a), (b) (EIS must discuss and disclose “all major points of view on the environmental impacts” including any “responsible opposing view). “It is the agency, not an environmental plaintiff, that has a continuing duty to gather and evaluate new information relevant to the environmental impacts of its actions, even after the release of an EIS.” *Friends of the Clearwater v. Dombeck*, 222 F.3d 552, 559 (9th Cir. 2000)(internal citation omitted). A NEPA document “must respond explicitly and directly to conflicting views in order to satisfy NEPA’s procedural requirements.” *Earth Island Institute*, 442 F.3d at 1172.

The Army Corps completed its first EIS on the Deepening Project in 1992; due to significant questions and issues that were unanswered by the 1992 EIS, it completed an SEIS in 1997. Since that time the Army Corps has not undertaken a new SEIS process despite the lapse of fourteen years and the availability of a tremendous amount of new scientific information, analysis, and data on the River’s ecological systems and resources, including changes that have taken place in the River ecosystem, and the Project’s likely impacts thereto. The 2009 EA, in which the Army Corps determined that the conclusions of the 1997 SEIS remained valid and required no further study, was both procedurally defective and substantively inadequate. The 2009 EA did not consider or address the vast majority of the sources and citations of new information provided to the Army Corps during the extremely limited comment period that preceded the creation of that document and in fact didn’t even inform the agencies or public that they were providing comment for purposes of a NEPA review. The Army Corps is under a continuing obligation under NEPA to evaluate the new information and data provided up through January 2009 that was not considered in the 2009 EA as well as respond to the numerous comments that raised significant scientific uncertainties never addressed in the 2009 EA, and identified ecosystem changes of relevance that could be impacted by the Deepening Project or have an impact on the Deepening Project’s implementation.

Moreover, the Army Corps is obligated to consider the new information and sources of data, and changed environmental and community conditions, that have either come into existence since January 2009 or are absent from the

administrative record of the Army Corps' environmental analyses and are now being provided as part of the current comment process on the 2011 Draft EA. The Army Corps may not legally limit its consideration of comments and information only to those aspects relevant to the issues raised in the 2011 Draft EA. In other words, the Army Corps may not limit its new NEPA analysis to the issues of the Deepening Project's impacts on loggerhead sea turtles and Atlantic sturgeon.

Based on the information contained in the 2011 Draft EA, as well as the new and previously submitted information that the Army Corps has heretofore failed to consider, the Army Corps may not avoid undertaking a new SEIS process by making a Finding of No Significant Impact (FONSI) as recommended in the 2011 Draft EA at p. 11. On a broad array of issues relevant to the Deepening Project's environmental impacts, it is clear that the Deepening Project will have "significant" effects upon the environment in ways that were not considered or analyzed in the 1997 SEIS.

The Army Corps is also obligated to undertake a new SEIS process because the available information and scientific data developed between 1997 and 2009 that the Army Corps previously failed to consider as well as new information, changed environmental conditions and knowledge, and new scientific information developed between 2009 and the present demonstrate that significant information gaps and unanswered questions about the Deepening Project's impacts still exist.

B. The Deepening Project Poses Significant Threats to the Critically Imperiled Atlantic Sturgeon. The Potential for the Deepening to Cause the Further Decline of the Species Mandates the Need for Up-to-date SEIS Review Based on New and Readily Available Information Regarding its Location, Spawning, Feeding, Water Quality, and Habitat Needs.

The Atlantic sturgeon, *Acipenser oxyrinchus oxyrinchus*, is a large, long-lived, late-maturing, slow-reproducing migratory fish that spawns in rivers such as the Delaware and migrates to the ocean and back again. Mature adults of this anadromous species may live as long as 60 years, reach lengths up to 14 feet, and weigh over 800 pounds. With its long snout and distinctive armor-like plates, this ancient fish may look as tough as a dinosaur but in reality is vulnerable to a number of human-caused threats and harms that have drastically depleted its numbers, including over-fishing, habitat destruction from activities such as dredging, vessel strikes, and water quality degradation.

The reaches of the Delaware River that will be affected by the Deepening Project are vitally important to the various life stages of Atlantic sturgeon. The Delaware River once supported the largest population of Atlantic sturgeon "known to exist." (*Attached Report 21*). Today, there are fewer than 300, maybe fewer than 100, spawning adults.

In the 19th century the Delaware River was so populated with sturgeon (both Atlantic and



Shortnose) that it became the caviar capital of North America. From 1890 to 1899, 75% of the sturgeon harvested in the United States came from the Delaware River. At the industry's peak, more than 2,000 metric tons per year of female Atlantic sturgeon were harvested from the Delaware, out of a total population of 180,000 individuals. Catching and canning sturgeon and caviar production became a way of life for many in the region. But by 1900 the population and the catch of sturgeon were already severely depressed. In 1901, New Jersey landings were down to a mere 6% of the peak levels harvested just over a decade earlier in 1889.

While sturgeon harvesting continued it did so only at these very depressed levels. In the 1950s the reason for harvesting sturgeon shifted largely to obtaining the fish flesh as opposed to the caviar/eggs.

In an effort to protect the populations from further decline, moratoriums have been put in place on the commercial, recreational and tribal harvest of Atlantic sturgeon in the United States.¹ In 1998, the Atlantic sturgeon fishery was closed by the Atlantic States Marine Fisheries Commission (ASMFC) and the ASMFC put in place a coastwide fishing moratorium.

Despite these protections, Atlantic sturgeon populations have never recovered. While Atlantic sturgeon used to spawn in 26 river and estuarine systems, today they only spawn in 17 (2 of which are in Canada).² The Delaware River population of Atlantic sturgeon population was almost completely extirpated by around 1900 and has demonstrated little recovery since that time. The Delaware River population of Atlantic sturgeon, a genetically unique stock, is among those in the worst shape nationally.

The Delaware River population of Atlantic sturgeon has been unable to recover largely "due to habitat loss primarily due to dredging, saltwater intrusion, water quality degradation, harvest pressure and bycatch mortality." (*Attached Report 21*).

According to NMFS, the abundance estimate for Atlantic sturgeon is fewer than 300 spawning adults. (*Attached Misc 28: Proposed Listing Determinations for three Distinct Population Segments of Atlantic sturgeon in the Northeast Region, 75 Fed. Reg. 61,872 (Oct. 6, 2010)*). In the case of the Delaware River it is believed by some experts that there are fewer than 100 Atlantic Sturgeon. (*Attached Report 14*).

¹ Shortnose sturgeon too have been the subject of needed regulation. Its population was so decimated that it was entered onto the Federal Endangered Species list. But while Shortnose sturgeon have received this higher level of population and habitat protection, the Atlantic sturgeon has not, despite the fact that its populations are believed to be in significantly greater decline at this point than those of the Shortnose sturgeon.

² Different sources have slightly different figures; for example, NMFS places the count at 35 rivers for historical spawning and 20 present day. Either way, the decline is significant and of great concern.

The 2008 *State of the Basin Report (Attached Report 14)*, which is based on science collected in the region, describes the status of the Atlantic sturgeon as “poor and getting worse” with numbers “estimated to be less than 1,000 and probably less than 100 across the Estuary.”

The significant impacts to Atlantic sturgeon that experts believe will result from the Deepening Project have not been adequately considered or addressed by the Army Corps in either its NEPA-required or its ESA-required documents. This deficiency is even more dramatic in light of recent events – i.e. the proposal by NMFS to list Atlantic sturgeon in the Delaware River as endangered and the increasing amount of scientific research demonstrating that the Delaware River population of Atlantic sturgeon is genetically unique.

There is a significant and growing body of knowledge in recent years regarding Atlantic sturgeon, their needs, their habitats and the ramifications of a variety of effects that will result from the Deepening Project. This information is readily available and significant. And yet the Army Corps continues to fail to consider it.

1. The Army Corps May Not Substitute a “No Jeopardy” ESA Analysis for a Thorough Discussion of Cumulative Impacts under NEPA:

The Army Corps has failed to undertake an adequate NEPA analysis of the effects of the Deepening Project on Atlantic sturgeon because it has unlawfully imported the jeopardy standard of the Endangered Species Act into the draft EA.

The EA states:

The primary concern with the Atlantic sturgeon is whether or not impacts associated with the Deepening Project ‘jeopardizes the continued existence’ of the species. Federal regulation defines this term as ‘engaging in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of the listed species in the wild by reducing the reproduction, numbers, or distribution of that species.’ Based on the Biological Assessment (USACE, 2011) the Army Corps concluded that the Deepening Project will not jeopardize the continued existence of the Atlantic sturgeon.

2009 EA at p. 8.

The Army Corps’ legal obligations under NEPA and the ESA are entirely separate, however, and compliance with the ESA Section 7’s prohibition against jeopardizing a species’ continued existence, 16 U.S.C. § 1536(a)(2), does not satisfy NEPA’s requirements to analyze significant impacts short of the threat of extinction. See *Greater Yellowstone Coalition v. Flowers*, 359 F.3d 1257, 1275-76 (10th Cir. 2004)(recognizing USFWS conclusion that action not likely to cause jeopardy does not necessarily mean impacts are insignificant); *Makua v. Rumsfeld*, 163 F. Supp.2d 1202, 1218 (D. Haw. 2001)(“A FONSI . . . must be based on a review of the potential for significant impact, including impact short of extinction. Clearly,

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there can be a significant impact on a species even if its existence is not jeopardized.”); *Nat’l Wildlife Fed. v. Babbitt*, 128 F. Supp.2d 1274, 1302 (E.D. Cal. 2000)(requiring EIS under NEPA even though mitigation plan satisfied ESA); *Portland Audubon Society v. Lujan*, 795 F. Supp. 1489, 1509 (D. Or. 1992)(rejecting agency’s request for the court to “accept that its consultation with [USFWS under the ESA] constitutes a substitute for compliance with NEPA.”).

The EA fails in any meaningful way to address and analyze the potential impacts of the Deepening Project on Atlantic sturgeon; it merely incorporates the March 2011 Biological Assessment by reference and restates the blasting windows and blast mortality/morbidity mitigation measures that it intends to implement. This discussion is not legally adequate, and must be revised to give a full discussion of the likely impacts to Atlantic sturgeon, both short- and long-term, from the Deepening Project, regardless of whether or not in the Army Corps’ view those impacts may trigger a jeopardy finding under the ESA.

Specifically, NEPA obligates the Army Corps to discuss in the EA (or, more appropriately, SEIS) the cumulative impacts of the Deepening Project on the Atlantic sturgeon. According to the CEQ regulations, “‘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.” 40 C.F.R. § 1508.7. This required analysis is legally distinct from and broader than the separate “cumulative effects” analysis of an ESA Section 7 consultation. Here, the draft EA makes no attempt at a cumulative impacts analysis for the Atlantic sturgeon and thus fails to fulfill this NEPA requirement.³

2. The Delaware River Population of Atlantic sturgeon is Genetically Unique – Increasing the Consequences of Harm from the Deepening Project and Associated Blasting and Spoil Disposal:

Scientific study demonstrates the existence of a genetically distinct population of Atlantic sturgeon that is unique only to the Delaware River and so could qualify for listing as a separate Distinct Population Segment by NMFS in its final listing decision. Although not all juveniles found in the Delaware River are from this unique genetic stock – i.e. Atlantic sturgeon spawned in other river systems are using the Delaware as nursery habitat – there is genetic evidence that there exists a specific Delaware River haplotype, i.e. a Delaware River-specific genetic line. According to scientific study, Haplotype A5 is private to the Atlantic sturgeon of the Delaware River. (We submit for the record scientific studies/findings that substantiate this assertion. See *Attached Report 11, Report 12, Report 16, Report 21 and Report 31*).

³ The same holds true for the other ESA-listed species that will be adversely affected by the Deepening Project, including the shortnose sturgeon and the loggerhead sea turtle. The Army Corps may not substitute its ESA conclusion of no jeopardy for the full discussion of cumulative impacts mandated by NEPA.

The unique A5 haplotype was identified in recent years in young-of-the-year Atlantic sturgeon, demonstrating that the “Delaware original genetic stock is contributing to new year classes and that the Delaware has its own distinct population segment.” (*Attached Report 31*). New information is also emerging that there are known to be at least 3 different mothers from this unique genetic line that are spawning in the Delaware River. (*Attached Reports 16 & 31*). It is significant that there are known to be at least 3 mothers because this shows an ongoing contribution to the genetic line by more than one. But 3 is also not that large a number and so this new information fuels the need for quick and significant protections to ensure that the number of mothers contributing to the genetic diversity of the Haplotype A5 line is not just protected but is allowed to increase so as to strengthen the future viability of the genetically unique population of Atlantic sturgeon found only in the Delaware River.

3. Proposed Listing of the New York Bight Distinct Population Segment of the Atlantic Sturgeon As Endangered:

Atlantic sturgeon are listed as endangered by the States of Delaware and Pennsylvania. New Jersey is currently undertaking a review to consider the species for listing. (*Attached Misc 21*).

On October 6, 2010, NMFS published a proposed rule to add the Atlantic sturgeon to the federal Endangered Species Act. (*Attached Misc 28; National Marine Fisheries Service, Proposed Listing Determinations for Three Distinct Population Segments of Atlantic sturgeon in the Northeast Region, 75 Fed. Reg. 61,872 (Oct. 6, 2010)*). NMFS proposed for listing as endangered or threatened under the Endangered Species Act, 16 U.S.C. §§ 1531 *et seq.*, five distinct population segments (DPS) of Atlantic sturgeon. NMFS explicitly found that “[T]he loss of any of the discrete population segments would result in a significant gap in the range of Atlantic sturgeon, and negatively impact the species as a whole, given the strong natal homing behavior of the species.” (emphasis added).

Atlantic sturgeon are known to spawn in the Delaware River, although there may be fewer than 300 spawning adults per year in this subpopulation according to NMFS. (*Attached Misc 28*). Other experts are concerned there may be fewer than 100 Atlantic sturgeon in the Delaware. (*Attached Report 14*). NMFS found that vessel strikes, dredging including specifically the Delaware River Deepening Project, filling, and degraded water quality pose significant threats and so proposed to list the New York Bight (NYB) DPS, which includes the Delaware River subpopulation, as endangered. (*Attached Misc 28*). NMFS found that the Delaware River spawning group is essential to the survival of the NYB DPS, as its loss “would result in loss of spatial structure for the DPS as well as numbers of fish to support spawning.” (*Attached Misc 28*).

4. Deepening is a Direct, Immediate, and Wide-Ranging Source of Harms to Atlantic Sturgeon:

According to the NMFS listing proposal, the Deepening Project poses a threat of both direct take and “the potential for indirect effects as well, such as changes in

hydrology of the river, which may affect possible spawning habitat (e.g., salt water intruding further into the river).” (*Attached Misc 28*). According to the listing proposal, the Atlantic sturgeon range is threatened and adversely affected by dredging and effects to water quality including dissolved oxygen (DO) levels, water temperature, and contaminants. The proposed Deepening Project will entail significant levels of dredging as well as significant water quality effects (including DO effects as discussed throughout this comment), movement of the salt line and salinity changes, and dramatic changes in important habitats including juvenile habitat and spawning grounds. (*Attached Misc 28*).

Dredging of river systems significantly affects aquatic ecosystems in a number of ways that will harm Atlantic sturgeon. Among the effects that the Deepening Project will have on the Delaware River population of Atlantic sturgeon are:

- ✓ Dredging activities remove, disturb, dispose of and re-suspend river sediments, modifying the river bottom substrate and impacting the community of benthic microfauna;
- ✓ Dredging operations can remove or bury organisms and destroy benthic feeding areas;
- ✓ Dredging operations can create noise and disturbance, and can disrupt spawning migrations;
- ✓ Dredging activities can re-suspend contaminants, affect turbidity and siltation, and deposit fine sediments in spawning habitats; and
- ✓ Dredging activities alter the hydrodynamic regime, alter physical habitats, and create the loss of riparian habitat;

In addition,

- ✓ Reach B of the Deepening Project is likely to have particularly significant impacts on the Atlantic sturgeon through both direct take and indirect take. Reach B is located near Marcus Hook, PA. The Deepening Project’s activities proposed for Reach B, namely rock blasting approximately 77,000 cubic yards, hydraulic and hopper dredging, and constructing a two-space anchorage, (*2009 EA*) pose significant threats of killing Atlantic sturgeon directly, inflicting physical harm that results in later death, destroying essential habitat, including spawning habitat, and degrading water quality.
- ✓ The Army Corps has not provided needed and recommended assurances regarding the protection of Atlantic sturgeon during construction of the Deepening Project. Specifically, the Army Corps has said that when working in the Delaware Bay (mouth to River mile 32) [“Reach E”], the Army Corps would not follow the recommendation to restrict hopper dredging between 1 June and 30 November in order to protect Atlantic sturgeon.
- ✓ The Deepening Project will move the salt line further up River. The increased saltwater intrusion resulting from deepening the River will continue to reduce the amount of spawning habitat available to the Atlantic sturgeon with unknown effects and potentially have other habitat impacts.

Because the Deepening Project will cause: the physical alteration of Atlantic sturgeon habitat at Marcus Hook and along its range; movement of the salt line that affects/reduces the spawning grounds and therefore successful spawning for the Atlantic sturgeon; the direct take from dredging and blasting; water quality degradation resulting from the Deepening Project including the addition of pollutants and the effect on oxygen levels; contribute to vessel strikes; and will have combined and cumulative effects magnified by other projects related to the Deepening Project (such as Southport) and in the vicinity of the Deepening Project (as discussed below), the Deepening Project poses a significant, substantial, immediate and long-range threat of irreparable harm to the Atlantic sturgeon of the Delaware River.

Because of the dramatic resulting harms to Atlantic sturgeon of the Delaware River; because of the impact of harming this population for the population itself and other related and interacting Atlantic sturgeon populations; because harming this population will prevent its restoration, and perhaps even exterminate it from our Delaware River, thus denying our region the economic, ecological, commercial and/or recreational values of a healthy Atlantic sturgeon population; because of the existence of a wealth of new, readily available information about the Atlantic sturgeon and the effects of the Deepening Project; clearly an updated SEIS on the Deepening Project is mandated and a Finding of No Significant Impact cannot be legally justified.

For additional specific information supporting the importance of the Delaware River's population of Atlantic sturgeon and the threats it faces, see *Attached Letter 35 from the Delaware Riverkeeper Network supporting listing of the Atlantic sturgeon as endangered*.

It is also important to note that at a May 13, 2010 meeting between the Army Corps and representatives from the State of Delaware it was apparently asserted by the Army Corps that no blasting was needed for the Marcus Hook anchorage. This seemed to affect the thinking and conversation of the meeting with regards to Atlantic and shortnose sturgeon, essentially dismissing blasting as a concern and truncating further conversation and exploration of the matter. (*Attached Report 58*). But the Army Corps still views blasting as a likely and needed element of its Marcus Hook portion of the project. At best, the Army Corps' statement at this meeting was disingenuous and merely served to prevent needed conversation on the topic; at worst it is a true possibility and the Army Corps has not only failed to pursue these other options but also has failed to subject the possibility of other approaches to the light of day through the NEPA process.

Further, this communication with Delaware demonstrates another clear reason why an SEIS is required for the Deepening Project. The Army Corps has, at various points with different agencies, asserted different iterations of the project, different claims about data, different claims about studies and effects and future plans. As a result, various agencies and members of the public are operating off of different bodies of information about what the current project is, the current plans for its implementation, potential effects, and the current levels of documentation and information the Army Corps possesses. It is critical that state and federal

agencies, experts and members of the public be given one complete, accurate, coherent and shared understanding of the project, plans, and underlying science used by the Army Corps for its assessments. State and federal agencies, experts, and members of the public are also entitled to receive a consistent and unified response from the Army Corps to the new and emerging information as well as to the existing and readily available scientific information available and/or provided to them. A new SEIS process is the only legally appropriate way for the Army Corps to present a unified and consistent view of the Deepening Project and its impacts.

5. Direct Take of Atlantic Sturgeon by Dredging Operations and Vessel Strikes Poses a Significant Risk of Harm:

Dredging can entrain Atlantic sturgeon, taking them up into the dredge drag-arms and impeller pumps resulting in death. New data from tagged Atlantic sturgeons continue to show their presence in or near the main navigation channel, making them vulnerable to direct take by dredging operations, as well as direct take from the larger vessels the Army Corps says will be using the channel. These lethal takes are significant for a species that is at such low levels (fewer than 300, maybe even fewer than 100), and is genetically unique as the Atlantic sturgeon of the Delaware River are. The Army Corps' failure to adopt and enforce the biological windows designed to avoid this harm is not well considered or justified and mandates a full SEIS analysis and input from experts in the field.

6. Direct Take and Habitat Destruction by Blasting are Significant and Their Effects Have Not Been Considered by the Army Corps:

The construction schedule included with the 2011 Draft EA plans for blasting and rock removal in the months of December, January and February 2012/2013 and again in the berth areas in January, February and July of 2015. Science and monitoring demonstrate that Atlantic sturgeon are in this region of the River during the time of proposed blasting and clamshell dredging. Tracking and capture efforts by sturgeon researchers indicate that the Marcus Hook Anchorage is a gathering point for Atlantic sturgeon – so much so that a recent research study team modified their efforts to focus on Marcus Hook as one area of “sturgeon concentration” in order to increase their catch rate success. (*Attached Report 31*). 2010 tagging data for Atlantic sturgeon confirm the preference for this reach of the River by Atlantic sturgeon during these very months of proposed blasting and dredging activity. (*Attached Misc 13*).

Studies and data demonstrate the rock blasting required for the proposed Delaware River Deepening Project would jeopardize the population of federally endangered Shortnose sturgeon as well as the Atlantic sturgeon in the Delaware River. After years of asserting that sturgeon would not be present at Marcus Hook during blasting, the Army Corps has finally been forced to admit that, in fact, sturgeon are in this precise area during the time of proposed blasting, dredging and associated activities. (*Attached Letter 46 from Army Corps to DNREC – “The Philadelphia District recognizes that sturgeon, including juvenile Atlantic sturgeon,*

utilize this area year round and it is not possible to time dredging or rock blasting activities to avoid their presence.”).

According to the NJ Division of Fish & Wildlife, “The spawning area for Atlantic sturgeon ... may well be the rock outcropping at Marcus Hook that will have to be blasted”. (*Attached Misc 21*).

The September 2005 Army Corps-commissioned study titled “*Delaware River Adult and Juvenile Sturgeon Survey, Winter 2005*” (2005 Army Corps Sturgeon Survey) acknowledges that:

[L]ittle is known regarding the occurrence and distribution of juvenile Shortnose sturgeon in the Delaware River. . . . While blasting in the winter months should protect most fish species that use the Delaware River in the spring and warmer months, Atlantic sturgeon (*Acipenser oxyrinchus*) and Shortnose sturgeon (*Acipenser brevirostrum*) may be susceptible to blasting mortality if they use the Marcus Hook area during winter.

(Administrative Record: AR023039, Record No. E0025).

In fact, during the 2005 Army Corps Sturgeon Survey, sturgeon were observed near the Marcus Hook area during the winter time frame when they would be at risk from planned Deepening Project activities including blasting.

The Delaware River Basin Commission (DRBC) agrees with this assessment of the 2005 Army Corps Sturgeon Survey:

Specifically, the 2005 study suggests that sturgeon are present at Marcus Hook and Trenton during winter months, as opposed to being present only during migration, and that sturgeon may be less likely to avoid a working dredge or blasting than previously believed.

(Attached Letter 10).

While the 2005 Army Corps Sturgeon Survey did find more sturgeon located upriver than down, sturgeon were observed near the Marcus Hook area during the winter time frame at issue; the study determined that the relative sturgeon density in the Marcus Hook area was .005 fish per 100 meters thereby suggesting “that sturgeons are more dispersed in the Marcus Hook region of the Delaware River” than upstream. The report included among its conclusions:

Although the video survey data suggests that large aggregations of sturgeon do not exist in the blasting area, impacts to even a small number of Shortnose or Atlantic sturgeon may not be acceptable to fisheries agencies.

(Administrative Record: AR023039, Record No. E0025).

It is important to note that the 2005 Army Corps Sturgeon Survey was based on one winter's data and so the language attempting to minimize use of this reach of the River by Atlantic sturgeon, in light of the significant body of research and expert opinion not considered by the Army Corps, does not hold great weight. What is most important is that it was proven Atlantic sturgeon will be found in the blast zone when blasting happens, thereby posing a direct risk of death, injury, and harm. The information about the presence of sturgeon in the blasting/dredging zones during the time of that work is now well agreed to by the experts.

If Atlantic sturgeon are present during blasting, they could be significantly harmed – either through direct death or severe injury.

It is known that "... blasting does have an adverse impact on fish." (AR031387.001, Record No. I0009). In its biological opinion on Shortnose sturgeon, NMFS stated: "... it is apparent from the study results that blasting may injure the species both internally and externally." (AR031387.001, Record No. I0009).

There is no certainty that the Army Corps' proposed deterrence measures will actually avoid injuring or killing sturgeon. The Army Corps is well aware, and yet seems intent on ignoring, that deterrence is not a sound mechanism for protecting sturgeon in the area from harm. While the Army Corps is proposing a series of efforts to dissuade sturgeon out of the blast zone prior to blasting, its own commissioned studies concluded:

[T]here is no 'out-of-the box' behavioral deterrent system for excluding sturgeon from an underwater blasting area.

(Administrative Record: AR023039, Record No. E0025).

Of course, deterrence does nothing to avoid the habitat destruction that the Deepening Project will inflict on Atlantic sturgeon as a result of the blasting, dredging, and deepening-induced salt line migration upstream.

The Army Corps' NEPA assessments to date have failed to consider the ineffectiveness and the environmental harms of a scare charge strategy to keep sturgeon out of the blast zone. "The Alaska Department of Fish and Game considered repelling charges to be ineffective and potentially harmful to piscivorous fishes, marine mammals, and birds which are attracted to feed on fish that are stunned or wounded by the repelling charge." (Attached Report 85). In some instances, scare blasts have been known themselves to cause fish mortality. Radio telemetry and scientific observation and study have shown that blasting is simply not effective at keeping fish away. (Attached Report 85).

Noise and bubble curtains have been found to be effective strategies for keeping fish away from blast zones, yet these are not discussed in the 2011 Draft EA. (Attached Report 85). Nor were they discussed in the 2009 EA. While these strategies may not ultimately be deemed acceptable for protecting Atlantic

sturgeon from the harm of blasting, their absence from consideration further highlights the tremendous informational and consideration deficiencies of the Army Corps' EAs on the Atlantic sturgeon issue.

The plan to use sinking gillnets around the blast zones to help keep fish away has been removed from Deepening Project plans since the 2009 EA. This change in procedure for trying to protect sturgeon is not discussed in the 2011 Draft EA or the 2011 Biological Assessment, and yet it was a prominent part of the 2009 EA.

In addition, at its February 2011 meeting with consultants who might bid for the blasting portion of the Deepening Project, one in attendance stated her observation and experience that on the Hudson, while blasting did not result in direct mortality for some sturgeon, it did cause them to rise to the surface of the water where they became prey for birds. (*See Attached Misc 34*). While the Army Corps was provided this information prior to its 2011 Draft EA, and it came from what appeared to be an experienced and credible source at a meeting organized by the Army Corps for the sharing of information, this threat of harm was not addressed in the 2011 Draft EA.

7. The Army Corps Has Ignored Biological Windows Important for Atlantic Sturgeon Protection Without Appropriate Discussion of the Reasons Why or Alternative Options:

The Army Corps is proposing to ignore biological windows necessary to protect Atlantic sturgeon from direct and indirect take and harm. The 2009 EA stated that when working in the Delaware Bay (mouth to River mile 32) ["Reach E"], the Army Corps would not be following the recommendation to restrict hopper dredging between 1 June and 30 November in order to protect Atlantic sturgeon.

The Army Corps' project schedule released with the 2011 Draft EA clearly articulates its continuing plan to ignore biological windows for Atlantic sturgeon. The 2011 Draft EA project schedule documents that in 2014, in Reach E, for Broadkill Beach, there will be hopper dredging in September, October and November; and in year 2015 for Kelly Island there will be hopper dredging during the months of April through August.

As a result of the failure to implement even this most basic level of protection, following the recommended biological windows for a portion of the Deepening Project's work, the harms to the Atlantic sturgeon resulting from the Deepening Project will be further maximized. The Army Corps has not adequately considered or responded to the effects of ignoring biological windows, nor considered viable alternatives to the project that exist, including the existing process of lightering that allows oil and goods to transport up the River without the need for any deepening. Recall, according to the Army Corps:

the mix and volume of cargoes coming to the benefiting terminals **will be the same for either the current 40 foot or proposed 45 foot channel** depths. The project's navigation benefits from the channel deepening are based upon transportation cost savings from more efficiently managing

vessel-operating costs. There is **no induced tonnage as a result of the Deepening Project**

(2009 EA).

NMFS expressed concerns about impacts to Atlantic sturgeon in its April 16, 2009 letter to the Army Corps (submitted after the 2009 EA was completed and publicly issued) resulting from the Kelly Island and Broadkill Beach elements of the Deepening Project:

We are concerned that the deepening of the channel below river mile (RM) 32, and the construction of the Kelly Island and Broadkill Beach projects are scheduled during months that Atlantic sturgeon may be present in the project area and when the Delaware River Fish and Wildlife Management Cooperative has recommended that hopper dredges not be used. ... given the critically low population of Atlantic sturgeon in the Delaware River and the potential for the species to be listed as threatened or endangered in the near future, the ACOE should adhere to the recommended seasonable dredging restriction for hopper dredging below RM 32, and not dredge from June 1 to November 30.

(Attached Letter 14).

The Army Corps' response, that it will have observers who will monitor when Atlantic sturgeon are "taken" during the work of the Deepening Project, does not in any way minimize or avoid harm. Such monitoring will do nothing to protect the Atlantic sturgeon; it simply documents the impacts that are observed. It is not an appropriate response to the concerns of NMFS, NJDEP, DNREC, the Delaware Riverkeeper Network and others for a species so unique and at such critically low levels in our River. "For small remnant populations of Atlantic sturgeon, such as that in the Delaware River, the loss of just a few individuals per year due to anthropogenic sources of mortality [] may continue to hamper restoration efforts." (Attached Report 80). The magnitude and variety of impacts that the Deepening Project will cause -- from immediate harm to habitat harm to impeding spawning abilities of the species -- challenges to the very core the Army Corps' suggestion that its primary response is monitoring rather than avoidance of harm.

8. The Army Corps Has Failed to Address Impacts of Dumping at Buoy 10 for Atlantic Sturgeon:

The disturbance of benthic fauna, elimination of deep holes and alteration of rock substrates have been identified as of particular concern for Atlantic sturgeon. Atlantic sturgeon are substrate-dependent and as such have been shown to avoid soil-dumping grounds. (Attached Report 5). The spoil disposal planned for Buoy 10 that is part of the Deepening Project is therefore a threat and concern for Atlantic sturgeon; and it is a threat that has not been addressed by the Army Corps for the Deepening Project.

9. The Army Corps Has Failed to Address the Significant Risks that Deepening will Result in Diminished Spawning Habitat and Decreased Spawning:

The Deepening Project threatens spawning habitat for the Delaware River Atlantic sturgeon in a number of ways, including by blasting the rock ledge where spawning is believed to take place, by decreasing the reaches of the River available for spawning as the result of salt water intrusion/migration upriver, and by damaging spawning habitat.

Data demonstrates that Atlantic sturgeon spawning is occurring in the Delaware River. Atlantic sturgeon, in general, are believed to spawn in the flow water between the salt front and the fall line of the major river systems they spawn in. Spawning requires freshwater and a hardbottom substrate. Research is indicating that suitable spawning habitat exists between Marcus Hook (rkm 125) and Tinicum Island as well as between Tinicum Island (rkm 136) and the mouth of the Schuylkill River (rkm 148). Because of the availability of freshwater and hard-bottom substrates, spawning habitat is also believed to exist all the way up to Trenton (rkm 211). (*Attached Report 21 & Misc 21*).

According to the NJ Division of Fish & Wildlife “The spawning area for Atlantic sturgeon ... may well be the rock outcropping at Marcus Hook that will have to be blasted” as part of the Deepening Project. (*Attached Misc 21*). The effects from the blasting, therefore, can be two-fold: (1) the direct impact from the blasting on sturgeon in the vicinity and (2) the consequences of physically altering this spawning habitat area, e.g., changing the rock outcrop in a way that affects the sturgeon’s ability or willingness to use this area for future spawning.

Dredging in the portions of the River near Philadelphia is likely to be detrimental to the successful spawning of the Atlantic sturgeon in the Delaware – not just because of the act of dredging but also because of the degradation of spawning habitat.

Of great concern is that the Deepening Project will move the salt line further up River, further reducing available spawning grounds for the Atlantic sturgeon. Increased saltwater intrusion up river diminishes the available freshwater habitat needed for successful Atlantic sturgeon spawning. Researchers believe that some of the spawning areas:

are located much further upriver than historically reported spawning grounds (rkm75-130; Ryder 1890, Cobb 1899) which may, in part, be due to increased saltwater intrusion. The effects of increased saltwater intrusion on Atlantic sturgeon in the Delaware River although not well understood, may continue to play a role in the slow recovery of this population especially with the political and socio-economic pressure to expand dredging efforts in the river potentially furthering the saltwater intrusion and reducing available habitat.

(*Attached Report 21*)

Previous deepening of the Delaware River main channel and its maintenance dredging has already increased the tidal range of the Delaware Estuary. (*Attached Report 3 & Report 10*). A Briefing Paper provided by experts to the Delaware Estuary Program's Science and Technical Advisory Committee also discusses and cites resources to document that past dredging practices have affected morphology, hydraulics and sediment transport in the estuary and notes "[t]hese impacts are significant and have not been adequately addressed by the U.S. Army Corps of Engineers' environmental impact statements (1) and modeling studies (2) designed to assess potential effects of the 45-foot deep shipping channel." (*Attached Misc 3*). Since the release of this briefing document the Army Corps has still failed to properly address the emerging science on these issues and the implications of the Deepening Project for them and sturgeon.

Consumptive use and water diversions upriver have reduced freshwater flows. The combination of increased tidal fluctuation and reduced freshwater flows has caused saltwater to intrude further into the freshwater-tidal reach of the estuary, depriving the Atlantic sturgeon of freshwater habitat important for spawning. Ongoing dredging continues to change salinity and bottom habitats in ways that adversely affect the Atlantic sturgeon and its habits -- it is already believed that there may be a move upriver by the sturgeon as the result of increased saltwater intrusion. The proposal to deepen the Delaware River's main channel from 40 to 45 feet will exacerbate these conditions -- moving the salt line even further up river and so further shrinking the available spawning grounds for the Atlantic sturgeon. (*Attached Report 21*). The fact that past practices and upriver water consumption have already begun to take a toll in reducing habitat does not make the similar effects of deepening to be of less concern; to the contrary, it makes them of greater impact and greater concern.

Scientists researching the Delaware River Atlantic sturgeon have specifically discussed the consequences of dredging and deepening of the River for the species, including the effect it has had on habitats, changed tidal flows and specifically that past deepening has resulted in "saltwater intrusion in the freshwater-tidal reach of the estuary. This displacement of freshwater habitat may have negatively affected any potential success for the contemporary spawning population." (*Attached Report 21*). The increased saltwater intrusion resulting from deepening the River would continue to reduce the amount of spawning habitat available to the Atlantic sturgeon.

Experts from Delaware State University are already on record with the Army Corps years ago urging that they "consider how small changes in salinity" could impact the suitability of important areas of the river as spawning habitat and for larval rearing. According to these experts, changes as small as less than one part per thousand (<1ppt) "can effectively close [] regions to spawning during period of salt water intrusion...." (*Attached Letter 40*). The loss of freshwater habitat due to past dredging practices and water withdrawals that together caused increased saltwater intrusion resulted in a loss of freshwater habitat for Atlantic sturgeon that may already "have negatively affected recovery despite fishing moratoriums for the Delaware River Atlantic sturgeon population." (*Attached Report 83*).

Despite increasing information about Atlantic sturgeon spawning in the River and the adverse effects of deepening, including on this issue of saltwater intrusion and its effects on spawning, the Army Corps has chosen not to consider these impacts from the Deepening Project. This is a significant deficiency in the agency's analyses and consideration of the impacts of the Deepening Project. The experts are clear about the extent and significance of these impacts.

Other ways the Deepening Project could impact spawning habitat is by increasing the level of suspended sediments and contaminants in the water. An increase in suspended sediments could be detrimental to egg survival of Atlantic sturgeon – increasing the probability that eggs adhere to suspended solids and suffocate. Increasing contaminant loads can alter growth and reproductive performance. (*Attached Report 83*).

10. The Army Corps Has Failed to Consider the Damage, Degradation, and Loss to Other Life Stage Habitats of Atlantic Sturgeon that the Deepening Project Will Cause:

A wealth of new information and scientific study that has emerged since the 1997 SEIS regarding habitat important for sturgeon life stages has not been considered, addressed or responded to by the Army Corps. This important new information needs to be the subjected to the SEIS process.

The proposed ESA listing specifically identifies dredging as a factor in the destruction, modification, or curtailment of the Atlantic sturgeon's habitat and range. "Environmental impacts of dredging include direct removal or burial of organisms, elevated turbidity or siltation, contaminant resuspension, noise or disturbance, alterations to hydrodynamic regime and physical habitat, and loss of riparian habitat." (*Attached Misc 28*). NMFS further found:

Dredging and filling operations can impact important features of Atlantic sturgeon habitat because they disturb benthic fauna, eliminate deep holes, and alter rock substrates necessary for spawning. Deposition of dredge sediment has been shown to affect the distribution of Atlantic sturgeon. Dredging can also result in direct takes (killing and injuring) of Atlantic sturgeon. Such takes have the potential to affect the range of Atlantic sturgeon.

(*Attached Misc 28*).

During the summer months juveniles concentrate in three main areas, experts believe: Artificial Island (RM 89), Cherry Island Flats (RM 110) and the Marcus Hook Anchorage (RM 125).

The Marcus Hook Anchorage, according to ongoing tracking and tagging research, is highly used by the Atlantic sturgeon. According to the NJ Division of Fish & Wildlife "The spawning area for Atlantic sturgeon ... may well be the rock outcropping at Marcus Hook that will have to be blasted" as part of the Deepening Project. (*Misc 1*).

In addition, science continues to emerge about the use of this reach of the River for spawning, young of year and other life stages. (*Attached Report 31*). Marcus Hook has been found to be a favored spot of summering juveniles. Tagging and tracking research has shown that in summers of high salinity and high water temperature the Marcus Hook Anchorage is highly utilized by late stage juveniles. (*Attached Report 31*).

2010 tagging data increasingly document the importance of the Marcus Hook Anchorage and Range to Atlantic sturgeon in the winter months, particularly December through March (*Attached Misc 13*), precisely the months when the 2011 Draft EA schedule says blasting is to occur.

At a May 13, 2010 meeting with the Army Corps that included sturgeon experts it was stated, "The most recent data suggest that the Marcus Hook anchorage is high use area for YOY and subadults." (*Attached Report 58 – see both memo and attached Figure 4*).

Considering the dramatic levels of harm to be inflicted by the Deepening Project on these key habitat areas, full SEIS documentation, consideration, and review is needed. It is not just about the direct effect of the blasting, but the impacts of physically altering this area of year-round high importance to many life stages of Atlantic sturgeon. These indirect effects of altering the key habitats of the Atlantic sturgeon has not been discussed in the Army Corps assessments.

Additionally, there are specific areas in the Delaware River that are shown to

serve as concentration areas for subadult Atlantic sturgeon, therefore providing valuable nursery habitat during the growth phase of the life cycle. Abundance of subadult Atlantic sturgeon (800-1300 mm total length) may potentially be greater in the Delaware River than other estuaries, and therefore it likely serves as valuable nursery habitat for not only Delaware River population but subadults from other estuaries as well.

(*citations omitted, Attached Report 83*). This fact increases the importance of protecting the habitats of the Delaware River for Atlantic sturgeon as habitat degradation is likely to have more broad-ranging impacts for Atlantic sturgeon than the Army Corps has, to date, considered and analyzed in its NEPA or ESA documents.

Habitat selection by subadults is likely driven by a combination of salinity, water temperature, dissolved oxygen, depth, substrate type and prey resources. Specifically, there is growing evidence about the importance of salinity levels for subadult habitat selection. (*Attached Report 83*). To the extent the Deepening Project will decrease oxygen levels and alter salinity levels in the Estuary, it will adversely affect the habitats used and needed by subadults. The Army Corps has not looked at the consequences of such shifts.

Scientific studies (including the research and other documents submitted as part of this comment) on the Delaware River population of Atlantic sturgeon show that the entire Delaware Estuary provides important habitat, with the upper reaches of the estuary providing important spawning grounds and lower reaches important habitat for a mix of life stages. The Deepening Project adversely affects every important habitat area of Atlantic sturgeon – directly or indirectly – and yet the Army Corps continues to limit its consideration to how to scare sturgeon out of the blast zone at Marcus Hook and/or to watch for their deaths during dredging via monitors. This limited and myopic approach clearly violates the requirements of both NEPA and the ESA.

11. The Army Corps Has Failed to Consider That Deepening Contributes to Water Quality Degradation Harmful to Atlantic Sturgeon:

a) Oxygen levels:

Atlantic sturgeon are vulnerable to situations of high temperature and low oxygen. Reduced oxygen levels have been found to reduce growth rates, respiration rates and survival in Atlantic sturgeon. Science has shown a correlation between decreasing sturgeon populations and decreasing water quality due to increased nutrient loadings and an increase in hypoxic (low oxygen) conditions and locations.

“[D]issolved oxygen concentrations below 2 mg/l can be lethal to sturgeons.” (*Attached Report 83*) In one study, all Atlantic sturgeon exposed to oxygen levels of 3 mg/l at a temperature of 26C, when unable to otherwise access air, died. The DO criteria currently set by the DRBC for the Delaware Estuary is 3.5 mg/l. In the Philadelphia reach of the River, even this low oxygen level is not always achieved. Research has shown that a combination of low dissolved oxygen, water temperature, and salinity can restrict available Atlantic sturgeon habitat and that by increasing oxygen levels the amount of habitat available can be significantly increased (13% in the Chesapeake Bay). (*Attached Report 45*). Other fish also need and thrive on higher dissolved oxygen levels, those higher than 3.5 mg/l.

NMFS is on record, post the 2009 EA, expressing its concern about the potential for both direct and indirect effects from the Deepening Project on Submerged Aquatic Vegetation (SAV). (*Attached Letter 14*). SAV is important for oxygen levels in the River, which is an important water quality issue for Atlantic sturgeon and other fish species. The effect on SAV in the Delaware River, and the resulting effects on Atlantic sturgeon, has not been covered by the Army Corps’ NEPA documentation and analysis despite concerns expressed and data provided by NJDEP, NMFS, and the USFWS as well as information resulting from other projects that are currently under consideration by the Army Corps.

According to a Normandeau Associates report (*Attached Report 46*), SAV found in the proposed project area, an area that includes the Deepening Project, “is important for its function as a substrate for macroinvertebrates and as cover for small fish **as well as a source of dissolved oxygen for the water**. Vegetated intertidal and shallow subtidal habitat is not common along the Delaware River

Philadelphia waterfront and should be considered ecologically important along this shoreline.” (*emphasis added*).

The Philadelphia/Camden reach of the Delaware River is known to still suffer from an oxygen sag that can affect fish species, including their ability to reproduce and propagate. The oxygen sag is of such a concern that the DRBC is considering revising its regulatory requirements as they pertain to oxygen levels in the Estuary. Accordingly, removal/destruction of an area of submerged aquatic vegetation that is an important contributor of oxygen in this reach of the River is of heightened concern. As our regulatory agencies and communities take steps to increase oxygen levels for the benefit of ecologically, recreationally and economically important fish and aquatic species, the Army Corps must consider the adverse impacts of its actions on these efforts, with a special focus on Atlantic sturgeon.

b) Contaminants:

Because Atlantic sturgeon forage for and eat food that lives on the bottom of the River, because they have long life spans, and because they are subjected to contaminants in all of the habitats they use throughout their life cycle, they are believed to be particularly susceptible to environmental contamination. Toxic metals, PAHs (Polychlorinated aromatic hydrocarbons), organophosphate and organochlorine pesticides, PCBs (polychlorinated biphenyls) and other chlorinated hydrocarbon compounds have been found to harm fish by causing production of acute lesions, growth retardation, reproductive impairment, reduced egg viability, reduced survival of larval fish, delayed maturity and posterior malformations. Exposure to pesticides harms anti-predator and homing behavior in fish, as well as harming reproductive function, physiological development, swimming speed, and swimming distances. Deformities and ulcerations found in Atlantic sturgeon in the Brunswick River may be due to poor water quality as well as boat propeller injuries. (*Attached Report 25*).

Fish exposure to PCBs causes a higher incidence of fin erosion, epidermal lesions, blood anemia and altered immune response. PCB exposure in fish has also been found to cause reproductive failure and mortality.

Delaware River shortnose sturgeon have been shown to have a wide range of toxins in their tissues, including PCBs, PCDDs, PCDFs, DDE, and a variety of heavy metals (including aluminum, cadmium, copper) above adverse effect concentration levels.

Metals, including mercury, cadmium, selenium and lead (also referred to as inorganic contaminants) may cause death or sub-lethal effects in fish. Loss of the ability to reproduce, body malformation, the inability to avoid predation, and increased susceptibility to infectious organisms may result from the chronic toxicity of some metals. Heavy metal exposure, depending on the metal and the fish, can cause brain lesions, altered behavior, degraded vertebrae, and reduced survival and abundance of larvae. Heavy metals and organochlorine compounds accumulate in sturgeon tissue. (*Attached Report 25*).

While there has not been much research on the implications of these toxins for Atlantic sturgeon specifically, it has been found that pesticides, heavy metals, and other contaminants have been found in other sturgeon species at high enough levels to cause concern and to cause harm. (*Attached Report 25*). Dioxin, mercury, PCBs and chlorinated pesticides are considered to be contaminants of particular concern for Atlantic sturgeon populations in the Delaware River. (*Attached Report 25*).

Early life stages of Atlantic sturgeon have been found to be more susceptible to some contaminants than a variety of other threatened and endangered fish species, and more susceptible than fish species that are more typically used to test for the aquatic toxicity of contaminants (i.e. fathead minnow, sheepshead minnow, rainbow trout). (*Attached Report 25*). Increasing contaminant loads can alter growth and reproductive performance of Atlantic sturgeon. (*Attached Report 83*)

NJDEP's recent study regarding the discharges from the Killcohook Confined Disposal Facility (CDF) associated with Reach C Deepening Spoils concluded:

Despite the limitations of the available data, analyses have identified potential adverse impacts to water quality resulting from the discharge of dredged material dewatering effluent from the Killcohook Upland CDF with elevated concentrations of selenium, copper (dissolved), mercury, aluminum and cyanide.

(*Attached Letter 38*).

NJDEP's finding that CDFs are a source of heavy metals and toxins confirms earlier findings by Dr. Tom Fikslin regarding Army Corps CDFs. (*Attached Report 7; also further discussed later in this comment*). The ramifications of CDF heavy metal and toxin inputs for Atlantic sturgeon have not been addressed by the Army Corps as it continues to deny that the CDFs are a source of pollution to the River. But NJDEP's research confirms that, in fact, CDFs still are a source of toxic and heavy metal pollution to the River. The Army Corps must revisit its analysis regarding CDFs and their contamination consequences for the River, particularly as they pertain to Atlantic sturgeon.

12. The Army Corps Has Failed to Address Changes from the Deepening That Could Increase the Risk of Vessel Strikes:

NMFS has determined vessel strikes to be a "significant threat" to the New York Bight DPS of which the Delaware population is a part. (*Attached Report 25 & 68; and Attached Misc 28*). The change in traffic patterns and vessel traffic on the Delaware River resulting from the Deepening Project were not part of the record provided with the public notice for review and comment.

A new study, done in response to the proposed listing of Atlantic sturgeon, has looked at the issue of vessel strikes. 50% of the mortalities of Atlantic sturgeon in the Delaware River between 2005 and 2008 were the result of vessel strikes. The

remaining 50% were too decomposed to determine if they were caused by vessel strikes but it is likely most were. “For small remnant populations of Atlantic sturgeon, such as that in the Delaware River, the loss of just a few individuals per year due to anthropogenic sources of mortality, such as vessel strikes, may continue to hamper restoration efforts.” (*Attached Report 80*). According to a 2010 research article on vessel strikes, “Both the dredging to deepen the channel and the subsequent increase in large vessel traffic may further hamper the recovery of the Delaware River Atlantic sturgeon population.” (*Attached Report 80*). Of critical importance, this study is concerned about the size of the vessels resulting from deepening as opposed to any increase in volume of vessels.

The Army Corps’ NEPA and ESA documents have failed to consider the most up-to-date information on the impacts of vessel strikes on sturgeon or the degree to which the Deepening Project will further increase vessel strikes.

In sum, the actual and potential risks to Atlantic sturgeon and the species’ habitat, both individually and cumulatively, demonstrate that the Army Corps is legally obligated to undertake a new and up-to-date SEIS.

C. The Potential for the Deepening to Cause or Significantly Contribute to the Further Decline of the Endangered Shortnose Sturgeon Underscores the Need for an Up-to-date SEIS Review Based on New and Readily Available Information.

The impacts of rock blasting, habitat alteration, water pollution and water quality degradation, and salt line movement for spawning apply to the Shortnose sturgeon as well as to the Atlantic sturgeon.

Since the 1997 SEIS, NJDEP’s Division of Fish and Wildlife has expressed the need for addressing “impacts to new wintering areas for shortnose sturgeon that were not evaluated in the previous SEIS.” According to the NJDEP Division of Fish & Wildlife, Shortnose sturgeon have been documented using the River all the way down to south of the C&D Canal, with young of year documented around the mouth of Oldman’s Creek. (*Attached Misc 1*). These data were not considered in either the 2009 EA or the 2011 Draft EA documents.

Recent study confirms that juvenile Shortnose sturgeon are sensitive to low dissolved oxygen concentrations and higher salinities. As a result, the fact that the Deepening Project will both move the salt line and reduce the level of SAV available to create oxygen to support Shortnose sturgeon habitat could have a significant effect on the species the Army Corps must consider. (*Attached Report 74*)

According to the USFWS, the “principal threats” to Shortnose sturgeon “survival are mortality resulting from dredging, impingement on the cooling water intake screens, and incidental capture. Secondary threats include habitat degradation or loss by dredging, bridge construction and dams (National Marine Fisheries Service, 1998).” (*Attached Letter 5; Letter from US Fish and Wildlife Service to the Army Corps of Engineers Philadelphia District, February 11, 2003*).

The leading expert, whose opinion is the basis for many of the Army Corps' assertions regarding impacts to shortnose sturgeon, commented in 1997 that there is not enough science or knowledge to support the Army Corps' claims that the blasting and deepening will not adversely affect the Delaware River shortnose sturgeon. (These comments can be found in the final 1997 SEIS: *Letter from John C. O'Herron, II, O'Herron Biological and Environmental Consulting, to John Brady, Army Corps of Engineers Philadelphia District, February 15, 1997*).

- ✓ “The basic information [] that was utilized in the document regarding shortnose sturgeon in the Delaware Estuary is not only dated (studies ended in 1987), but also does not reflect the current circumstances of shortnose sturgeon occurrence.” (Please note that in 1997 Mr. O'Herron was already referring to the 1987 studies as dated.)
- ✓ “To date, no one has resolved, or even touched upon, the temporal and spatial occurrence aspects of shortnose sturgeon young (young-of-the-year and older juveniles) in the Delaware Estuary. The protection of this life stage(s) is critical to the survival of the population. There is every reason to believe that these young are to be found along the freshwater side of the oligo/mesohaline transition boundary within the federally maintained navigation channel. This puts the young at considerable risk, especially since they likely occur on a seasonal basis in the vicinity of Marcus Hook where both dredging and blasting are planned to occur.”
- ✓ “However, shortnose sturgeon do frequent the lower estuary and occurrence within the deeper waters is consistent with their behavior elsewhere in the estuary. With this information, one must recognize that the proposed dredging project will impact a great deal of shortnose sturgeon habitat in one fell swoop, and then again and again as needed to maintain the proposed additional five feet of project depth.”
- ✓ The recommended dredging windows of the Delaware Basin Fish and Wildlife Management Cooperative [] were not designed to protect shortnose sturgeon...”
- ✓ “However, the wintertime occurrence of young and adult shortnose sturgeon between Cherry Island Flats (River Mile 73.5) and the Little Tinicum Island (River Mile 85.5) has never been assessed and no assumption can be made that shortnose sturgeon will not be present during blasting operations at Marcus Hook.”
- ✓ “The movement of shortnose sturgeon during the 1990's and beyond is likely quite different from that observed during the 1980's when most of the population was pollution-locked into the upper tidal Delaware River. With that in mind, shortnose sturgeon occurrence within the federal navigation channel from Petty Island (River Mile 103) to the sea may be far more persistent than earlier imagined.”
- ✓ “The biological assessment of impacts to shortnose sturgeon as a result of the proposed channel Deepening Project used dated material that is out-of-

place and some of its assertions are incorrect. Furthermore, that assessment cannot speak to the occurrence of shortnose sturgeon young. It is more than likely that the young are negatively impacted (this connotes negative impact to the entire population and lessens its' survivability) by routine maintenance dredging conducted from the oligo/mesohaline transition boundary to upstream. The proposed project will require dredging in the presumed area of greatest young shortnose sturgeon occurrence for an extended period of time. The impact will be chronic and acute. A no impact conclusion is inappropriate until the temporal and spatial occurrence of these young has been clearly documented and it is demonstrated that the project can be accomplished without jeopardy to the species. ... It is impossible to conduct this project with a lack of knowledge regarding the whereabouts of the young and at the same time guarantee no negative impact/jeopardy to the Delaware Estuary's shortnose sturgeon population."

It is known that "... blasting does have an adverse impact on fish." (AR031387.001, Record No. I0009). Referring to Shortnose sturgeon, NMFS has stated: "... it is apparent from the study results that blasting may injure the species both internally and externally." (AR031387.001, Record No. I0009).

O'Herron points out that Shortnose sturgeon in the Delaware Estuary are "very frequently found in aggregations ranging in numbers of a few to thousands.... The predisposition to occur in aggregations makes a large number of individuals vulnerable to negative impacts at any one place or time. So much so, that when one encounters a dead shortnose sturgeon the first question to ask is, 'how many others?', and not, 'were there any others?'"⁴

The new information and data on sturgeon amassed since John O'Herron's 1997 comment letter supports that there should be a higher, not a lower, level of concern for the impacts of the Deepening Project on Shortnose sturgeon.

The 2009 EA conclusion that Shortnose sturgeon do not aggregate near Marcus Hook is not well substantiated. The study from which this conclusion was drawn was exceedingly limited: too limited to draw such a meaningful conclusion in the context of deepening and blasting. Further, this conclusion, along with the other conclusions in the 2009 EA, was never subject to the rigors of public and agency review and comment because the Army Corps refused to allow comment on a draft of the 2009 EA. Finally, the 2009 EA only considered the blasting issue, not the habitat, water quality, saltwater intrusion and other issues that have been identified by agencies and experts and are substantiated by readily available data. Nor have these issues been considered in the 2011 Draft EA. Hence, the variety, magnitude, and significance of the impacts the Deepening Project will have on Shortnose sturgeon have never been given proper NEPA consideration, review or assessment.

⁴ Letter, John C. O'Herron, II to John Brady, Army Corps of Engineers Philadelphia District, February 15, 1997, regarding the Draft Supplement Environmental Impact Statement
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Additional Sources for sturgeon information:

- Attached Misc 1-- Letter from Clifford G. Day, Supervisor, USFWS NJ Office to Robert L. Callegari, US Army Corps of Engineers, June 8, 1999
- Attached Report 14 “Delaware River Deepening -Dumped Again,” March 1, 2007

D. Deepening is a Direct Threat to Horseshoe Crabs and Migratory Shorebirds and Necessitates an Up-to-date NEPA SEIS Analysis.

The Delaware Bay is critical habitat to more than 400 species of birds and migrating shorebirds. In fact, the Delaware Bay “is one of the most important stopover sites in North America for long distance migratory shorebirds.” (*Attached Report 38*). Each spring, at least 11 species of birds, including the red knot *rufa*, stop over on the Delaware Bayshore to feed on the eggs of the horseshoe crab and thereby fuel their annual spring migration.



Photo provided by Lanny McDowell

The red knot *rufa*, based on its precipitous decline in recent years, has been identified as a candidate species for listing under the Federal Endangered Species Act and was proposed on January 18, 2011 for listing as endangered under New Jersey’s Endangered and Nongame Species Conservation Act. (*Attached Misc 17*). In August 2011 the USFWS will begin the listing determination process for the Red Knot.

Available scientific studies clearly indicate a large decline in shorebirds that is directly linked to decreasing shorebird weights and their decreased ability to feed themselves with horseshoe crabs eggs when they arrive along Delaware Bay beaches during their spring migration. Horseshoe crab numbers are at historic lows, resulting in low abundance and availability of horseshoe crab eggs for migratory shorebirds. Additionally, the bio-medical industry that is vitally important to the health and safety of the country also depends upon healthy populations of horseshoe crabs for the irreplaceable substance found only in horseshoe crab blood. As crabs take 7-10 years to mature, we have a long way to go before historic densities of eggs will once again be found on the beaches of the Delaware Bay. We cannot afford actions and decisions that set this trajectory back.

Peak counts of red knots on the Delaware Bay stopover have declined by 70% since 1998. Other shorebirds that rely on horseshoe crab eggs, such as ruddy turnstone, semipalmated sandpiper, sanderling, dunlin and short-billed dowitcher have also declined in number on the Delaware Bay migratory stopover. During the period from 1998 to 2007, all of these species declined by approximately 64%. The ruddy turnstone declined by a severe 82%. In 2010, ruddy turnstone numbers were among the lowest ever recorded, a mere 18,231. The sanderling declined by 61% and the short-billed dowitchers suffered a decline of 74%. These species, together with red knots, make up 99 percent of the shorebird concentration in
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Delaware Bay. All are dependent upon horseshoe crab eggs for all or most of their diet during the stopover, and all have significantly declined in population. (Attached Report 44 & Report 35 & see also Report 24).

In 1982, 95,530 red knots were counted on the shores of the Delaware Bay. In 2010, only 14,475 were observed during the same time period. (Attached Report 35).

Regarding horseshoe crabs in the Delaware Bay, the Delaware Trawl Survey shows no significant trend of increase; neither does the Virginia Tech Offshore Trawl Survey. According to the “Status Update for the Red Knot” issued April 2011, juvenile horseshoe crab abundance in 2010 declined and “There is no evidence of a significant increase in the mature horseshoe crab population in the Delaware Bay Spawning Crab Survey, the Delaware 30-foot Trawl Survey or the Virginia Tech Benthic Trawl Survey.” (Attached Report 35; see also Attached Report 18).

In the past 5 years, when efforts to protect horseshoe crabs and the volume of horseshoe crab eggs available for migratory shorebirds have been at their greatest, “there has been no significant change in the population of adult crabs” over this period, and “[t]here has been no substantive improvement in the annual mean egg densities in NJ and DE.” And, in fact, “[t]en years of horseshoe crab surveys have shown no significant improvements in adult crab abundances ... or spawning females.” (Attached Report 38).



In New Jersey, egg densities have not improved and have remained low in the 2005 to 2010 time frame. Similarly, in Delaware, egg densities also did not improve and to the extent there was a trend in egg density it was “non-significant and negative.” At a minimum, a density of 50,000 eggs/sq. meter over 50% of suitable spawning beaches is needed to allow red knots and other shorebirds to begin to recover. All beaches surveyed from 2005 to 2010 in DE and NJ were below this threshold, except for Mispillion Harbor in DE. As a result the beaches are unable to support recovery of the diminishing shorebird populations or to support a population if it were recovered. (Attached Report 38; see also Attached 44).



This highlights the vital importance of protecting the horseshoe crabs and eggs that we do have. The horseshoe crabs and shorebird populations dependent upon them are not in a condition that would allow any take that results in the reduction of eggs available for migratory birds. This is a new body of data that continues to grow and continues to be ignored by the Army Corps in its NEPA analyses of the Deepening Project.

From the “Delaware Bay Egg Survey: 2005-2010” there is some suggestion that egg densities may be higher on the Delaware side of the Bay than on the New

Jersey side. This may be the result of differing data collection methods. But if there is some accuracy to the finding, then it makes it even more important to protect the Delaware Beaches and spawning areas as they may be of greater importance for spawning horseshoe crabs, egg densities, and therefore shorebirds, raising even higher the flag of alert for the damaging consequences of Kelly Island and Broadkill Beach spoil disposal plans discussed in this comment. (*See Attached Report 38*).

Much of the recreation and culture of the New Jersey Bayshore is linked to the spawning of the horseshoe crabs and the annual arrival of the migratory shorebirds, including the red knot. The arrival, feasting and migration of the shorebirds supports a multi-million dollar ecotourism industry. Birding and outdoor enthusiasts from all over the world flock to the Delaware Bay shore to watch the spectacular feeding frenzy. During their visits, they buy recreation-related goods and services, stay in the region's hotels, visit parks and patronize restaurants and local shops. According to one report, horseshoe crab-dependent ecotourism generates between approximately \$7 million and \$10 million of annual spending in Cape May, New Jersey alone, and creates 120 to 180 related jobs, providing an additional \$3 million to \$4 million in social welfare value. According to a New Jersey Department of Fish and Wildlife report, the economic value of the horseshoe crab and migratory bird phenomenon seasonally for the Delaware Bay shore area is over \$11.8 million with over \$15 million of economic value generated if other beneficiaries beyond New Jersey are included. Annually, it provides \$25 million in benefits to the Delaware Bay shore region and \$34 million regionally. Because most of these expenditures occur in the "off-season", they are particularly valuable to local economies. (*Attached Reports 73 & 54; see also Attached Report 20*).

The continuing existence of the horseshoe crab and migrating shorebird phenomenon is vital for the related ecotourism industry. Of those surveyed, only 6.6% said that the horseshoe crab and shorebird phenomenon was unimportant to their visitor satisfaction. On average those surveyed said they would be willing to pay as much as \$212.45 (in decreased annual household income) annually for a program to protect these resources; and that they would "be willing to tolerate no more than 50.7% decline in Horseshoe Crabs and migratory shorebirds before they would cease visiting the Delaware Bay shore area." (*Attached Report 54*)

In response to the dramatic declines, the red knot *rufa* is a candidate species for listing as endangered under federal law. It is also proposed for listing as endangered in New Jersey. (*Attached Misc 17*). The listing of the red knot will necessarily require increased and ongoing protections of their stopover habitat – the beaches of the Bayshore. It will also necessitate ongoing protection of their primary food source when they land here – the eggs of the horseshoe crabs. Other birds that have been in decline may not yet be federally or state listed, but the ecological and economic effects of their declines have a major impact on the region.

The spoil disposal plan for the Deepening Project depends upon 2.5 million cubic yards of dredge spoils being dumped at Kelly Island and 1.6 million cubic yards

being dumped on Broadkill Beach. A new report, titled “Investigation and Review of the Surface and Sub-Surface Sediment Distribution of Reach E for the Delaware River and Bay Main Channel Deepening Project,” (*Attached Report 29*), documents that the Army Corps’ scientific data and analyses used to assess and plan the Kelly Island and Broadkill Beach projects are highly deficient and scientifically questionable. The report also documents that the Broadkill Beach and Kelly Island spoil disposal projects will significantly harm horseshoe crabs, their spawning success, and the viability and development of eggs laid on those spoil disposal areas. Findings of the report include:

- ✓ “...**numerous discrepancies and sampling errors** were found. The existing data collected by the PD-ACOE is therefore considered inadequate ...”
- ✓ “An **artificial skewing** of the grain size results occurred due to the **inappropriate sampling** scheme.”
- ✓ “The **sediment sampling errors, discrepancies in grain size descriptions, and gaps** in core locations reduce the validity of the PD-ACOE’s efforts to accurately characterize the sub-surface sediments for Reach E.”
- ✓ Regarding Kelly Island the report finds “...it is **doubtful** that a CDF design could **pass a rigorously engineering and geological review.**”
- ✓ “The discrepancy between grain sizes means that **the requirements set by the ASMFC Fishery Management Plan for Horseshoe Crab** that placed sediment matches existing conditions **would not be met.**”
- ✓ “...these beneficial use sediments would be inadequate for horseshoe crab habitat.”
- ✓ “... the proposed beach to be constructed **would likely have a detrimental effect on horseshoe crab spawning habitat.**”
- ✓ “The potential Broadkill Beach nourishment by the PD-ACOE does not meet the beneficial use requirements for this project, if anything it would negatively impact the prevalence of horseshoe crab spawning habitat and **impede horseshoe crab egg development.**”
- ✓ “...it is essential that information be provided to the State of Delaware indicating that the beneficial use projects will be able to achieve their proposed purpose and **not become a financial burden and/or ecological catastrophe.**”

DNREC confirms that shorebirds too will be negatively affected: “The proposed beach will be of poor quality for horseshoe crabs and shorebirds.... Minimal if any habitat benefits for horseshoe crabs, and key species of shorebirds, can be expected to be realized from the project.” (*Attached Letter 34*).

DNREC has provided this new Investigation and Review Report (*Attached Report 29*) to the Army Corps. It is significant and substantial information about the serious, deleterious impacts of the Deepening Project for horseshoe crabs and the

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several species of migratory shorebirds discussed, including the ESA candidate species red knot *rufa*.

These harmful impacts to horseshoe crab spawning and egg development is also significant new information relevant to all species dependent upon the horseshoe crabs in any dietary way, including carnivorous loggerhead turtles for which horseshoe crabs are a significant prey species. Even if the horseshoe crab is only a portion of the diet of a species, if that portion of their diet is removed due to lack of availability, there could be detrimental cascading effects to other species that have to be analyzed and considered. For example, as discussed below, the decrease in availability of horseshoe crabs has been documented to cause loggerheads to target finfish and to scavenge from fishery gear, thereby increasing the levels of loggerhead take in fisheries.

The harm caused by the Kelly Island and Broadkill Beach dredged spoil disposal projects to horseshoe crabs and their spawning success is also a threat to the biomedical industry that gets a large proportion of their crabs for bleeding from the Delaware Bay horseshoe crab community. (*See Attached Misc 43 & 32*). Any project that will further diminish the horseshoe crabs populations of the Delaware Bay affects the biomedical industry, the economic contributions it provides to the nation, and the health and safety benefits it provides to the nation and world. These effects and this new data on the negative impacts of deepening spoil disposal plans must be considered through a new, in-depth SEIS process.

The USFWS has also expressed concerns about the impacts of dredge spoil disposal plans on horseshoe crabs. The USFWS has noted that additional NEPA documentation is necessary in order for the agency to make a determination on proposals to place dredge materials at Kelly Island, and Port Mahon and Broadkill Beach. (*Note: Port Mahon has been taken out of the Army Corps' current disposal plans for the Deepening Project*). The USFWS has expressed concern about the potential of the Army Corps' proposed beach nourishment projects to kill one to two year-classes of juvenile horseshoe crabs during initial construction and during each renourishment period. Biologists have said that smothering even one generation of juvenile horseshoe crabs could further threaten the sustainable population. (*Attached Letter 4, and personal communication by David Conrad, National Wildlife Federation with NJFO fisheries biologists, December, 2001. Additional detail on this issue can be found in Attached Report 3 by the Delaware Riverkeeper Network and National Wildlife Federation*).

While the landside construction for Broadkill Beach is currently slated for September, October and November, horseshoe crab spawning can occur from March through December, and so while September through November may not be prime spawning months, that does not mean about the project will not adversely affect juvenile horseshoe crabs. The Army Corps has neither analyzed nor discussed the implications of this timing. And the truth is that while changing the months might reduce this particular harm, it does not eliminate it as a real threat to the population. This potentially very significant harm must be analyzed, considered, and weighed along with all other impacts in a new NEPA SEIS process.

Horseshoe crab and shorebird populations remain well below historic levels, leaving them highly vulnerable to changing conditions. Actions cannot and should not be taken that risk reducing their numbers further. The Deepening Project threatens the spawning and egg development and viability of horseshoe crabs, thereby impeding their ability to increase in population size and to provide the eggs necessary (now or in the future) to support the migratory shorebirds that are so important ecologically and economically to our region, and potentially confounding the future ability of horseshoe crabs to continue to support the biomedical industry and the commercial horseshoe crab fishery. New Jersey has taken strong steps to protect horseshoe crabs in order to protect shorebirds; likewise strong action has been taken by the ASMFC. It is counter to all that good state and federal protective work that has been carried out with federal and state money to allow the Deepening Project to undo it.

The data regarding shorebirds and horseshoe crabs submitted in this comment, along with supporting data and documentation, is new and substantial information that necessitates updated NEPA analysis and demonstrates the need for an up-to-date SEIS.

A June 2005 Army Corps document, *“Pre-Construction, Horseshoe Crab Monitoring; Egg Island, New Jersey and Kelly Island, Delaware Wetland Restoration Areas”* prepared by Versar, Inc. does not lay to rest the concerns for impacts to horseshoe crabs. There is no indication on the record that this report was ever reviewed or commented on by the USFWS nor does it include the Broadkill Beach site. The report acknowledges that the proposed project will violate the April 15 to August 31 biological window on shoreline construction projects for protection of horseshoe crabs and as a result will do harm to horseshoe crabs and spawning:

Given operational and scheduling constraints, the reconstruction projects for Egg Island and Kelly Island may be jeopardized if they are held to the restricted interval in its entirety. ... The reconstruction of Egg and Kelly Island will likely span over a year, and therefore overlap with time of spawning for horseshoe crabs. Once the construction project is initiated, it must be carried on until completion.... By this circumstance, impacts to horseshoe crabs will be unavoidable for at least one spawning season.

(Versar Inc. for the Army Corps of Engineers, Pre-Construction, Horseshoe Crab Monitoring; Egg Island, New Jersey, Kelly Island, Delaware Wetland Restoration Areas, June 2005).

The 2011 Draft EA construction timeline continues to show a violation of this biological window for the Kelly Island construction project.

The rationale put forth by the Army Corps is that, while the impact to the horseshoe crabs is “unavoidable,” the benefits are overriding. But this does not allay the USFWS concern that the replenishment project will require renourishment after initial construction or the concern of experts that smothering even one generation of juvenile horseshoe crabs could further threaten a

sustainable population. (*Attached Letter 4*). It also does not mesh in light of the ongoing harm that Kelly Island and Broadkill Beach will, according to DNREC (*Attached Report 29*), be inflicting on horseshoe crabs by impeding both successful spawning and egg development/viability. The impacts during construction will not be ameliorated after construction is completed; rather, they will be compounded and ongoing. See further discussion on Broadkill Beach and Kelly Island in this Comment.

There is also the concern that by making Broadkill Beach and Kelly Island look more attractive to crabs, but in fact be devastatingly harmful upon their arrival, these projects might attract crabs from other spawning beaches where they might have spawned successfully but now will be doomed to spawning failure. What would be the effect of this attractive nuisance on horseshoe crab spawning success and how will this compound, exacerbate and increase the population level harms to horseshoe crabs promised by the Broadkill Beach and Kelly Island projects? Additionally, how often will the Army Corps engage in renourishment of these sites, which will result in the literal burying of adults that may be found there, further compounding the harm by killing spawning females that are already at such alarmingly low levels? These questions must be fully addressed in a new NEPA SEIS and commented on by the public and expert agencies.

In a May 21, 2010 letter (*Attached Letter 46*) the Army Corps promised changes in construction and timing with regards to the Broadkill Beach site – a change that appears to be reflected in the 2011 Draft EA. Given the broad range of harmful impacts both short-term and long-term, these issues must be discussed and opened for public and expert comment in a new SEIS process.

With regards to the horseshoe crabs studies used by the Army Corps in their justifications, NMFS is on record as stating:

The blue crab and horseshoe crab studies should be updated due to the age of the existing data generated by the ACOE, the changes in the ecological conditions of the Bay, the availability of new data from other sources, and the changes in the status of the stocks.

(*Attached Letter 14*).

The USFWS also has asserted the need for the Army Corps to use the most recent data for its horseshoe crab and migratory shorebird assessments:

New information is available regarding the resource value of horseshoe crabs [] eggs to migratory shorebirds, particularly for red knot, and the need to protect/restore horseshoe crabs and their habitats within the project area.

The USFWS specifically urges review of “new information compiled by the Atlantic States Marine Fisheries Commission, U.S. Geological Survey and the States of Delaware and New Jersey....” (*Attached Letter 11*).

Successful spawning and egg development are important for the future survival of the species. Beach dynamics and sediments are important to determining whether there will in fact be spawning success. *Attached Misc 37* discusses these various beach dynamics and should be considered by the Army Corps in its assessment and development of the Broadkill Beach and Kelly island projects it asserts are intended to benefit horseshoe crabs and their successful spawning. (*Attached Misc 37*).

It is important to note that, as the result of the Atlantic States Marine Fisheries Commission's actions, the harvest of horseshoe crabs in Delaware Bay is strictly regulated and limited. It is limited because of the dramatic declines that have been seen in recent years and the vital importance of ensuring that spawning horseshoe crabs and their eggs are not removed from the population or the beaches because doing so harms both the horseshoe crab and the migratory bird populations of the Delaware Bayshore region. The harvest that is allowed is restricted to males only. In New Jersey, the concern based on the science is so high that legislation has been passed putting in place a moratorium on the harvest of horseshoe crabs until such time as the horseshoe crab and migratory shorebird populations have been sufficiently restored to health.

The horseshoe crab takes that will result from the Army Corps' activities associated with the Deepening Project are not limited in quantity and are not limited by sex. It is irresponsible and unfair that the horseshoe crabbers of the region should be denied harvest (a decision we agree with) and yet the Army Corps is going to be allowed to kill an unknown number of males and females of all ages. The harvest limit on horseshoe crabs in the Bay is very strict – as the result of good science, good policy, good thinking and good sense – and should not be undermined by the Army Corps' Deepening Project.

It seems from a May 13, 2010 "Summary of Meeting" document (*Attached Report 58*) that there has been discussion about Broadkill Beach and horseshoe crabs and the dredging time frames. The elements of this private discussion were not subject to the rigors of public comment and an SEIS process. Experts and expert resource agencies, both state and federal, have raised serious concerns about the impacts of the Deepening Project and dredged spoil disposal on horseshoe crabs. The significance and magnitude of these concerns mandate a new NEPA SEIS process with full and open public and expert comment.

Clearly, any project that threatens harm to horseshoe crabs is of major and substantial concern. Data about the horseshoe crabs, the red knot *rufa* and the other migrating shorebirds has been amassed on an annual basis by experts. The Army Corps has not taken into consideration the wealth of horseshoe crab and migratory shorebird data currently being put together every year for purposes of informing horseshoe crab harvest regulations and shorebird protection strategies. The Army Corps has not considered the wide ranging ecological, cultural, and economic implications of the Deepening Project as a result of the many harms that will be inflicted on horseshoe crabs and their successful spawning.

In the face of this significant new information and the substantial concerns of experts and resource agencies at both the federal and state levels, the Army Corps absolutely must undertake a new, in-depth, up-to-date analysis of these issues in the context of a new SEIS process.

E. The Army Corps Has Not Fulfilled Its Legal Obligations under NEPA and the ESA with Regards to Loggerhead Sea Turtles.

The loggerhead sea turtle (*Caretta caretta*) has been listed as a threatened species under the Endangered Species Act since 1978. 43 Fed. Reg. 32,800 (July 28, 1978). Critical habitat has never been designated for the species. Loggerheads, like other species of sea turtles, are important to conserve not only in their own right but also because of the key roles they play in maintaining healthy and functional oceanic and coastal ecosystems. (See *Attached Reports 57 and 60; Misc. 36*) Yet despite more than thirty years of protection under the ESA, the loggerhead continues to face significant threats from human activities and its population continues to decline. (See generally *Attached Misc. 18*) (*Proposed Listing of Nine Distinct Population Segments of Loggerhead Sea Turtles as Endangered or Threatened*, 75 Fed. Reg. 12,598 (March 16, 2010))(2010 Proposed Rule).

Both juvenile and adult loggerheads are found in the Delaware Bay, with the greatest numbers occurring between June and October. The estuarine waters of the Delaware Bay constitute important developmental habitat for juvenile loggerheads as well as an important foraging area for the species. Estuarine habitat in of the Delaware Bay also provides important habitat for the loggerhead's prey species, particularly benthic invertebrates such as crabs (especially horseshoe crabs). (*Attached Letter 49 at 7-8; Attached Report 55 at I-27; Attached Misc. 19; Attached Misc. 24*). Loggerheads tend to congregate in channel habitats; in the Delaware Bay, they are most commonly found along the shipping channel into Philadelphia. (See *James R. Spotila, Sea Turtles: A Complete Guide to Their Biology, Behavior, and Conservation, Johns Hopkins University Press (2004) at p. 174.*)

In November 2007, Oceana and the Center for Biological Diversity petitioned USFWS and NMFS to designate the western North Atlantic subpopulations of loggerhead sea turtles as a distinct population segment (DPS) and to reclassify this DPS as endangered under the ESA. (*Attached Letter 49*). The loggerhead sea turtles that use and occupy the Delaware Bay are part of this proposed distinct population segment, based on their genetic distinctness from nesting populations in the South Atlantic, Pacific, and Indian Oceans and the Mediterranean Sea. (*Attached Letter 49 at 5*) The petition provided strong evidence that the western North Atlantic loggerhead sea turtle population is experiencing a significant population decline.

In March 2008, NMFS published its finding in the *Federal Register* that this petition presented substantial scientific information indicating that the petitioned action may be warranted. 73 Fed. Reg. 11,849 (March 5, 2008). Thereafter, NMFS assembled the Loggerhead Biological Review Team (BRT) to complete an updated status review of the species. The BRT issued its updated status review in August

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2009, after the issuance of the final July 17, 2009, Biological Opinion on the Deepening Project, in a document titled “Loggerhead Sea Turtle (*Caretta caretta*) 2009 Status Review under the Endangered Species Act.” (*Attached Report 76*).

NMFS also released two other significant documents in 2008 and 2009: the “Second Revised Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (*Caretta caretta*),” issued in December 2008 (*Attached Report 55*) (*2008 Recovery Plan*), and “An Assessment of the Loggerhead Turtle Population in the Western North Atlantic,” completed in 2009 by the Turtle Expert Working Group (TEWG) (*Attached Report 98*) (*2009 TEWG Report*).

The 2009 Status Review substantiated the petition findings regarding the qualification of the Northwest Atlantic loggerhead population as a DPS. (*Attached Report 76 at 27-29, 30, 33-35*). The 2009 Status Review further determined that the Northwest Atlantic DPS demonstrated a high likelihood of population decline on the species’ current trajectory, putting it at risk of extinction. (*Attached Report 76 at 164*).

Among the many threats cumulatively causing the decline of the Northwest Atlantic DPS that may be caused or exacerbated by the Deepening Project, the 2009 Status Review identifies channel dredging and the disposal of dredged material and the resulting benthic habitat degradation or destruction as threats of concern. (*Attached Report 76 at 131*). Such habitat degradation or destruction may adversely affect loggerhead resting or foraging grounds. The 2009 Status Review also highlights the decline in the horseshoe crab population forcing loggerheads to target fish species and forage in or around fishing gears, which are responsible for countless turtle deaths each year. (*Attached Report 76 at 131*). Dredging of sediments from navigation channels is well-documented to result in direct mortality and injury to loggerheads. (*Attached Report 76 at 138*). Hopper dredges, such as those that will be deployed in the Deepening Project in Reaches D and E, are known to be a source of loggerhead mortality and injury. (*Attached Report 55 at I-55, I-72*) (*2008 Recovery Plan*).

In March 2010, NMFS issued the 2010 Proposed Rule to delineate nine distinct population segments of loggerhead sea turtles and to list two as threatened and seven as endangered. The Northwest Atlantic Ocean DPS was determined to host the most significant nesting assemblage in the western hemisphere and to be one of the two largest nesting assemblages of loggerheads in the world, demonstrating its critical importance to the survival of the species as a whole. 75 Fed. Reg. at 12,614. Yet because of the significant, overall decline of nesting within this DPS, and the numerous threats it faces, NMFS proposed to list the Northwest Atlantic Ocean DPS as endangered, reiterating many of the threats stated by the BRT, including channel dredging and the resulting degradation or destruction of benthic habitat, the decline in horseshoe crab availability leading to greater foraging in or around fishing gears and on discarded bycatch, and direct mortality and injury from dredging equipment. *Id.* at 12,626-27, 12,630. In addition, vessel strike mortality is increasing and is likely also a significant threat to the DPS. *Id.* at 12,645.

In the 2009 Biological Assessment written by the Army Corps for its ESA Section 7 consultation with NMFS, as well as in the 2009 Biological Opinion subsequently issued by NMFS, both agencies considered the impacts of the Deepening Project on the threatened loggerhead sea to determine whether adverse effects of the Deepening Project would or would not rise to the level of jeopardy. (*See, e.g., NMFS Biological Opinion of July 17, 2009 at pp. 16-24, 60-62, 101-104.*)

Because of the 2010 Proposed Rule and the possibility that NMFS will issue a final rule listing the Northwest Atlantic Ocean DPS as endangered, the Army Corps wrote the March 2011 Biological Assessment and re-initiated consultation with NMFS to obtain a conference opinion that will become the final biological opinion if and when the final listing is published.

1. The 2011 Biological Assessment and the draft 2011 Environmental Assessment Are Not Based on the Best Available Scientific Information:

The 2011 Draft EA, although referring to the 2010 Proposed Rule, does not update its discussion of the loggerhead sea turtle's status or its analysis of the Deepening Project's impacts on the species. Rather, it merely states that it incorporates by reference the discussions and analyses of the January 2009 Biological Assessment and the July 2009 Biological Opinion, without taking into consideration the new information post-dating these documents as reflected in the 2008 Recovery Plan, the 2009 Status Review, the 2009 TEWG Report, and the 2010 Proposed Rule. Neither the 2011 Draft EA nor the March 2011 Supplemental Biological Assessment references these documents nor the most recent scientific papers cited therein. Therefore, the Army Corps' Biological Assessment and draft Environmental Assessment documents are not based on the best available scientific information on loggerhead sea turtles.

Additionally, we submit herewith a number of scientific references and documents containing scientific references relevant to the loggerhead sea turtle population in the Delaware Bay and the species in general that have not been previously referenced by the Army Corps in its ESA or NEPA documents. (*See Attached Letters 49 and 54; Misc 19, 24, 35, 46; Reports 57, 60-67, 71, 76-77, 89-91, 94-98, 100-101.*)

To comply with its obligations under both the ESA and NEPA, the Army Corps must update its assessments of the Deepening Project's impacts on loggerhead sea turtles to address these references and the relevant information contained therein to ensure that its analyses are based on the best available scientific data. As we do not claim that this set of references is comprehensive, it should only constitute a starting point for the Army Corps in meeting its affirmative obligation to obtain the best available information on loggerheads and most particularly their presence in and use of the Delaware Bay as well as the impacts, both direct and indirect, that the Deepening Project will have on the species.

2. The 2011 Draft EA Inappropriately Conflates the ESA Section 7 Jeopardy Analysis with NEPA's Requirements and Fails to Address Cumulative Impacts:

In addition to the fact that the 2011 Draft EA is demonstrably not based on the best available, most up-to-date information on loggerhead sea turtles, it also inappropriately attempts to rely on the “no jeopardy” finding of the 2009 Biological Opinion to conclude that the Deepening Project will not have a significant impact on the species. As shown above with respect to the draft EA's treatment of the Atlantic sturgeon, the ESA and NEPA require separate environmental analyses. Regardless of the ultimate conclusion of the jeopardy or no jeopardy finding of the ESA consultation process, NEPA obligates the Army Corps to explain the range and severity of impacts that the Deepening Project will have on loggerhead sea turtles and to discuss the cumulative impacts thereof. This it has entirely failed to do.

Given that loggerhead populations are in decline, and that there are other forces that injure and kill loggerhead turtles in the Delaware Bay, the Army Corps must discuss in its NEPA analysis on the Deepening Project how the impacts of the Project may compound those other threats. To date, the Army Corps' NEPA documentation of the impacts of the Deepening Project on the loggerhead sea turtle fails to address cumulative impacts, in violation of NEPA.

3. The Army Corps Lacks Sufficient Information on the Relative Importance of Loggerhead Sea Turtles in the Delaware Bay to the Survival and Recovery of the Species:

With respect to loggerhead sea turtles, there is much better information on nesting populations than there is on the distribution, status, or biology of foraging populations and their relative use of various foraging grounds. (*See generally Attached Misc. 35*). Although it is clear that the Delaware Bay is a significant foraging ground for loggerheads, overall, there is a general lack of detailed information on the number and distribution of loggerheads found in the Delaware Bay each year. To ensure informed decision-making, the Army Corps needs to collect data on how the species uses the Bay, for what portions of its lifecycle, and to what degree (i.e. approximately how many are found in the Bay in each given time of year) to understand the impacts of the Deepening Project on this species. Without that information the Army Corps will be unable fully or accurately to assess the impacts of the Deepening Project on the species. The 2011 Biological Assessment and Draft EA fail to provide this information and analysis.

The Delaware Bay is likely as important a foraging habitat for loggerhead sea turtles as the Chesapeake Bay. In 1995, sea turtle experts James R. Spotila, Pamela Plotkin, and John Keinath estimated the loggerhead population in the Delaware Bay via in-water and aerial surveys, and calculated that loggerheads were present in the Delaware Bay at the same density as in the Chesapeake. (*See James R. Spotila, Saving Sea Turtles: Extraordinary Stories from the Battle Against Extinction, Johns Hopkins University Press (2011) at p. 71; see also Attached Misc. 19 (abstract form for presentation on “Delaware Bay is an Important Foraging*

Habitat for Loggerhead Turtles,” 2007 Delaware Estuary Science Conference) and Attached Report 71 (“Sea Turtles of Delaware Bay” slideshow presentation by Spotila, Plotkin, and Keinath).⁵

Of special relevance to the Deepening Project are both the locations of loggerheads as well as their density in the Delaware Bay. First is the fact that these surveys located loggerhead turtles near the shipping channel. (*Attached Report 71 at slides 18, 22.*) A question raised by this study is whether loggerheads overwinter in the shipping channel in fall and winter. *Id.* Second, this research found juvenile sea turtles in the Delaware Bay between June and October at a density of 21 to 33 turtles per 100 square kilometers. (*Attached Report 71 at slide 15.*) Slide 21 compares this density to other known loggerhead aggregations in the southeastern US, and slide 22 concludes that the density of loggerheads in the Delaware Bay is comparable to or greater than habitats in the southeastern US.

The habitat suitability model for loggerheads in the Delaware Bay, compiled by sea turtle scientist Dr. Lucy Hawkes and her colleagues based on the research described in Hawkes et al. (2011) and Hawkes et al. (2007) (Reports 64 and 96), evaluated the presence in the Bay of 14 adult female loggerhead turtles from the Northern Recovery Unit with respect to water depth and water temperature. This model was based on the largest ever sample size for tracking data for loggerheads in the Northwest Atlantic. The model demonstrates that, from May to October, the Delaware Bay has a habitat suitability score of 60%. (*See Attached Report 64 & Misc. 24.*)

To date, the Army Corps’ NEPA and ESA documents have failed to incorporate the best available information demonstrating that the Delaware Bay provides critically important foraging habitat for loggerheads and that loggerheads are present in much greater numbers than is credited. The Army Corps must undertake a new NEPA analysis and an updated ESA Section 7 Biological Assessment to analyze the Deepening Project’s impacts on loggerheads in light of this information to provide the necessary analysis of the location, scope and magnitude of the Deepening Project’s adverse effects on loggerheads.

4. The 2011 Draft EA and BA Neither Consider the Newest Information on the Status of the Peninsular Florida Recovery Unit Nor Consider Whether Loggerhead Turtles in the Delaware Bay May Originate from the Smaller Northern Recovery Unit in Greater Proportions:

NMFS analyzes threats to loggerheads in the Northwest Atlantic Ocean in terms of the effects on five identified recovery units (i.e., nesting groups). (*2008 Recovery Plan*). These five recovery units show limited evidence of interbreeding. The five recovery units are: the Northern Recovery Unit (NRU), the Peninsular Florida

⁵ This research is cited in NMFS documents as: Spotila, J.R., P.T. Plotkin, and J.A. Keinath. 1997. In water population survey of sea turtles in Delaware Bay. Final Report to the National Marine Fisheries Service Office of Protected Resources for Work Conducted under Contract #43AANF600211 and NMFS Permit No. 1007. 21 pages.

Recovery Unit (PFRU), the Dry Tortugas Recovery Unit (DTRU), the Northern Gulf of Mexico Recovery Unit (NGMRU), and the Greater Caribbean Recovery Unit (GCRU).

During the 2009 ESA Section 7 consultation on the Deepening Project, NMFS assumed that loggerhead turtles in the Delaware Bay originate from several of the recovery units, with the vast majority (at least 80%) originating from the PFRU and the remainder from the NRU and GCRU. 2009 Biological Opinion at 102. NMFS stated in that Biological Opinion that the PFRU is the largest of the nesting assemblages, and that the loss of 16 individual turtles killed by the Deepening Project would not have a detectable effect on the numbers and population trends of the PFRU recovery unit.

NMFS and TEWG analyses from 2008 and 2009 identified declining trends in the annual number of nests for all recovery units for which there were adequate data. *Id.* at 12,614. The most significant declining trend was documented for the PFRU (the recovery unit from which NMFS assumed that the majority of loggerheads in the Delaware Bay would originate), “where nesting declined 26 percent over the 20-year period from 1989 to 2008, and declined 41 percent over the period 1998-2008 (NMFS and USFWS, 2008; Witherington *et al.*, 2009).” *Id.* In 2009, the nest count in the PFRU recorded the fourth lowest loggerhead nesting in the 21-year monitoring period. *Id.* The NRU, the second largest recovery unit within the DPS, has also shown significant declines of 1.3 percent annually. *Id.* *See also Attached Misc. 35.*

If NMFS’ assumption that the loggerheads in the Delaware Bay come primarily from the PFRU is correct, then both NMFS and the Army Corps must re-analyze the impacts of the Deepening Project in light of the latest information documenting the significant decline of this recovery unit.

Substantial evidence, however, indicates that NMFS’ assumption is flawed, and that a larger proportion of the loggerheads in the Delaware Bay are actually from the much smaller and more imperiled Northern Recovery Unit. (*Attached Reports 61, 62, 63, 64, 66, 77, 98; Dr. James R. Spotila, personal communication, 6/22/11; Edna Stetzar, personal communication, 6/14/11.*)

In fact, NMFS’ assumption in the 2009 Biological Opinion that the majority of loggerheads in the Delaware Bay come from the PFRU is at odds with the analysis in its 2003 Biological Opinion provided to the Army Corps on maintenance dredging in Virginia, in which NMFS determined that the loggerheads from the northern nesting group are more prevalent in northern foraging grounds and noted research suggesting that the number of loggerheads originating from the northern and south Florida subpopulations do not vary proportionally along the coast. (*Attached Letter 54 at 9-13, 52-53*)

That Biological Opinion also noted the critical role of the northern subpopulation in producing predominantly males, given that the much larger south Florida subpopulation produces predominantly females. If males from the northern subpopulation are an important source of males throughout the southeast U.S.,

then takes from the already-small northern subpopulation may have a disparate impact on the prospects of the species. *Id.* at 12, 14. It also noted that relatively small decreases in annual survival rates of both juvenile and adult loggerheads will have adverse effects on large segments of the total loggerhead population. *Id.* at 14.

The primary source cited by NMFS in its 2009 Biological Opinion for the basis of its determination that 80% of the loggerheads anticipated to be taken by the Deepening Project originated from the PFRU is Bass et al. (2004) (*Attached Report 95*).⁶ Yet this study examined only loggerheads captured in the Pamlico-Albemarle Estuarine Complex in North Carolina, more than two hundred miles south of the southernmost part of the Delaware Bay. It drew no conclusions about turtle distribution in the Delaware Bay or areas outside the Pamlico-Albemarle Estuarine Complex. Indeed, it noted a number of papers that have suggested that juveniles recruit preferentially to foraging grounds closer to their natal beaches. *Id.* at 792; (see also *Attached Report 94 (Bowen et al. 2004)*).

The studies by Hawkes et al. (2007) (*Attached Report 96*) and Hawkes et al. (2011) (*Attached Report 64*) suggest that the turtles foraging in North Carolina and the ones that venture further north to the Chesapeake and/or Delaware Bays are not the same turtles, especially given the fidelity to foraging grounds that loggerheads exhibit. In the Chesapeake Bay, much closer geographically to the Delaware Bay, research has shown that juvenile loggerheads are genetically composed of both the northern (54%) and southern (46%) subpopulations. (*Attached Report 63 at p. 2556 (citing Norrgard 1996)*). The 2009 TEWG Report provides additional insight on the presence in and use of the Delaware Bay of loggerheads from the Northern U.S. Subpopulation. Report 98 at pp. 19-47.

The NRU has a much smaller population than the PFRU, and its population has sustained a longer decline. (*Attached Report 55 at I-6 to I-8*). As a result, if a larger proportion of loggerheads in the Delaware Bay originate from the NRU than previously assumed, the take by the Deepening Project of loggerheads from this population will have a far greater effect on the future viability and existence of the NRU than the Army Corps and NMFS have analyzed to date. This issue must be fully explored and addressed in a substantial revision of both the draft EA (in the context of a new SEIS) as well as in an updated Biological Assessment as part of the ESA Section 7 consultation/conference process with NMFS.

5. The Army Corps Has Failed to Analyze the Impacts of the Decline in the Availability of Horseshoe Crab as Prey Species for Loggerhead Sea Turtles that will Result from the Deepening Project As Well As Other Impacts to Foraging Habitat:

Loggerheads not only demonstrate strong fidelity towards nesting areas, but also “demonstrate preferences in their foraging ground locations, [so] disturbance of

⁶ The published studies that exist of satellite tracked loggerheads from Florida, including the PFRU, do not show turtles foraging as far north as those from the Northern U.S. Subpopulation. See *Attached Reports 89-91, 97*.

these coastal habitats can disrupt the loggerheads' ability to find food. Because loggerheads exhibit fidelity towards both nesting beaches and feeding areas, both types of habitat must be protected for each subpopulation in order to ensure that subpopulation's survival." (*Attached Letter 49 at p. 10. See also Attached Report 63 at pp. 2565-66 and sources cited therein (loggerheads exhibit site fidelity to foraging areas both between and within years)*). Therefore, degradation of benthic foraging habitat and diminishment in prey species availability resulting from the Deepening Project may have significant, long-term impacts on the loggerheads that exhibit strong seasonal philopatry to the Delaware Bay. (*Attached Report 63 & Report 55 at I-56-57*).

Horseshoe crabs have historically been a key component of the carnivorous loggerhead's diet, both within the Delaware Bay and elsewhere. (*Attached Report 55 at I-27, I-29, I-56-57*). The decline in the horseshoe crab population has had significant deleterious impacts on the loggerhead, as the species has shifted from targeting crabs to targeting finfish and foraging in and around fishing gear. *Id.*; (*see also 2010 Proposed Rule, 75 Fed. Reg. at 12,626-27; Attached Report 71 at slide 22*). This shift in prey species due to the decline in horseshoe crabs puts loggerheads in further harm's way, as incidental take in fishing gear is one of the most significant causes of loggerhead mortality in the Northwest Atlantic Ocean. 75 Fed. Reg. at 12,628-30. Observed stranding increases in Virginia and the 65-75% decline of the loggerhead in the Chesapeake Bay since the 1980s have been hypothesized to be linked to the decline of horseshoe crab and blue crab prey availability in the Chesapeake Bay. (*Attached Report 63 at 2556 (citing Lipcius and Stockhausen 2002; Mansfield 2006; Seney and Musick 2006)*).

The Army Corps' plans to dispose of dredged spoil on Broadkill Beach as a so-called "mitigation" project will have serious impacts on horseshoe crabs, both directly, by preventing horseshoe crab spawning for at least one year, and indirectly, by degrading or destroying the quality of this location as suitable horseshoe crab spawning habitat, as discussed in detail above.

By decreasing even further the already dramatically reduced population of horseshoe crabs that exist in the Delaware Bay, and by impeding the ability of the species to successfully reproduce by reducing egg viability, the Deepening Project will further reduce a key food source of the loggerhead sea turtle and potentially cause even more fishery gear interactions as loggerheads seek to replace horseshoe crabs with fish and other fishery-targeted species. This issue must be fully analyzed in the context of a new SEIS as well as in a revised Biological Assessment for the ESA Section 7 conference/consultation process with NMFS.

More generally, the Army Corps must consider in more detail whether and how its dredging activities will degrade or destroy benthic foraging habitat or impact other prey species of loggerheads. As stated in the 2008 Recovery Plan:

Channel dredging projects may have greater impacts on habitat than the obvious mechanical destruction of the channel bottom.

Channelization can alter natural current patterns, disrupt sediment transport, and suspended materials from dredging may severely

damage adjacent corals and seagrasses. . . . Regulatory agencies should carefully consider the potential environmental consequences before permitting any new channel development projects

(Attached Report 55 at II-57; see also 2010 Proposed Rule, 75 Fed. Reg. at 12,627) (“The effects of benthic habitat alteration on loggerhead prey abundance and distribution, and the effects of these potential changes on loggerhead populations, have not been determined but are of concern.”) Given the significant and unaddressed impacts on benthic habitat that dredging and dredge spoil disposal will have, the Army Corps must consider these issues more fully in revising its NEPA and ESA documents.

6. The Army Corps’ Biological Assessment and Draft EA Analyses of the Direct Impacts of Hopper Dredging on Loggerhead Turtles Are Inadequate:

As noted above, the entire premise for the Army Corps’ re-initiation of consultation/conferencing under ESA Section 7 is based on the proposed listing of the Northwest Atlantic DPS of loggerhead sea turtles as endangered. In turn, this proposed listing rule is based on significant new information, as summarized in the 2008 Recovery Plan, 2009 Status Review, 2009 TEWG Report, and 2010 Proposed Listing Rule. Thus, for the Army Corps’ 2011 Draft EA to rely solely on the 2009 Biological Assessment and 2009 Biological Opinion for a discussion of the direct impacts of hopper dredging on loggerheads entirely fails to meet NEPA’s requirements. Similarly the 2011 Biological Assessment regarding the impacts of the proposed action on loggerheads is simply factually inadequate.

Moreover, the 2009 Biological Opinion largely determined the level of assumed loggerhead take based on dredging projects conducted in the past. The level of take during these past projects was used to assume the level of take for the Deepening Project. This approach is not sufficient to capture the full scope of incidental take of loggerheads that will result from hopper dredging in the Delaware Bay.

First, three of the projects used to make this assessment took place in the October to November time frame; these are not the months when loggerheads are believed to be most prevalent in the Bay. Loggerheads are known to use the Bay more during the warmer months when the Army Corps will be implementing hopper dredging. They are assumed to be in the Bay between May 1 and November 15, with the highest concentrations during June and October.

According to the latest revised schedule in the 2011 Draft EA, in 2014, hopper dredging in Reach E will take place between September and November, while in 2015, hopper dredging in Reach E will occur from April through August. In 2016 hopper dredging will occur for Reach D in April, May, and June. These are exactly the windows that the Army Corps has been required to avoid in comparable dredging projects elsewhere along the Atlantic in order to minimize loggerhead incidental take. Although these windows have been put into place for the protection of other aquatic species, there is no analysis whatsoever in the 2011 Draft EA or the Biological Assessment of whether the dredging windows should be

changed to avoid take of the imperiled loggerhead altogether. This question warrants substantial discussion with the State resource agencies as well as NMFS and USFWS.

Second, prior to 1995 observers for dredging projects were only required for 25% of the dredging cycle. As a result, it likely that a significant proportion of the take of loggerheads was unobserved, unrecorded and therefore uncounted. This too skews the consideration of impacts and ensures an undervaluing/undercounting of harm. Nor does the draft EA or Biological Assessment contain any reference to data gathered from turtle stranding networks, which can sometimes determine through necropsies whether stranded turtles were fatally injured by channel dredging or correlate increased stranding numbers with channel dredging activities.

Third, although sea turtle deflectors are required to be put in place on the dragarms of hopper dredges, these are not always effective. (*2009 Recovery Plan at I-55*). The 2011 Draft EA and Biological Assessment should contain a discussion of the likelihood that the deflectors will help avoid loggerhead entrainment and a discussion of the circumstances under which deflectors are ineffective.

Finally, on the broader picture, the Army Corps should undertake a regional consideration of channel deepening and maintenance dredging impacts on loggerheads and other endangered and threatened species in consultation with NMFS to obtain a regional biological opinion for all channel dredging north of North Carolina, as it has done in the southeast U.S. Atlantic and the Gulf of Mexico. (See <http://el.erc.usace.army.mil/seaturtles/refs-bo.cfm>) Given the critical importance of the Northern Recovery Unit and the Peninsular Florida Recovery Unit loggerheads to the survival of the species in the Northwest Atlantic and as a whole, as well as the significant impacts of channel dredging, a regional consultation on the impacts of dredging is the logical way for the Army Corps and NMFS to address incidental take of loggerheads and other species rationally and consistently.

For the reasons stated above, the Army Corps must undertake a new, up-to-date SEIS process on the impacts of the Deepening Project on the threatened (and possibly soon to be listed as endangered) loggerhead sea turtle. Given the demonstrated insufficiencies of the analyses of these impacts considered for ESA purposes, the Army Corps must also revise the March 2011 Biological Assessment to comply with the requirements of that statute.

F. Spoil Disposal Plans Are Deficient, Inaccurate and Fail to Consider Up-to-date Science Demonstrating Harmful Impacts.

The Army Corps' consideration, discussion and analysis of the spoil disposal plans for the Deepening Project are not based upon the most recent facts, analysis, data, science, information or reports. There are numerous issues not addressed in the 1997 SEIS, 2009 EA or 2011 Draft EA regarding spoil disposal that need to be the subject of an up-to-date SEIS analysis, documentation and process, including new scientific and factual information.

The dredging that has taken place in the small section of the project called Reach C has documented how significantly the Army Corps' calculations may be in error. An overall increase in spoils from the project by the 38% figure found in Reach C could have profound pollution, habitat, and community impacts for the River, the communities where spoils are to be disposed of, and at Buoy 10. The fact that the Army Corps had its calculations so dramatically wrong for this 12 mile stretch highlights the importance and value of objective review and input by other agencies, experts and the public. This significant change in information and understanding regarding spoils resulting from the project also clearly demonstrate the need for an up to SEIS process.

1. Army Corps Data Demonstrates that It Has Underestimated the Spoil Volume in Need of Disposal:

The Killcohook Upland Confined Disposal Facility is located in Pennsville, NJ, downstream of the Delaware Memorial Bridge, and is where the Army Corps has disposed of dredge spoils from Reach C of the Deepening Project, the one 12-mile stretch of the project to have been implemented to date. In documents filed September 7, 2010 in federal District Court for the District of Delaware (*Attached Misc 14 & 15*), the Army Corps admits to dumping dredge spoils in a confined disposal facility located on New Jersey lands and discharging runoff into New Jersey waters. This revelation came despite a preliminary injunction that was based upon Army Corps representations, according to the court ruling, that "all dredged material from Reach C is to be deposited in the Killcohook Confined Disposal Facility ("CDF"). Both Reach C, in its entirety, and the CDF are located in Delaware" and that discharge will also be only into Delaware waters. According to the documents filed with the court: after August 13, 2010 spoils began being dumped into a CDF located in New Jersey; on August 28 a dike failed that would lead to discharge of CDF runoff into New Jersey waters; and on August 30 discharge into New Jersey waters occurred. Only on August 31 did the Army Corps direct the contractor to stop disposal on New Jersey lands and halt the discharge of CDF runoff waters into New Jersey waters. The court and all affected parties, including New Jersey and Delaware, were only notified on September 7, 2010 via the legal filings.

The Army Corps deposited material in the additional section of the CDF located in New Jersey because its calculations of the spoils that would be dredged from this reach of River were substantially wrong. The Army Corps' surveys led it to estimate that approximately 2.6 million cubic yards of materials would be dredged from Reach C as part of the Deepening Project. What it found was "the need to dredge and dispose of approximately 1 million cubic yards of **additional** material not anticipated in the Reach C contract." (*emphasis added; Attached Misc 15*).

This means that the Army Corps' estimates of the volume of spoils that would need to be dredged for Reach C were wrong by 38%, i.e. the volume of spoils dredged and disposed of was 38% greater than the Army Corps had calculated, anticipated, planned for or budgeted for. This significant increase in volume means greater disposal-site needs, greater costs, greater level of contaminants by virtue of the greater volume of contaminated materials dredged up and disposed

of, and greater ramifications for aquatic life and habitat alteration/disturbance. This increase also means that all of the Army Corps' costs, calculations, assumptions, data, information and claims put forth for this project, including Reach C and beyond, are demonstrably off.

Based on this new factual information, proving that the Army Corps' calculations, data, assumptions, assessments and data interpretations are wrong, all of the costs, disposal needs, and impacts of the Deepening Project need to be recalculated assuming at least a 38% greater volume of dredge spoils from all reaches of the project.

Furthermore, the Army Corps has asserted that the volume of dredge spoil materials that will result from the Deepening Project has been greatly reduced, and thus resulted in a changing cost analyses and spoil disposal plans. The process by which the Army Corps reached its estimated dredged materials quantities needs to be subject to review and comment by outside agencies and experts. The volume of spoils is a critical issue. The spoil disposal plan for this project, as well as quantity calculations, have been a moving target for the last 14 years. The new calculations, including the assumptions and methods used to achieve them, are fundamental to the economic and environmental ramifications of this project and therefore it is important that they be subjected to a full and valid EIS review.

The Army Corps has failed to revisit its calculations in the 2011 Draft EA and subject them to NEPA review, analysis and documentation based upon this new information and data that it itself collected. The impact of this new information and data regarding the flawed Army Corps assessments regarding spoil volume is clearly of such significance that it alone, notwithstanding the other issues in this comment, mandates an updated SEIS analysis.

2. The Army Corps' Unilateral Calculations Regarding Dredge Spoil Volume Have Not Had The Benefit Of Full Review By Other Agencies And Experts In Order To Validate Or Challenge The Corps' Assumptions, Which Have Now Been Shown To Be Wrong:

The Army Corps has asserted that the volume of dredge spoil materials that will result from the Deepening Project has been greatly reduced, and thus resulted in a changing cost analyses and spoil disposal plans. The process by which the Army Corps reached its estimated dredged materials quantities needs to be subject to review and comment by outside agencies and experts. The volume of spoils is a critical issue. The spoil disposal plan for this project, as well as the quantity calculations on which the plan is based, has been a moving target for the last 14 years. The new calculations, including the assumptions and methods used to achieve them, are fundamental to the economic and environmental ramifications of this project and therefore it is important that they be subjected to a full and valid Environmental Impact Statement review. Such a request for disclosure and review was made by the DRBC prior to the 2009 EA being released and yet this opportunity has never been provided. (Attached Letter 10).

The dredging that has taken place in Reach C has documented how significantly the Army Corps' calculations may be in error. An overall increase in spoils from the project by the 38% figure found in Reach C could have profound pollution, habitat, and community impacts for the River, the communities where spoils are to be disposed of, and at Buoy 10. The fact that the Army Corps had its calculations so dramatically wrong for this 12 mile stretch highlights the importance and value of objective review and input by other agencies, experts and the public. This significant change in information and understanding regarding spoils resulting from the project also clearly demonstrate the need for an up to SEIS process.

3. Spoil Disposal at Buoy 10 Could Have Significant Effects That the Army Corps Has Failed to Assess:

Spoil disposal at Buoy 10 is a documented concern to NMFS that has neither been addressed to NMFS' satisfaction nor subjected to the rigors of the SEIS process. Considering the level of harm and impact that disposal at Buoy 10 poses, the need for SEIS review is clearly triggered. At a minimum, according to the materials provided to DNREC as part of its Subaqueous Lands Permitting Process, (EA section 6.0 of that documentation) maintenance spoils for the channel, an amount that will dramatically increase with deepening, will be deposited at Buoy 10. In an April 16, 2009 letter to the Army Corps referencing its Essential Fish Habitat (EFH) materials, NMFS questions whether Buoy 10 will continue to be used for either construction spoils or maintenance spoils from the project. NMFS stated explicitly:

“We also note that an EFH consultation has not been completed for the use of Buoy 10. There are no records in our files of its location, previous use, or any evaluation of the potential effects of using an overboard disposal site on NOAA trust resources. This is of particular concern due to the wide variety of important aquatic resources that exist in Delaware Bay.” (*Attached Letter 14*).

The threat posed by dumping at Buoy 10 is increased by the likelihood that, based on new information, the Deepening Project will result in a substantially increased volume of dredged spoils. As the Corps' own experience proves, the Army Corps has potentially underestimated the volume of spoils that will result from deepening by at least 38%. This is significant new information that needs analysis, review, calculation and assessment. The consequences of dredged spoil volume increasing by an additional 38%, or even a lesser percentage that is larger than currently anticipated by the Army Corps, would be a significant change in the spoil disposal plans required for the Deepening Project that could have significant community and environmental effects.

As NMFS has said, there needs to be clarity on the use of Buoy 10 and there needs to be full environmental analysis in order to ensure full and informed environmental understanding and decision-making.

4. The Army Corps Must Undertake a NEPA Assessment of the Necessity of Increasing the Size of Existing CDFs:

The Army Corps' plans for increasing the size of existing spoil disposal sites have not had the benefit of public, agency, expert, or host communities review and comment. The 2009 EA was never issued in draft form or the subject of public or agency comment. According to Army Corps documents, to accommodate all spoil disposal in existing Army Corps CDFs the dikes on most of the federally owned facilities would need to be raised significantly higher than they are today; significantly higher than the height originally anticipated or planned for these CDFs. Disposing of all of the spoils in existing federal CDFs requires the raising of dikes as follows, according to Army Corps documents (*e.g. Attached Report 93 & 2009 EA*):

- ✓ **National Park facility** from 35 ft currently to 60 ft (25 ft higher and 71% bigger than it is today; 10 ft higher than the 50 ft previously anticipated for the current channel),
- ✓ **Pedricktown North** from 42 ft currently to 76 ft (34 ft higher and 80% bigger than it is today; 26 ft higher than the 50 ft previously anticipated),
- ✓ **Oldmans** from 36 ft currently to 66 ft (30 ft higher and 83% bigger than it is today; 16 ft higher than the 50 ft previously anticipated),
- ✓ **Pedricktown South** from 45 ft currently to 75 ft (30 ft higher and 67% bigger than it is today; 25 ft higher than the 50 ft previously anticipated),
- ✓ **Penns Neck** from 30 ft currently to 60 ft (30 ft higher and 100% bigger than it is today; 10 feet higher than the 50 ft previously anticipated),
- ✓ **Artificial Island** from 20 ft to 50 ft (30 ft higher and 150% bigger than it is today)
- ✓ **Killcohook 1** from 35 ft currently to 65 ft (30 ft higher and 86% bigger than it is today; 15 ft higher than the 50 ft previously anticipated).

(Reedy Point in Delaware will also receive spoils from the project but the height of the CDF is not being increased.)

In its permit application materials to DNREC, the Army Corps says that, if the dikes at the CDFs are to be raised, then the Army Corps will require that an erosion and sedimentation plan from the appropriate county district be obtained. But, as the Army Corps has made clear, it has every intention, and sees the need, to raise the dikes significantly on almost all of the CDFs to be used for this project. Therefore, to be able to ensure such a disposal plan is possible, it needs to ensure it is able to obtain these needed approvals in the first instance.

The community, engineering and environmental impacts of these dike raisings have not been subject to Army Corps, State, other agency, expert or public review and comment. The environmental, engineering, community and economic ramifications of raising the dikes are likely to be substantial and yet the host

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communities have not formally been informed by the Army Corps of the plan to raise the dikes or been given the opportunity to understand the implications of, or to comment upon, a spoil disposal facility with a dike 10 to 26 feet higher than expected. As evidence of this:

- ✓ In 2008 the Salem County Board of Chosen Freeholders passed resolution 2008-336 stating its belief that the original disposal plan will be “detrimental” to their farmland and open space preservation and their tourism initiatives, the ramifications of any new plan should be subject to their consideration and review.
- ✓ On March 2, 2010, Oldmans Township, NJ passed resolution 2010-53 opposing deepening because of concerns the project and its spoil disposal plan has on their community and on the Delaware River. (*Attached Misc 20*).
- ✓ On May 5, 2010 the Borough of National Park passed Resolution 42-2010 which stated, among other things, “...the Governing Body believes that the expansion of the dredge facility with the Borough will have an adverse and negative impact in terms of the community’s quality of life, economically, environmentally and aesthetically; and ... that the Mayor and Council of the borough of National Park does not hold true the equity of the decision to increase the size of the dredge facility as consideration of the impacts to the Borough were not considered and the community was not included in such decision” (*Attached Misc 21*).

5. Confined Disposal Facilities to be Used by the Army Corps Are Demonstrated, by New Data, to be Pollution Sources, Contrary to the Army Corps’ Previous Claims:

In a detailed letter dated April 11, 2011 from NJDEP to the Army Corps, which included a rigorous data analysis by the State of New Jersey, it is demonstrated that spoil disposal associated with the Deepening Project is a source of water quality contamination.

The NJDEP, in its letter and supporting analysis, identified numerous contaminants for which DRBC or NJ Water Quality Standards were in fact exceeded/violated. As a result of the analysis of Army Corps data NJDEP concluded:

Despite the limitations of the available data, analyses have identified potential adverse impacts to water quality resulting from the discharge of dredged material dewatering effluent from the Killcohook Upland CDF with elevated concentrations of selenium, copper (dissolved), mercury, aluminum and cyanide. (*Attached Letter 38*)

The NJDEP analysis also identified multiple problems with the data collection performed by the Army Corps regarding spoil disposal at Killcohook which impeded their ability to determine if there were pollution violations, including:

- ✓ “In order for the sample data to be usable, the reporting and analytical detection limits for non-detected (“ND”) sample concentrations must be less than the applicable DRBC or NJ” Water Quality Standards. The Army Corps reporting limits were greater than the applicable standards for at least 8 contaminants including cadmium, cyanide, PCB Aroclors, Pesticides (such as chlordane, dieldrin, endosulfan, endrin and heptachlor), toxaphene, PAHs, parathion, and chloropyrifos.
- ✓ Sample collection and preservation did not follow proper procedure.
- ✓ Background samples collected were collected at times and locations when the effluent of concern from the CDF may have been present, rendering the sampling inaccurate for comparison purposes.

(Attached Letter 38)

Already, in 2009 post the 2009 EA, New Jersey had shown that the information provided by the Army Corps in the past regarding water quality impacts was so deficient and dated that “it is not possible to evaluate the potential impacts to surface water quality and the aquatic ecosystem that could result from the discharge of dewatering effluent from new work dredged materials placed in upland CDFs.” *(See Attached Letter 17)*. Additionally, consideration of the water quality implications of the CDFs fails to consider the implications of surface water runoff from these open air facilities.” *(Attached Letter 17)*.

New Jersey’s most recent analysis of the more detailed information it was able to secure from the Army Corps after deposition of Reach C spoil disposal at Killcohook allowed it to confirm the continuing deficiency of Army Corps data and sampling techniques, and in some instances, to be able to document and demonstrate water quality exceedances (i.e. pollution inputs/events) resulting from spoil disposal of deepening associated spoils in a confined disposal facility. This new data on the environmental and water pollution implications of deepening-associated spoils is significant and demands updated NEPA consideration in the form of a new SEIS. This new data, information and analysis, provided to the Army Corps before the release of its 2011 Draft EA, is not included in any of the Army Corps’ new NEPA analysis or documentation. Standing alone, as well as in combination with the other new information and issues raised in this comment letter, this mandates an up-to-date SEIS analysis.

This new information out of NJDEP confirms data and information previously provided by the DRBC but which was summarily dismissed without NEPA analysis by the Army Corps. In 1998, DRBC provided data that showed existing Money Island and Fort Mifflin disposal facilities discharge Cadmium, Lead, Copper, Zinc and total suspended solids at significant levels into the Delaware River. In some instances the discharge concentration exceeded the DRBC’s acute and/or chronic criteria, although the DRBC criteria are for dissolved metal. The two disposal facilities reviewed were found to be the eighth largest discharger to the estuary and in the case of lead to discharge more lead than all 78 point source

dischargers to the estuary combined. The following discharges were identified at the two sites:

	Money Island (total)	Fort Mifflin (total)	Acute Criteria	Chronic Criteria
Metals				
(ug/liter)				
Lead	268.1	242.0	48	16
Copper	229.7	76.7	13.3	9.1

(Attached Reports 7)

DRBCs analysis also concluded, “CDFs have the potential to impact aquatic life through acute and chronic toxicity, and human health through the bioaccumulation of organic compounds such as PCBs and DDX.” *(Attached Reports 7)*

In response, at the time, the Army Corps provided information about the Pedricktown CDF indicating that toxic discharges are not an issue to the same degree at that particular location. But it has not provided detailed information regarding modifications to or changed operations of the other existing CDFs or the consequences of placing more spoils in those locations than originally planned/anticipated. NJDEP’s data on the Killcohook CDF, demonstrating it too is a source of heavy metals and toxins, bears out the DRBC conclusions and refutes the Army Corps’ decision to ignore this issue in its NEPA reviews.

In addition, the Army Corps has now expanded the volume of dredge spoils it plans to place in the existing CDFs (from deepening and maintenance thereof) to be used. This increased volume of spoils means an increased level of toxins placed in the CDFs. We do not believe the Army Corps has done an analysis of the water quality effects of discharges from each of the CDFs with the increased volume of spoils and therefore increased level of toxins concentrated therein. It has also not considered the effects on bird and wildlife of increasing the volume of spoils and therefore toxins in the CDFs to which wildlife and bird life are attracted.

Further, as discussed, the Army Corps has potentially underestimated the volume of spoils that will result from deepening by as much as 38%, increasing further the volume of spoils it would plan to place in these CDFs or have to plan to dispose of elsewhere. This is significant newly identified volume that could significantly increase the amount of heavy metals and toxins that would be released into waterways and the environment. The impacts of an additional 38% of spoils, or even a percentage smaller than that but larger than currently anticipated by the Army Corps, would be a significant change in the spoil disposal plans and potential pollution impacts that could have significant community and environmental effect. The threat posed by an increased volume of spoils now known to be a source of water pollution after onland disposal could be significant.

6. The Army Corps' NEPA Documentation Fails to Address Alternative Spoil Disposal Plans:

With regards to spoil disposal, the Army Corps fails to mention other spoil disposal options being pursued by the project sponsor and a new port project that is a very foreseeable outcome of the Deepening Project. The Army Corps has repeatedly changed its spoil disposal plans for the Deepening Project; here we have a project sponsor that clearly wants to see other uses for the spoils from the Deepening Project and has taken steps to pursue their plan. This alternative spoil disposal plan needs to be addressed in the NEPA documentation.

Project sponsors, PRPA and the Commonwealth of PA, propose to use spoils from the Deepening Project to build a new development project they call Southport. Construction of Southport requires filling in 33 acres of the Delaware River, a reach of River that provides food and habitat for a variety of species including those that visit and are important to Delaware ecosystems. This is a foreseeable and known outcome of deepening, as demonstrated by a June, 2005 Feasibility Assessment sent to the Army Corps (*Attached Report 1*), as acknowledged by the Army Corps in an email from Barry Gale to Roy Denmark and others dated Jan. 5, 2009 in which the Army Corps acknowledged the foreseeability of Southport as an outgrowth of the 45-foot Deepening Project (*Attached Misc 4*), as asserted by NMFS in its April 16, 2009 letter in which it asked for consideration of Southport as part of a cumulative assessment (*Attached Letter 14*), and as demonstrated by ongoing agency meetings regarding this project (*Attached Letters 20, 23, 24 & 29, letters authored by the Delaware Riverkeeper Network regarding the status and agency discussions regarding the Southport Project*).

Southport is a direct and foreseeable outcome of deepening, including being proposed to be built with deepening spoils, that needs to be included in the Deepening Project NEPA documentation including the project description and assessment of direct, indirect and cumulative effects and spoil disposal plans.

G. Overdredge beyond Overdredge – A Threat Unconsidered

The public notice notes a 2 foot overdredge depth for the areas of rock blasting. But the notice fails to discuss the environmental and cost implications of blasting and/or rock removal that exceeds the 2 foot overdredge – an outcome that the Army Corps has said publicly it expects will happen. At the February 25, 2011 meeting for consultants regarding blasting in Reach B of the project, attended by myself, Maya van Rossum, the Delaware Riverkeeper, Army Corps representatives stated that there would be no penalties for overdredging and that they fully expect there will be overdredging beyond the template 2 feet. They went on to assert that overdredging greater than 2 feet simply ensured a greater degree of safety for vessels. (*see Attached Misc 34, notes taken by van Rossum during the course of the meeting*). The Army Corps also stated that as part of the process associated with identifying contractors for this portion of the project, the Army Corps was open to discussion and recommendations of different approaches – demonstrating that it is still unclear how the rock blasting and rock removal is to be performed and therefore preventing the Army Corps' ability to assess its effects.

The 2011 Draft EA provides no discussion of the ecological implications of exceeding the 2 foot overdredge proposed for the project, including implications for the drinking water aquifer that flows in the vicinity of this rock ledge, supplying drinking water for New Jersey communities, or the ecological/habitat ramifications for sturgeon that use this ecological feature for various life stages.

H. The Broadkill Beach and Kelly Island “Beneficial Use” Projects Will Have Substantial Adverse Environmental Impacts including Significant Adverse Effects On Ecologically, Economically, Recreationally, and Culturally Important Species.

1. Kelly Island

The Army Corps characterizes the Kelly Island project as beneficial reuse of spoils, portraying it as mitigation for the harms to be inflicted by the Deepening Project. Yet it has been documented that the Kelly Island project will in fact be environmentally harmful rather than a “beneficial reuse” of spoils. In assessing the ramifications of the Deepening Project, Kelly Island cannot be claimed or planned for as mitigation in light of the new information postdating the 2009 EA. Coupled with the new information submitted to the Army Corps in the past two years demonstrating the Deepening Project’s significant environmental impacts, the inadequate environmental analysis of the deleterious effects of these so-called “mitigation” project further underscores the need for full SEIS review.

According to NMFS, the Kelly Island project, which will fill 120 acres of intertidal and subtidal shallows to create emergent wetlands and beach, will be constructed as an impoundment and may remain or be returned to this impoundment configuration depending upon future outcomes and decision-making. A June 15, 2010 letter from DNREC to the Army Corps confirms the possibility that Kelly Island will remain as an impoundment. (*Attached Letter 34*). Both NMFS and DNREC have described the harms that the Kelly Island project will inflict:

- ✓ According to NMFS: “Since the early planning stages of the Kelly Island project, we [NMFS] have consistently opposed the creation of an impoundment at the site. ... Impoundments primarily benefit waterfowl. Since the Delaware River Deepening Project overwhelmingly impacts fishery resources, not birds, and the Kelly Island project construction fills 120 acres of fishery habitat, the creation of an impoundment should not be considered a beneficial use of dredged material.” (*Attached Letter 14*).
- ✓ NMFS also makes clear that “The wetland and beach to be created have little to no habitat value” for a variety of species including summer flounder, windowpane, winter flounder, skates and scup.” (*Attached Letter 14*).
- ✓ Further, DNREC is on record concerned that “The proposed beach will be of poor quality for horseshoe crabs and shorebirds.... Minimal if any habitat benefits for horseshoe crabs, and key species of shorebirds, can be expected to be realized from the project.” (*Attached Letter 34*).

- ✓ In addition DNREC is on record as concerned that “If a dike [at Kelly Island] should fail, the sediment load could be catastrophic to the adjacent oyster beds. The shoreline has eroded back to the point where it is no longer feasible to use this project to protect the Port Mahon public ramp.” (Attached *Letter 32 & Letter 46*).
- ✓ In the summary of a May 13, 2010 meeting between Delaware agency representatives and the Army Corps it is stated: “Fine-grained material will rapidly erode and not be particularly beneficial to horseshoe crabs. The proximity of the Delaware’s oyster beds and the potential for these beds to be smothered by the placed materials is troubling. The past history of the area suggests that there is a high likelihood that the placed sediments will rapidly erode and the proximity and structure of the oyster beds lends itself to smothering the beds. A failure of the dike will almost certainly be catastrophic to the oyster beds.” (Attached *Report 58*).
- ✓ Additionally, correspondence dated June 15, 2010 from DNREC to the Army Corps reiterate that there remain concerns about risks for oysters from the Deepening Project. (Attached *Letter 34*).

In a very recent analysis of Army Corps data regarding the beneficial reuse values of sediments to be dredged from the lower reaches of the channel and used on the ‘beneficial reuse’ sites, including Kelly Island, DNREC determined that the Army Corps had not accurately identified, represented, or reported the true grain sizes and beneficial reuse qualities of the dredged sediments from the lower reaches of the project, i.e. Reach E. (Attached *Report 29*). For Kelly Island this means, according to DNREC:

- ✓ “The existing PD-ACOE sediment data does not meet the minimal lithologic and volumetric data requirements that are necessary for the development of an engineering design for the Kelly Island CDF. At this time no detailed plans have been presented for the CDF project, so there is little that can be evaluated to validate the feasibility of such a project. Due to the lack of confidence in the validity of the existing grain size data, it is doubtful that a CDF design could pass a rigorously engineering and geological review.”
- ✓ “At this time not enough data has been collected, or provided, by the PD-ACOE to allow the State of Delaware to adequately assess the outcome of the proposed beneficial use of the Reach E sediments. In addition to the lack of sediment data, not enough information has been provided to accurately predict how the Broadkill Beach nourishment and Kelly Island CDF projects will respond to wave conditions at these locations. Without good constraints on the grain sizes of the sediments within Reach E, it is possible that the dredged sediments may be outside of the projects design and expectation. This could result in an outcome that would deviate significantly from the project’s initial design and result in significant negative ecological impacts. ... [I]t is essential that information be provided to the State of Delaware indicating that the beneficial use projects will be able to

achieve their proposed purpose and not become a financial burden and/or ecological catastrophe.”

Kelly Island is known to be actively used by horseshoe crabs for spawning. According to DNREC, the sediments found in Reach E are not only not beneficial for horseshoe crab spawning but could be highly detrimental to both spawning and egg viability/development. DNREC is on record stating that:

The fine grained quality of the sand material to be used may be poorly suited for the intended purpose, making it unlikely that the project can provide the habitat needed for horseshoe crabs or shorebirds and potentially results in a more degraded habitat condition rather than an improved one. If a dike should fail, the sediment load could be catastrophic to the adjacent oyster beds. The shoreline has eroded back to the point where it is no longer feasible to use this project to protect the Port Mahon public ramp. (*Attached Letter 32*).

Further, although the Army Corps asserts it is undertaking the proposed project at Kelly Island for the benefit of horseshoe crabs and so that is one of the reasons we are all to suffer the many insults of deepening, in a June 15, 2010 letter to the Army Corps DNREC is very clear that:

The proposed design does not meet the requirements that must be met to create the type of habitat needed. The proposed beach will be of poor quality for horseshoe crabs and shorebirds due to the fine to medium grain sediments to be used and the low foreshore slope. ... Minimal if any habitat benefits for horseshoe crabs, and key species of shorebirds, can be expected to be realized from the project. (*Attached Letter 34*).

Finally, DNREC issued a report this year that lays out in greater analysis and detail the harms of Kelly Island and Broadkill Beach for horseshoe crabs. (*Attached Report 29*). Findings of the report include:

- ✓ “...**numerous discrepancies and sampling errors** were found. The existing data collected by the PD-ACOE is therefore considered inadequate ...”
- ✓ “An **artificial skewing** of the grain size results occurred due to the **inappropriate sampling** scheme.”
- ✓ “The **sediment sampling errors, discrepancies in grain size descriptions, and gaps** in core locations reduce the validity of the PD-ACOE’s efforts to accurately characterize the sub-surface sediments for Reach E.”
- ✓ Regarding Kelly Island the report finds “...it is **doubtful** that a CDF design could **pass a rigorously engineering and geological review.**”

- ✓ “The discrepancy between grain sizes means that **the requirements set by the ASMFC Fishery Management Plan for Horseshoe Crab** that placed sediment matches existing conditions **would not be met.**”
- ✓ “...these beneficial use sediments would be inadequate for horseshoe crab habitat.”
- ✓ “... the proposed beach to be constructed **would likely have a detrimental effect on horseshoe crab spawning habitat.**”
- ✓ “The potential Broadkill Beach nourishment by the PD-ACOE does not meet the beneficial use requirements for this project, if anything it would negatively impact the prevalence of horseshoe crab spawning habitat and **impede horseshoe crab egg development.**”
- ✓ “...it is essential that information be provided to the State of Delaware indicating that the beneficial use projects will be able to achieve their proposed purpose and **not become a financial burden and/or ecological catastrophe.**”

In response to requests for information, the Delaware Riverkeeper Network has also secured an email and review document that show there was a 1996 report “Geoacoustic Study of the Delaware Main Channel” by Richard McGee “which collected seismic data, grab samples, and 15-vibra cores (from the channel) from Reach E (they did this for the entire Navigation channel, with 29 vibra cores from the whole area up to Mifflin, Reach A). They have the core logs (with grain size data) and interpreted cross-sections up the channel, and general conclusions on the vertical distribution of sediments along the entire channel. This study was not referenced in the Final SEIS (July 1997), the Environmental Assessment (April 2009), or any of the beneficial use documents. It is also not located with any of the documents on past studies either.” (*Attached Misc 10*).

It is troubling that the Army Corps would have a study of this importance and informational value for the very reaches of the River at issue, specifically conducted for the Philadelphia District, that it has never shared or disclosed publicly. From the summary of the document crafted by Bartholomew Wilson, dated 12/21/09, (*Attached Report 42*) it is clear that the findings of this study speak directly to the issue of the character of the sediments in Reach E (and beyond) and therefore are very significant in the assessment of the Kelly Island and Broadkill Beach projects and any other aspects of the Deepening that are affected by the quality and characterization of the dredged spoils used. It seems that the study calls into question, as early as 1996, the appropriateness of the Reach E sediments for the “beneficial reuse” they were planned for. (*Attached Report 56*).

Among further concerns raised by the Kelly Island project are that:

[H]ighly disturbed sediments have a tendency to be colonized and dominated by invasive species such as phragmites, leading to an extremely low quality and low benefit wetland system. ... providing this type of habitat directly adjacent to the high quality habitat found on the Bombay Hook National Wildlife Refuge could provide additional seed stock that may spread and cause ecological degradation of the adjacent marsh area. (*Attached Letter 34*).

Once phragmites invades, if one wants to control it, the level of activity and action required is extensive and generally includes a combination of glyphosate application as well as discing, mowing, burning and other damaging action. For over a decade, PSE&G has been engaged in a long-term effort to control phragmites in estuary and bay wetlands; the result has been the application of thousands of pounds of glyphosate, along with discing, mowing, burning and/or other disturbance. Despite all this expense and activity, the effort continues to fall short of expectations for success and is demonstrably unsustainable. If phragmites colonizes Kelly Island, directly adjacent to the national wildlife refuge, the so-called “beneficial use” project will have caused far more harm than good.

The Army Corps has not conducted the level of review necessary to assess the consequences of sea level rise for this element of the Deepening Project, i.e. Kelly Island. DNREC is on record questioning the lack of assessment, and, like the Delaware Riverkeeper Network has, questioned the assumptions, scenarios and other details regarding a sea level rise analysis that have prompted the Army Corps to dismiss any concerns. (*Attached Letter 34*). DNREC characterizes the Army Corps’ assertion that sea level rise will not compromise a key portion of the project as being apparently “an unsubstantiated opinion.” DNREC goes on to say with regards to sea level rise: “More importantly, it may be in direct conflict with the latest Army Corps of Engineers guidance that stipulates that sea level rise must be considered in all phases of Civil Works programs.” (*Attached Letter 34*).

The concerns for Kelly Island expand as additional information and research appear. DNREC, via correspondence, has expressed many concerns about the proposed design and maintenance of the project, Army Corps data used to design the project, and more. (*Attached Letter 34*).

According to the Army Corps Feasibility study, the Kelly Island “restoration” project will consist of dredge spoils being dumped in an area diked in at the south end of Kelly Island near the mouth of the Mahon River. The dike will be a closed-in area with dams for control. In front of this CDF a sand beach will be constructed. The dredge spoils deposited into the diked area and on the beach are expected to erode at a rate of 35,000 cubic yards per year, and therefore may affect navigation at the mouth of the Mahon River. The Army Corps has not addressed the potential impacts to the Mahon River or navigation at the mouth of the Mahon River. The Army Corps has not addressed who will be responsible for remedying that harm in future years and who will shoulder that cost.

According to DNREC, with regards to Kelly Island and Port Mahon: “The shoreline has eroded back to the point where it is no longer feasible to use this project to

protect the Port Mahon public ramp.” The Army Corps responds to this concern by dismissing it as not relevant to the ecosystem restoration goal of the project (*Attached Letter 46*). But to the extent the Army Corps used the claims of Port Mahon benefit as part of its previous rationales and selling points for the Deepening Project, and considering the implications for recreation, an out-of-hand dismissal of this issue by the Army Corps is inappropriate. It needs to be addressed in a new NEPA SEIS.

Further, the description of the Kelly Island project in Appendix M of the Army Corps permit application submitted to DNREC discusses the erosion rate of 20 feet per year at this site (how does that compare to 35,000 cubic yards per year?). And yet it does not describe how the project and the work to be done are sustainable and will not, in short order, be the subject of the same erosive forces (forces likely increased due to the deepening according to the research of Walsh and Sommerfield). The feasibility study for the project suggests that in fact, over time, the project will wash away. At a rate of 20 acres a year, the work at Kelly Island could be washed away and disappear in 6 short years. If Kelly Island is to wash away in a matter of years, how can it be deemed mitigation for the permanent harms that will be inflicted by deepening? If, in order to maintain it the Army Corps plans ongoing renourishing of the spoils, it raises the whole set of questions and concerns already discussed for horseshoe crabs and others. But before discussing those we want to point out that mitigation needs to provide permanent and ongoing benefits to offset the environmental damages inflicted, particularly where the harms inflicted will be permanent. An unsustainable “mitigation” project that will not provide ongoing protection and environmental benefits is not acceptable.

Finally, at a May 13, 2010 meeting Delaware representatives discussed an alternative strategy to Kelly Island for dredge spoil disposal. The Army Corps asserted at this meeting it had no plans to even consider the options put forth. To the extent there is a clearly viable alternative for avoiding the many harms of Kelly Island, it was inappropriate for the Army Corps to dismiss consideration of this option without considered analysis and review and certainly without subjecting it to the open light of the NEPA process or for any public consideration beyond the closed doors of the May 13 meeting. (*Attached Report 58*).

According to DNREC, the Kelly Island project, as of June 15, 2010, well after the 2009 EA, did not have final design plans for review and evaluation of the project, and that to the extent the Army Corps had a design it was one that included substantial changes from designs discussed previously. The Kelly Island project and its proposed new design, including the substantial changes made, is not part of this 2011 Draft EA. Clearly the ramifications of the Kelly Island project for horseshoe crab, oysters, a variety of fish, for shorebirds, for the spoil disposal plans of the project, and the overall implications of environmental harm, are so significant that they alone, and together with the other issues discussed in this comment, mandate an up-to-date SEIS for the project and demonstrate the deficiency of the 2011 Draft EA and the 2009 EA.

2. Broadkill Beach:

A primary focus of the Broadkill Beach project for the Army Corps' has been an assertion that it is beneficial reuse of spoils for the benefit of horseshoe crabs and therefore the migratory shorebirds they sustain. As discussed previously, DNREC has found the benefits claimed for horseshoe crabs from the Broadkill Beach project are dubious at best. According to DNREC's analysis (*Attached Report 29*) regarding Broadkill Beach:

✓ "... the proposed beach to be constructed **would likely have a detrimental effect on horseshoe crab spawning habitat.**"

✓ "The potential Broadkill Beach nourishment by the PD-ACOE does not meet the beneficial use requirements for this project, if anything it would negatively impact the prevalence of horseshoe crab spawning habitat and **impede horseshoe crab egg development.**"

Additionally, the USFWS has expressed concerns about the potential of the Army Corps' proposed beach nourishment projects to kill one to two year-classes of juvenile horseshoe crabs during initial construction and during each renourishment period. Biologists have expressed concern that smothering even one generation of juvenile horseshoe crabs could further threaten the sustainable population. (*Attached Letter 4, and personal communication by David Conrad, National Wildlife Federation with NJFO fisheries biologists, December, 2001*).

The claims of ecological benefit from Broadkill Beach made by the Army Corps in its SEIS and EA documentation are clearly not substantiated, supportable or accurate and demonstrate the need for new SEIS review. The Army Corps' inability to provide accurate information and assessments on this and other key elements of the Deepening Project demonstrate the vital need to apply full and rigorous SEIS analysis, review and comment in order to meet the legal demands of NEPA.

- ✓ Horseshoe crab and shorebird populations remain well below historic levels leaving them highly vulnerable to changing conditions, and therefore actions cannot and should not be taken that risk reducing their numbers further. The Broadkill Beach project, and Kelly Island Project, threatens the spawning and egg viability of horseshoe crabs – thereby:
- ✓ impeding their ability to grow the population and to provide the eggs necessary (now or in the future) to support the migratory shorebirds that are so important ecologically, culturally and economically to our region;
- ✓ potentially confounding the future ability of horseshoe crabs to continue to support the biomedical industry and the commercial fishery that seeks their use; and
- ✓ threatening a key portion of the diet of Loggerhead Turtles when in the Delaware Bay.

New Jersey has taken strong steps to protect horseshoe crabs because of the vital ecological and economic role they play in our region; likewise strong action has been taken by the ASMFC; it is counter to now allow the Deepening Project that would undermine these important state and federal efforts.

The Army Corps' application to DNREC seeking needed state permitting suggested that use of the Broadkill Beach site by spawning horseshoe crabs is low, and therefore the impact taking place during construction of that project "is not considered significant." In anticipation of the Army Corps making this same argument now as a way to minimize the population impacts of the harm Broadkill Beach promises to inflict on horseshoe crab spawning and egg viability as per DNREC's most recent analysis, the characterization that spawning on Broadkill beaches is "low" as compared to other Delaware Bay beaches and therefore not of significance is misleading. Broadkill Beach is designated a "Horseshoe Crab Sanctuary." In a 10-year survey it is documented that the use of Broadkill Beach by spawning horseshoes is comparable to that of other Delaware Beaches and in 2008 was higher than all but two of the New Jersey beaches included in the survey (16 NJ beaches were part of this 10 year analysis). Broadkill sits at about the median for the 2008 survey of 14 Delaware beaches. (*Attached Report 15*). In 2009, horseshoe crab counts on Broadkill Beach also showed this beach to be well used with 14,940 individual crabs surveyed. For use Broadkill was lower on the totem pole in 2009, but it was not the bottom and it was well used.

The concerns about the threat of the Broadkill Beach, Kelly Island and Port Mahon proposals with regards to their impacts to horseshoe crabs are greatly magnified by the science of recent years focused on the health and viability of the horseshoe crabs of Delaware Bay as well as the migrating shorebirds dependent upon them. Eggs laid by the horseshoe crabs, historically at very abundant levels, are an irreplaceable food source critical for the migration of red knot *rufa* and other shorebird species. The eggs of the horseshoe crab are so critical that recent declines in their abundance are threatening the future survival of the red knot and other shorebirds as discussed previously in this comment.

Trends indicate that the mean density of horseshoe crab eggs on beaches in the bay region has been 3,231 eggs/square meter over the last decade (2000-2009). Despite good conditions for spawning, the mean density of horseshoe crabs eggs available to shorebirds (top 5 cm of sand) remained low in 2010 with 4,994 eggs/square meter and have shown no signs of recovery.

According to the "Update to Status of the Red Knot *Calidris canutus* in the western Hemisphere, April 2010" issued by 19 scientific experts and institutions researching the status of the migratory shorebirds and horseshoe crabs of Delaware Bay, while in 2009 egg densities on bay beaches did show some increases, those increases are merely a return to the low levels of recent years (i.e. 2005), and "there is no evidence of a significant increase in the mature horseshoe crab population." And there has not been a trend of increase in red knot or other shorebirds that suggests they are on the path to recovery and that therefore are no longer in need of, or entitled to, strong protection of their primary migratory food source, horseshoe crab eggs on the Delaware Bay stopover. In fact, the 2011

Update confirms the continuing dire straits of the horseshoe crabs, egg availability, and dependent migratory shorebirds. (*Attached Report 18; Attached Report 35; Attached Report 24*).

The ecological phenomenon of the horseshoe crabs and the migratory shorebirds is responsible for supporting a multi-million dollar ecotourism industry – therefore its loss also means tremendous economic and community damage to the Delaware Bayshore region and communities. (*See generally Attached Report 59*).

Clearly, any project that threatens harm to horseshoe crabs is of major and substantial concern. Data about the horseshoe crabs, the red knot and the other migrating shorebirds has been amassed on an annual basis by experts. The Army Corps has not taken into consideration the wealth of horseshoe crab and migratory shorebird data currently being put together every year for purposes of informing horseshoe crab harvest regulations and shorebird protection strategies.

With regards to the effects of renourishment for horseshoes: How many renourishment actions for Kelly Island and/or Broadkill Beach does the Army Corps propose? In perpetuity as long as needed, only a set number after which the erosion that will occur will be unaddressed and so the “habitat created” lost, or not at all? If it is in perpetuity, how frequently and how many year-classes of horseshoe crabs are predicted to be affected? And how many crabs are predicted to be on the beaches during those renourishment times and therefore to be affected by the efforts? And what is the prediction regarding lost egg production/availability for shorebirds during that time? Answers to these questions need to be based upon current information and knowledge, not the data of the past.

Neither Kelly Island nor Broadkill Beach are appropriately characterized as beneficial reuse or restoration for the harms inflicted by the Deepening Project and therefore do not balance or mitigate any of the harms identified. They should instead be viewed as inflicting harm on habitats and aquatic life.

Referencing and relying upon Broadkill Beach and Kelly Island as mitigation for the variety and wealth of adverse environmental impacts resulting from deepening is simply not appropriate.

- ⇒ First, the two projects themselves will inflict an unacceptable level of negative effects.
- ⇒ Second the benefits the Army Corps claims these projects will provide do not mirror the kinds, wealth, variety and extent of harms inflicted by the Deepening Project. For example they do nothing for the oysters, for a moving salt line, for Atlantic sturgeon or shortnose sturgeon, for *Sabellaria vulgaris*, for water quality, and more. In fact in some cases these projects will make the harms worse.

⇒ Third, the projects don't even attain the benefits the Army Corps claims they will provide, as documented by this comment and the information upon which it is based.

I. Deepening Poses Threats to a Wide Variety of Fish, Finfish, Benthic Organisms and Others, Including Both Direct Harms and Harms to the Food and Habitats Necessary to Sustain Them. New Science Remains Unconsidered by the Army Corps; But Demonstrates the Need for an SEIS.

After the Army Corps released the 2009 EA, the State of Delaware submitted comments questioning and challenging many elements of that document, including the analysis of impacts to blue crab and sandbar shark, the analysis of impacts on wetlands, the assessments of sea level rise, and more. (*Attached Letter 32*). These concerns and questions were explored in greater depth and detail in a June 15, 2010 letter (*Attached Letter 34*). These letters are attached to this comment. To the extent the issues contained in them were not addressed in the 2011 Draft EA, they remain unaddressed as part of the NEPA process.

1. The information used by the Army Corps with regards to blue crabs is not sufficient to make a claim of no significant impact:

With regards to the blue crab studies used by the Army Corps in its justifications for the Deepening Project, NMFS is on record, post the 2009 EA:

The blue crab and horseshoe crab studies should be updated due to the age of the existing data generated by the ACOE, the changes in the ecological conditions of the Bay, the availability of new data from other sources, and the changes in the status of the stocks. (*Attached Letter 14*)

According to NMFS, declines in Chesapeake Bay stocks of blue crabs, since the time of the Army Corps' studies, has "put an increased pressure on New Jersey's blue crab resources, particularly in Delaware Bay." There have been reports of declines in Delaware Bay blue crab landings and catch-per-unit-effort. (*Attached Letter 14*).

Yet the Army Corps has responded that it plans no further research on horseshoe crabs or blue crabs. (*Attached Letter 16*). Blue crabs are important ecologically and economically to the Delaware Bay. Their declines and the information provided by NMFS are significant enough to warrant an up-to-date SEIS.

2. The Deepening Project threatens significant harm to the oysters of Delaware Bay, an ecologically and economically important species:

Oysters are important ecologically and economically to our river and region. They provide food and habitat as well as water pollution filtering, and are the basis of a vital and re-growing oyster industry of incredible economic and jobs value to the region. Reef-building oysters in the estuary can provide needed habitat for

diadromous fish that serve as hosts for juvenile freshwater mussels. Thus, adverse impacts to oysters can also adversely affect freshwater mussels (as we discuss below with respect to freshwater mussels, these species are critical to maintaining water quality in the River).

Economically the oysters are of increasing value, the potential devastation of which has not been addressed by the Army Corps. The Army Corps has failed to discuss and analyze the significant level of environmental and economic harms that would result from damage to the oyster populations of the Bay by the Deepening Project.

As the result of a \$6.5 million federal investment in restoring the oyster populations of Delaware Bay, over 2.1 million bushels of clam and oyster shells have been harvested in the Delaware Bay from 2005 through 2009. For the region, oyster harvest resulting from this federal investment is projected to generate up to and over \$80 million of annual economic benefit, much of this in some of New Jersey's poorest communities who could not tolerate the loss of associated jobs, revenue and benefit should this harvest be substantially reduced. (*See Attached Letters 43, 44 & 45*). Projects that harm these restored oyster populations will undermine the value of this federal, and taxpayer, investment.

In April 2009, after the Army Corps released its 2009 EA, NMFS expressed its concerns about oyster impacts and the Army Corps' inadequate response to concerns of relying upon monitoring studies conducted in 2000 and 2001:

More than eight years have passed since these pre-construction monitoring studies have been completed. Ecological conditions of the estuary and the status of the oyster stocks have changed. In addition, more information is now available on water quality in the estuary, the conditions of the oyster seedbeds, and the benthic communities of the Bay from sources According to the NJDEP, an expansive area of habitat has been identified in the area of Hope Creek near Salem, NJ, but little data is available from this area.

To ensure the impacts on oysters are evaluated fully and the appropriate measures are taken to avoid, minimize, and mitigate for these impacts, the ACOE should update the 2000 and 2001 studies. ... These studies should be undertaken before any construction occurs in the Bay.

(*Attached Letter 14*).

The Army Corps' entirely inadequate response was to say

- ✓ that in 1997 (14 years ago) they shared their conclusions with the Haskins/Rutgers Shellfish Lab who reviewed the conclusions regarding oysters; and...
- ✓ that they will monitor as the project moves forward to look for impacts.

Neither response effectively addresses the concerns raised, including how new information and data will or should affect the analysis regarding risks and impacts to oysters. Nor has the Army Corps updated its analysis of impacts to oysters based on readily available, recent data.

Further, with regards to the Army Corps' commitment to monitoring before and after undertaking the Deepening Project to determine *ex post facto* if any adverse environmental impacts occurred, USFWS noted about the pre-project monitoring that "environmental contaminants were not a component of the study. ... The Service remains concerned that dredging activities in the Delaware River may result in the release of buried contaminants from localized 'hot spots.' Baseline body burden levels need to be established for representative groups (oysters, dominant fish species) *prior to any dredging activities.*" (*Attached Letter 4, emphasis added*).

Additionally, in an often-expressed concern that the Army Corps has been pursuing the Deepening Project with a set of pre-determined findings and outcomes, USFWS wrote the following about the Army Corps' oyster monitoring report:

The Service also recommends modifying the statement presented in the Summary and Conclusions section of the Versar, Incorporated, report (Page 4.1). The concluding paragraph reads: 'it is intended that these data could then be used to direct any mitigation that may be required in the *unlikely* (emphasis added) event that significant impacts are detected by the post-construction monitoring.' As written, the statement appears pre-determining.

(Attached Letter 3)

More recently, DNREC has stated on the record its position, based on its analysis of Corps information, that a failure of the Kelly Island CDF project could be catastrophic for the oyster populations of the Delaware Bay. When discussing Kelly Island, DNREC has said "If a dike should fail, the sediment load could be catastrophic to the adjacent oyster beds." (*Attached Letter 32 & Letter 46*).

The Army Corps' response was to rely on a 1996 Design Memorandum to dismiss DNREC's concerns. But the 1996 Design Memorandum could not have foreseen, and certainly did not include, the present shape of Kelly Island, new predictions for sea level rise, the current status of oysters in the bay including both their population health and precise locations, the new information on circulation patterns and the erosion-causing effects of dredging (all of which are issues discussed elsewhere in this comment). Therefore, the Army Corps' May 21 response to this issue is essentially non-responsive and not defensible based on present data and knowledge without further analysis, study and consideration.

In fact, in its June 15, 2010 correspondence to the Army Corps, DNREC questions the Army Corps' assertions regarding Kelly Island and sea level rise. DNREC characterizes the Army Corps' assertion that sea level rise will not compromise a

key portion of the project as “an unsubstantiated opinion.” DNREC goes on to say with regards to sea level rise: “More importantly, it may be in direct conflict with the latest Army Corps of Engineers guidance that stipulates that sea level rise must be considered in all phases of Civil Works programs.” (*Attached Letter 34*).

Experts from NJ DEP’s Division of Fish & Wildlife, the Delaware Division of Fish & Wildlife, the University of Delaware’s College of Marine Science and Earth Studies, and the Haskins Shellfish Research Laboratory have expressed concern that a change in salinity levels may have an adverse effect on oyster resources in the Estuary and have stated the need for full consideration of this potential harm. (*Attached Misc. 1; Attached Misc 2; Attached Misc 8*). The Army Corps has not given appropriate consideration to this issue.

In response to the question of whether there was any new thinking about the potential implications of the Delaware River Deepening Project for oysters and/or other shellfish in the estuary, an oyster expert responded:

The potential for the salt wedge to move farther into the bay is, in my mind, the most serious potential consequence. ... With the continued presence of oyster diseases in the bay, and since their extent and overall effects are primarily controlled by the salinity, anything that increases the salinity of the bay will be detrimental to the oyster population. I call attention to the distribution of oysters within the system. They occupy large areas in the lower part of the Estuary, but the dense population currently exists where the bay begins to narrow. A small rise in salinity would force the oysters farther up bay, but there is less and less area in that portion of the system. (*Attached Misc. 8*)

The Army Corps must fully assess how a deepened channel would affect the salt line as it pertains to the oysters of Delaware Bay. This is a known risk that, through impact to the oysters, could have significant ecological, cultural and economic ramifications for the region. As this comment discusses, the Army Corps has not appropriately or defensibly considered how much movement of the salt line and increases in salinity levels will result from the Deepening Project, individually and/or in combination with sea level rise, upstream consumptive uses and losses, and/or the 2011 NY City reservoir management plan based on the most current and relevant scientific information and data. One of the major deficiencies in all of the Army Corps’ work when it comes to the salt line and its impact on species like oysters, is that it has failed to use the most current predictions on what sea level rise will be for our River and region.

Elsewhere this comment provides discussion on the movement of the salt line and changing salinity levels resulting from the Deepening Project and the fact that the Army Corps has entirely failed to provide a detailed analysis of these impacts grounded in the best available and most current scientific data. As a result of its deficient work on this front, the Army Corps will underestimate how far up river the salt line is likely to move as the result of the Deepening Project and so inaccurately assess the ramifications for oysters. While sea level rise may be a

factor in a changing salt line for the future, the Deepening Project will contribute to the moving salt line and the harmful effects it will have on oysters in a manner that is in our present day power to prevent.

NJDEP Division of Fish & Wildlife has also stated its concern for oysters, specifically regarding the “potential siltation of the natural seed beds and leased grounds in the lower bay.” (*Attached Misc. 1*).

Clearly, according to experts, there continue to be legitimate and documented concerns regarding harms to the oyster populations of the Bay from the Deepening Project. There is also new information on the status of the oyster populations in the Bay, their economic contribution to local communities and the nation’s food supply, and new scientific information on the ramifications of continuing and renewed exposure to MSX and Dermo that the Army Corps has failed to consider in its 2009 EA or its 2011 Draft EA. (For abstracts from new research see Misc 33).

The questions, concerns and challenges raised by the agencies and experts have not been addressed by the Army Corps in NEPA documentation. Considering the significant cultural, economic and ecological impacts that would result from damage to the oyster populations, full SEIS review is clearly required.

3. The Deepening Project threatens significant harm to the ecologically important and unique Sabellaria colonies of the Delaware Bay region and the variety of species dependent upon them:

The spoil disposal plan, which includes dumping on Broadkill Beach, is also a threat to *Sabellaria vulgaris*, a species of special significance to the Estuary and region, and one that is important to a number of other aquatic species as well as for the protection of bay beaches.

Sabellaria vulgaris is a species of polychaetous annelid sand-building worm that constructs colonies of sand reefs. The reefs provide intricate habitat for a number of small crustaceans and minute species that are key parts of the aquatic food chain, as predators on plankton and prey for fish. The colonies are feeding, hiding, spawning, and nursery areas for a large number of sportfish including black sea bass, summer flounder, scup, weakfish, black drum, and others. Sportsmen may find that their sportfishing opportunities will significantly diminish if these reefs were degraded or eliminated. As noted in the 2008 State of the Basin Report (*Attached Report 14*), the weakfish populations of the Delaware Estuary are depressed with populations further declining in recent years. So in addition to the overall ramifications of losing the *Sabellaria* reefs for the variety of species dependent upon them, the impacts to *Sabellaria* as it pertains to the existing decline of weakfish is another particular consideration in need of analysis and review.

The *Sabellaria vulgaris* populations of the Delaware Estuary are uniquely different from those found elsewhere. “While the species ranges from Cape Cod to Georgia (Gosner, 1978), the formation of reef structures seems unique to Delaware Bay....”

(Dr. Douglas Miller, *Pre construction Sabellaria Vulgaris Baseline Monitoring at Broadkill Beach Sand Placement Site, Sussex County, Delaware, Revision Jan. 3, 2002*). Moreover, *Sabellaria* reefs can provide a degree of protection from the effects of wave action, stabilizing beach sands and intercepting the force of waves near the low tide mark. (Wells, H.W. 1970). Delaware Bay *Sabellaria* reefs are of considerable geological importance and should be considered in the analysis of factors influencing sedimentation on beaches. (Wells, H.W. 1970);(Dr. Douglas Miller, *Pre construction Sabellaria Vulgaris Baseline Monitoring at Broadkill Beach Sand Placement Site, Sussex County, Delaware, Revision Jan. 3, 2002*.)

“While they [*Sabellaria vulgaris*] have some capability to withstand burial under thin layers of sand, shoreline restoration would be expected to bury the present reefs at Broadkill Beach resulting in a substantial loss of this habitat.” (Dr. Douglas Miller, *Pre construction Sabellaria vulgaris Baseline Monitoring at Broadkill Beach Sand Placement Site, Sussex County, Delaware, Revision Jan. 3, 2002*). The Army Corps’ report regarding this species found that activities associated with the Deepening Project could adversely impact the *Sabellaria vulgaris* and identified three mitigation options, but no supporting data or research are cited in support of these untested mitigation actions. In addition, the cost of these plans has not been included in the cost of the Deepening Project.

In its April 16, 2009 letter to the Army Corps regarding the EFH analysis done for *Sabellaria*, NMFS says of the efforts by the Army Corps to avoid *Sabellaria* harm, “reefs may still be impacted due to the runoff of sand below mean low water along the beach nourishment footprint.” (Attached Letter 14). This letter is confirmation that *Sabellaria* reefs are still at risk from the Deepening Project and that the Army Corps NEPA analyses needed to address this issue but did not and have not done so.

The finalized report by Dr. Miller confirms some of his findings and in no way allays the concerns raised above. The study by Dr. Gary F. Smith, titled “Subtidal Pre-Construction *Sabellaria vulgaris* Monitoring in Delaware Bay at Broadkill Beach and Port Mahon Sand Placement Sites, and Kelly Island and Slaughter Beach Control Sites, Draft Report,” (Sub-Contract Number 003951, April 2005), also does not address the outstanding concerns. Dr. Smith’s study focused on offshore occurrences of *Sabellaria* and therefore does not bear direct relevance to the proposal to conduct beach reconstruction on Kelly Island and at Port Mahon. Dr. Smith’s study discusses bottom substrate conducive to *Sabellaria*; but this can be misleading as the worm does not always require a specific type of bottom, only some hard surface such as oyster shells, clam shells, scattered gravel etc. upon which to build. Once the *Sabellaria* has started to build it can continue to build upon its own structure as long as it is left undisturbed. And there is a question whether the benthic raking conducted as part of Dr. Smith’s survey actually degraded *Sabellaria* colonization or reef development.

There are numerous patches, colonies and reefs of *Sabellaria vulgaris* located in the intertidal zone of Broadkill Beach, Slaughter Beach and Port Mahon.

In summary, the Miller and Smith studies confirmed the presence of *Sabellaria vulgaris* at proposed spoil disposal locations and confirmed that the *Sabellaria* populations would be buried and thereby killed as a result of the project as proposed. These studies confirmed that as a result there would be a “substantial loss of this habitat.” Three mitigation options were proposed, but no supporting data or research are cited in support of the untested mitigation actions.

Assertions by the Army Corps that it will continue to consider pathways forward to avoid harm do not provide the appropriate level of detail or assurance that there will be no harm. If there was to be additional consideration, the 2011 Draft EA would have been the appropriate time and place to do so -- but no such review or discussion is included.

The Army Corps needs to provide a program and plan that experts agree will not just minimize harm, but will successfully avoid it. Assurance of future, unknown actions, does not fulfill the requirements of NEPA.

4. The Army Corps has not adequately analyzed harms to essential fish habitat based upon current science:

According to NMFS:

The filling of the unvegetated shallow water habitat [that will take place at Kelly Island] will have an adverse effect on federally managed species such as winter flounder, windowpane, summer flounder, and other benthic species that feed on the organisms currently found at the site. ... [S]ampling found that the site was dominated by the bivalve *Mulinia lateralis*, which accounted for 94 percent of the individuals collected ... *Mulinia lateralis* is a prey species consumed by a wide variety of fish including winter flounder, summer flounder windowpane, little skate ... winter skate,..., and scup. The placement of fill material in this area will eliminate 120 acres of forage area for these federally managed species, and as a result, adversely affect their EFH. (Attached Letter 14)

NMFS has further stated that:

the impoundment at Kelly Island will adversely impact EFH designated by the federal fisheries management councils for a wide variety of federally managed species, including forage habitat for summer flounder, windowpane, winter flounder, skates and scup, and early life stage EFH for winter flounder. The wetland and beach to be created have little to no habitat value for these species. (Attached Letter 14)

According to NMFS, to minimize the impacts to EFH for these species at Kelly Island, the Army Corps

should require the removal of the water control structure and the maintenance of permanent, unrestricted tidal flow with no option to revert to an impoundment or provide for the compensatory mitigation for the loss of 120 acres of fishery habitat or eliminate the Kelly Island project from the Deepening Project. (*Attached Letter 14*)

The Army Corps' response to NMFS (the version of which we have is undated and unsigned and therefore it is unclear the status of this letter from the FOIA documents we received) seems to reiterate Corps planning language for Kelly Island and does not fulfill the irrevocable commitments sought by NMFS in its April 16 letter. (*Attached Letter 16*)

The 2011 Draft EA fails to discuss, consider or even acknowledge this information regarding Kelly Island.

5. Threats to American Shad overlooked:

According to the ASMFC, American shad stocks are at an all time low. Declines are the result of a combination of overfishing, pollution and habitat loss. Although during the 19th century annual American shad harvests reached over 50 million pounds, today they are in the 1 to 2 million pounds range coastwide. The ASMFC believes that the Delaware River population is greatly depressed – so much so that it has created a shad management plan to focus on the species' recovery and restoration. To the extent the Deepening Project further impedes the protection and restoration of the shad populations of the Delaware River it is working at cross purposes with both the ASMFC and NMFS, and is undermining the protection and restoration of a species vital to the ecology, economy, recreation, and culture of our region. The most recent information on the Delaware River's American Shad population and ASMFC's status reports are in need of updated consideration.

6. Threats to Striped Bass overlooked:

“SAV is vital habitat for many of the life stages of prey base, young-of-the-year striped bass, and river herring.” (*Attached Letter 11*). SAV, as discussed in this Comment, is at risk from the Deepening Project, its locations and the effects of the Deepening Project ill-considered by the Army Corps. “The striped bass *Morone saxatilis* is one of the most economically important fish species along the Atlantic Coast, supporting a valuable recreational and commercial fisheries.” (*Attached Report 32*). New research out of the State of Delaware provides information on the status of the Striped Bass in the River. Considering the species' tremendous value to the region anything that affects “vital habitat” for this species, including SAV, should be carefully researched and include information from this newly released study. (*Attached Report 32*)

Striped bass are also dependent upon freshwater reaches of the River for the initial stages of their life history; as such, the salt water intrusion implications of

the Deepening Project also need to be considered in the context of the effect on Striped Bass. (*Attached Letter 40*)

7. Threats to Sand Tiger Shark & Sand Bar Shark overlooked:

Sandbar shark were granted federal protection in 2008 in order to allow for a rebuilding of the declining stock levels. The central and lower portions of the Delaware Bay are important habitat for both pupping and young sandbar sharks that return to the Bay for their first years of life.

“Delaware Bay serves as one of the largest, if not the largest nursery habitat for young-of-year (YOY) and juvenile sandbar sharks along the Atlantic Coast.” (*Attached Report 84*). The recovery of sandbar sharks largely depends upon the identification and conservation of critical habitat, including major nursery areas, for young sandbar shark. (*Attached Report 84*). The ASMFC has seasonal closures in effect from May 15 to July 15 in Delaware and New Jersey waters to protect the species by protecting pupping and nursery habitats. NMFS has listed Delaware Bay as a Habitat Area of Particular Concern for sandbar sharks. (*Attached Report 84*). Beach renourishment projects are known to disrupt feeding patterns of sandbar shark. Dredging is also a concern and can affect sharks inhabiting nearby areas; it also can reduce the availability of prey. In the case of the Deepening Project, there are concerns about effects to blue crabs, a food source for sandbar sharks. (*Attached Report 84*). The Deepening Project has been specifically identified as a threat of harm to sandbar shark because of its capability for:

- ✓ Releasing toxins such PCBs and PAHs into the river
- ✓ Increasing suspended sediment concentrations
- ✓ Depressing dissolved oxygen levels
- ✓ Increasing noise
- ✓ Changing salinity regimes
- ✓ Altering tidal flows and
- ✓ Disturbing habitats of a variety of fishes.

(*Attached Report 84*).

“Delaware Bay is crucial to the long term recovery of the Northwest Atlantic sandbar shark stock.” (*Attached Report 84*). “Delaware Bay serves a critical role in large segments in the life of juvenile sandbar sharks.” (*Id.*) Research issued December 2009 (*id.*) provides significant information on when and where sandbar shark are located in the Delaware Bay. This information is readily available to the Army Corps. Considering the importance of the Delaware Bay to the sandbar shark species, the Army Corps should be using this study to inform its decision-

making and actions regarding the Deepening Project, Kelly Island, Broadkill Beach and Buoy 10 spoil disposal plans, but has entirely failed to do so.

Study is starting on the plight of the sand tiger shark. Concerns about the species' decline are so significant that it is now a candidate for listing as an endangered species. Research is underway which, according to an assistant professor of fisheries and researcher at Delaware State University, could have policy implications for beach replenishment projects and the dredging of the Delaware River shipping channel. (*Attached Article 3*).

Delaware Bay is also an important summer foraging area for all segments of the sand tiger shark population from young-of-the-year to adults. "In fact, Delaware Bay is one of the few locations in the world where sand tiger sharks can be encountered with any regularity. This fact, when combined with their reported population declines has brought increased attention to the role of Delaware Bay in rebuilding the western Atlantic stock of sand tigers." (*Attached Letter 40*)

Changes in salinity can affect both sandbar and sand tiger sharks, as can sedimentation resulting from dredge spoil disposal. (*Attached Letter 40*).

How a deepened channel combined with sea level rise will affect the salt line and the resulting impacts on the sand bar and sand tiger sharks of Delaware Bay needs to be fully assessed. The Army Corps has not appropriately or defensibly considered how much movement of the salt line and increases in salinity levels will result from the combination of sea level rise and deepening. One of the major deficiencies in all of the Army Corps' work when it comes to the salt line and its impact on species like these sharks, oysters, Atlantic and shortnose sturgeon, freshwater mussels, and wetlands is that the Corps has failed to use the most current predictions on what sea level rise will be for our river and region and it has failed to use the best modeling and data for assessing salinity and salt line changes. See discussion in this Comment.

Further, that the sandbar and sand tiger sharks are affected by increased sedimentation, such as that which could result from spoil disposal, raises concerns about the Broadkill Beach project, the likelihood of erosion or failure of Kelly Island due to inappropriate sediment being used for that project (based on the Army Corps' mischaracterization of spoils to be used for the project) and/or because of sea level rise and tidal fluctuations, and the disposal of spoils at Buoy 10. The Army Corps has not, in the context of NEPA documents, explored these critical issues as they pertain to the sandbar and sand tiger sharks.

8. Sponges Newly Identified in the Project Area Have Not Been Considered:

There has been a new finding of colonies of sponges on the floor of the Delaware Bay; new research is underway on this recent discovery. (*Attached Article 4*). These emerging discoveries and bodies of research have not been considered by the Army Corps in their assessment of environmental impacts, biological windows, or costs associated with the Deepening Project.

9. Newly Identified Mussels in the Project Area Have Not Been Considered:

In November, 2010, researchers discovered beds of freshwater mussels between Chester, PA and Trenton, NJ. The species found included the alewife floater (*Anodonta implicata*) and the tidewater mucket (*Leptodea ochracea*), both previously thought to be extinct in Pennsylvania and New Jersey; the pond mussel (*Ligumia nasuta*) and the yellow lampmussel (*Lampsilis cariosa*), both considered critically-imperiled; and the creeper (*Strophitus undulates*) and the eastern floater (*Pyganodon cataracta*) both considered vulnerable; as well as the eastern elliptio (*Elliptio complanata*), the only mussel known to be native to our Delaware River that is not considered to be in jeopardy. (*Attached Articles 14 & 15*). The region of the River these mussels were found are well within the bounds of direct impact from the Deepening Project.

Freshwater mussels can live 80 to 100 years old, and most species do not begin reproducing until they are 8 to 10 years old. Because they are so slow growing and don't begin to reproduce until this older age, they are not able to quickly recover from disturbances or impacts that result in death. Freshwater mussels require a fish host, a specific species depending on the mussel, to complete their life cycle. Activities that damage the needed fish hosts in turn do direct harm to the freshwater mussel species they help serve in the life cycle. (*Attached Report 75*).

“Freshwater mussels are the most imperiled of all the flora and fauna across North America. In the Delaware River Basin approximately 12 to 14 species of freshwater mussels (*Unionidae*) are considered native; however only a few of these species can still be found.” In addition to the loss of species, there is also a loss of abundance of the few species that remain in the River system. Mussels are vital for filtering pollution and filling important habitat niches. It is estimated by experts that just one “relic population of 500,000 Eastern elliptio on the lower Brandywine Creek still filter greater than 1 billion liters and remove 26 metric tons of dry total suspended solids each summer season.” (*Attached Report 75*).

Experts believe that revitalizing freshwater mussels in the Delaware could improve water quality downstream and thereby benefit estuarine species. Reef-building oysters in the estuary can provide needed habitat for diadromous fish that serve as hosts for the juvenile freshwater mussels. So adverse impacts to oysters can also adversely impact freshwater mussels, as discussed above.

All of the freshwater mussels in the Delaware River system, except for one (the Eastern elliptio, *Elliptio complanata*), present are identified by one or more of the states as endangered, threatened, imperiled, vulnerable, critically impaired, very rare, extremely rare or extirpated. (*Attached Report 75*).

Pollution inputs and saltwater intrusion that will result from the Deepening Project can have adverse effects on these newly-discovered freshwater mussel populations.

Freshwater mussels are very sensitive to water quality, according to experts. Exposure to contaminants either directly via dissolved compounds or

contaminants that are particle-mediated can have adverse consequences. Freshwater mussels are highly exposed to changes in water quality because of their filtering activities and the passage of large volumes of water across many thin tissue layers. Dissolved toxins, such as heavy metals, are “rapidly taken up by direct absorption ... and indirectly via the food.” (*Attached Report 34*). Because data shows that the Deepening Project, both directly and through contaminants from spoil disposal, will pollute estuary waters with contaminants including toxins and heavy metals, the implications of this pollution for the mussels still found in the estuary must be examined.

Freshwater mussels are just that, freshwater creatures. So the implications of salt water intrusion further up the River as the result of the Deepening Project is a concern that must be fully addressed in a new NEPA process.

Salinity rise is one of the top concerns for bivalves that live in the freshwater tidal areas of the River. (*Attached Report 75*). The effects of the Deepening Project on the salt line and its contribution to harmful effects on mussels, and the loss of ecosystem services they provide, has not been considered by the Army Corps based on the new information identified by experts on the existence and locations of freshwater mussels in the estuary. (*see Attached Report 75*).

A moving salt line may not only affect mussels, oysters, sturgeon, etc. but could also affect macroinvertebrates found in the estuary. Macroinvertebrates attached to rocks or found in sediments are also sedentary, like mussels, and so can't escape pollution issues or changing salt conditions. There are macroinvertebrates in the tidal section of the Delaware River that are in the sediments. Since macroinvertebrates also help filter out nutrients and other pollution, this could increase nutrient levels in the river as well – they may not filter as much as mussels or oysters but scientists have shown their importance in breaking down nutrients and detritus.

Stressed mussels require more oxygen. (*Attached Report 34*). The Deepening Project is threatening SAV that is critical for providing oxygen in the Estuary, including the Philadelphia reach of the River where still today oxygen levels can become excessively low. (See discussion elsewhere in this comment on oxygen levels and SAV). SAV is only now rebounding and is an important part of solving the oxygen deficit problems in the Estuary waters. The impact of the loss of SAV, its effect on oxygen levels and in turn the effect on freshwater mussels in the Estuary, particularly considering their imperiled conservation status across the states, mandates SEIS consideration and review. To date there has not been such consideration in the Army Corps' NEPA documentation.

Additionally, invasive or exotic species resulting from interbasin transfers of water can be a very direct threat to freshwater mussels as well as many other species. (*Attached Report 34*). Increased ballast water from deeper ships brought up the River by a deeper channel could heighten this risk. The issue of invasive and exotic species and ballast water and their ecological and economic implications for freshwater mussels and other River fish and wildlife species must also be considered in a new NEPA process.

Identification of host fish needed for freshwater mussels is one of the least studied aspects of freshwater mussel life history. American eel are known to be hosts for *Elliptio complanata*; some believe they are in fact the preferred host. Some species of trout and yellow perch too can serve as hosts. Some data shows that some of the species found in the tidal estuary, *Strophitus undulates*, can use pumpkinseed and yellow perch. Shad too are considered by some as possible host species. (Attached Misc 42).

There is apparently no information on fish hosts for the rarest and most special species discovered in the estuary, such as pond mussels (*Ligumia nasuta*) and tidewater mucketts (*Leptodea ochracea*). Since mucketts only live in tidal freshwater habitats like the Trenton to Marcus Hook area, they must be naturally adapted to use a native fish host from that area. (Attached Misc 42).

Considering the importance of the fish hosts to the life cycle of the mussels and the new discovery of a variety of freshwater mussel colonies in the reaches of the River to be affected by the Deepening Project, it is critical that the Army Corps not take any action that would harm known or believed fish hosts, and that the Army Corps undertake the research necessary to learn more about the hosts so that it can take steps to ensure they too are not harmed.

This new information regarding the presence of freshwater mussel species previously believed to be extirpated in the River, and the various implications of the Deepening Project on their present and future health, including pollution effects, damage to SAV that could affect oxygen levels in a reach of the River where the mussels are located, salt water intrusion, and impacts to fish hosts, have not been the subject of NEPA review by the Army Corps. Clearly, considering their status designations in each of the three states where the Deepening Project will happen, this information mandates a full analysis in a new SEIS.

10. Harms to American Eel overlooked:

American eel is a slow maturing and long-lived species that spends 8-30 years in estuary and freshwater streams, before returning to the Sargasso Sea, the same place they were born, to spawn as "silver eels" in the late summer and fall. While females produce millions of eggs, American eels reproduce only once in their lifetime and die after they spawn. The life history of the species, such as late age of maturity and a tendency for certain life stages to aggregate, can make this species particularly vulnerable to decline.

Young American eels return to their estuaries in a stage where they are referred to as glass eels. In all of its life stages, eels serve as an important prey species for many fish, aquatic mammals, and fish-eating birds. Although fisheries are a fraction of what they were historically, eel support valuable commercial, recreational, and subsistence fisheries and are an important part of the ecosystem. Loss of nearshore habitat destruction will have deleterious impacts on American eel.

While further study is needed, chemical contamination of American eel is known to occur and could be associated with an increased incidence of disease and reproductive impairment. Because eel are long lived, their exposure to endocrine disrupting contaminants could affect their sexual development, maturation, fertility and fecundity (ability to reproduce). Because there are concerns about the reintroduction of contaminants from the Deepening Project and its spoil disposal plans, consideration of the ramifications for the American eel is needed.

Dissolved oxygen levels have been found to affect American eel. Dissolved oxygen (DO) has been found to be a strong predictor of the distribution of American eel. In North Carolina high catches of American eel regularly occurred in waters with DO levels above 4 mg/L. In the Chesapeake Bay, VA, 82% of American eel caught were in waters with DO levels between 5 and 9 mg/L. As discussed previously in this comment, the Deepening Project will likely result in the destruction or degradation of subaquatic vegetation (SAV) that is an important source of oxygen in the River. The Philadelphia reach of the river continues to experience low oxygen levels, so much so that there is a question about its ability to support fish propagation. The failure to evaluate the destruction of SAV and the effects this will have on oxygen and American eel as well as other fish species is a significant shortcoming of the review and consideration of the Deepening Project to date.

American eels are known to be a host fish, some believe them to be the preferred host for *Elliptio complanata*. Thus, harming the American Eel could have significant impacts on this important freshwater mussel species. (*Attached Misc 42*).

Further, according to NJDEP's Division of Fish and Wildlife, "American Eel (elvers) were not addressed in the original EIS. Potential impacts should be addressed in the new SEIS." (*Attached Misc 1*). Delaware State University scientists have also urged the Army Corps to consider ramifications of the Deepening Project for American Eel. (*Attached Letter 40*).

The Army Corps' 2009 EA does not discuss the American eel and it does not appear in the 2011 Draft EA. As a result the potential harms to the American eel that are a concern according to NJDEP experts are unknown. The Army Corps had ample notice that this issue should be considered and has simply chosen not to do so.

11. Other Threatened or Endangered Species overlooked:

The July 2010 draft mitigation plan associated with the Southport development project mentions State-listed rare, threatened and endangered species that are present and at risk from that project, a project affecting a reach of the Delaware River affected by the Deepening Project. The list includes: bald eagle (state threatened), shortnose sturgeon (*Acipenser brevirostrum* – federal and state endangered), red belly turtle (*Pseudemys rubriventris* – threatened), Eastern mudminnow (*Umbra pygmaea* – potential candidate), field dodder (*Cuscuta pentagona* – proposed threatened), bugle weed (*Lycopus rubellus* – endangered), velvety panic-grass (*Panicum scoparium* – endangered), forked rush (*Juncus*

dichotomus – endangered), and Atlantic sturgeon (*Acipenser oxyrinchus* – federal species of concern and now proposed for listing as endangered in the Delaware River).

As of July 2011 this list is extensive, and yet, the Army Corps' NEPA documents for the Deepening Project do not discuss a majority of these species, how these species will be harmed by the project, to what degree they will be harmed and how that harm translates into population status, and how that harm might be avoided. (See Attached Report 49). The inadequate analysis and investigation the Army Corps has done does not fulfill the level of attention and detail mandated by NEPA for rare, threatened, endangered and candidate species under State and federal law.

Assertions by the Army Corps that it will ensure no harm to natural resources from the Deepening Project because it has done preconstruction monitoring to establish a baseline of information on some species and that it will continue some level of monitoring during and after construction are absurd. This kind of monitoring will not prevent harm, it will only identify damage that has been done after the fact, and even then only to a limited degree (i.e. only for the specific species and elements monitored). This promise of future monitoring is not responsive to the question regarding resulting environmental harms and does not provide the data, information or opportunity to know what harms may occur to aquatic or tidal vegetation, benthic organisms, or other flora and fauna and their habitats; whether those harms are acceptable how they might be avoided, minimized or mitigated; and how they fit into a consideration of cumulative impacts of the project.

J. Both Withdrawals and Discharges of Ballast Water Pose Significant Threats of Harm to Species and the River that Require SEIS Consideration.

NJ's Division of Fish and Wildlife has written that the impact of "increased ballast water intakes cumulative effect to early life stage fishes needs to be addressed." That the "SEIS should quantify the anticipated withdraws by increased and/or larger capacity ships." And that "data should be gathered and/or collected addressing potential adverse impacts to ichthyoplankton and/or early life stage fisheries." (Attached Misc 1). While the Army Corps asserts that "effects on plankton should be minor" it fails to cite any research or documentation for this position and it fails to consider the concerns raised by NJ DEP.

To the extent the Deepening Project will result in larger vessels coming up the River it means more ballast water needs, discharges and impacts. Impingement and entrainment of the variety of species discussed in this comment and beyond due to the intake and discharge of ballast water could be significant. The intake of millions of gallons of ballast water from the River as a result of the commercial vessels coming into the River due to this project "will entrain early life stages of commercially and recreationally important fish" including American shad, alewife, blueback herring and striped bass. The cumulative effects of this impingement and entrainment need to be considered in conjunction with the impingement and entrainment that already occurs at existing cooling water intakes operating in the

Delaware Estuary and River including, but not limited to, the Salem Nuclear Generation Station, Eddystone 1-4, Delaware City facility, Edgemoor 104 and 5, Hope Creek facility, Sun's Marcus Hook facility, the Paulsboro facility in NJ, Dupont Edgemoor in DE, and PP&L Martins Creek facilities, to name a few. (*Attached Report 32 gives new information on the status of striped bass in the Delaware River that should be part of this analysis.*)

In addition, the concerns about invasive exotic species that may result from larger discharges of ballast water from larger vessels cannot be overstated in terms of either ecological or economic impacts. The invasion of such species into major ports and waterways of the US have cost billions of dollars in control efforts and lost economic value from damage to important fish and wildlife species as well as the habitats that support them. For more information see

http://water.epa.gov/polwaste/vwd/ballastwater/invasive_species_index.cfm

http://water.epa.gov/polwaste/vwd/ballastwater/invasive_species_bal_links.cfm

<http://www.invasivespecies.gov/index.html>

<http://www.fws.gov/fisheries/ans/Index.cfm>

To date, the Army Corps has failed to engage in any serious analysis of the issue of invasive species in ballast water. Given the potential economic and ecological consequences, this issue must be addressed in a new SEIS.

K. Impacts to Essential Fish Habitat Designated under the Magnuson-Stevens Fishery Conservation and Management Act has not Been Adequately Addressed through the NEPA Process.

“The mixing zone in the Delaware River has been designated as EFH for all life stages of winter flounder and windowpane, juvenile and adult bluefish, summer flounder, juveniles Atlantic sea herring, Atlantic butterfish (*Peprilus triacanthus*), scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*) and all life stages, king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculatus*), cobia (*Rachycentron canadum*), clearnose skate (*Raja eglanteria*), little skate (*Leucoraja erinacea*), and winter skate (*Leucoraja ocellata*). The mixing zone is those areas of the River where the salinities range from 25 ppt to 5 ppt according to NMFS, bringing the mixing zone to just above the Schuylkill River in PA (*see Attached Letter 42*). According to the EFH final rule published in the *Federal Register* on January 17, 2002, an adverse effect on EFH is “any impacts which reduce the quality and/or quantity of EFH.” This effect may be direct or indirect, it may be physical, chemical or biological alterations of the waters or the substrate, it may include the loss or injury of benthic organisms, prey species and their habitat or other ecosystem components. Adverse effects may result from action within or without the EFH area. Adverse impacts may include individual, cumulative, synergistic consequences of actions, and the effect may be site-specific or habitat-wide. Adverse effects may be the loss or reduction in availability

of prey species through direct harm or capture, or through harm to the prey species' habitat. (See Attached Letter 42).

The Deepening Project, which will result in significant levels of dredging, filling, altered circulation patterns, water quality degradation, destruction of shallow water habitat and riparian habitat, and so on, will have a substantial and unacceptable impact to a wide variety of NOAA trust resources. And while there is an EFH process, the level of impacts to the wide array of species that have not heretofore been considered and publicly commented upon as part of a NEPA process necessitates consideration in an SEIS process as well.

L. The Army Corps Has Overlooked a Variety of Mechanisms by which the Deepening Project Will Harm Birds and Wildlife, Including Reductions in Prey Species and Forage Habitat, Increases in Water Pollution, and Increases in Toxic Contamination Loads

Resident and migrating birds and wildlife are an important part of the Delaware River and Estuary ecosystem. They are within the affected environment of the Deepening Project and mandate SEIS consideration.

The significant deleterious impacts of the Deepening Project on migratory shorebirds important to the Delaware River ecosystem and communities has already been discussed in this comment. But other species will be adversely affected as well.

Private channel deepening would be necessary if oil facilities are to take advantage of a deepened main channel; in fact six oil facilities are to receive 50% to 80% of the project benefits (depending upon which of the many economic reviews done for the project over the years).

The Army Corps has not addressed the habitat or species implications of private channel deepening. At the proposed Southport site, a new port development that would utilize the deepened channel, Asiatic clam, a food source for shortnose sturgeon, is found. Food for other species are also found at this location including Gammarus, polychaete worms, chironomus, and blood worms – known to be prey for striped bass, American shad and blueback herring. This led NMFS to conclude that the Southport development site is an important source of prey species and forage habitat for fish. Similarly, Weston, the project consultant, concluded that “Based on the range of substrate type and the diversity and abundance of macrobenthic invertebrates present in the study area and the results of fish surveys, the macrobenthic invertebrate community at the proposed Southport Development Project provides a significant source of forage for fish utilizing the site.” (see Attached Report 47).

These same kinds of species and the impacts to these species and key forage habitat may be associated with deepening private channels. The Army Corps must therefore analyze these environmental impacts of private channel deepening as foreseeable consequences of the Deepening Project in the context of a new SEIS, which to date it has failed to do.

In 2003, the USFWS expressed concerns about the dredging of private channels and berths on the bald eagle because of the toxic contaminants that dredging will reintroduce into the water column and food chain of this species. (*Attached Letter 5*). In addition, since the completion of the 1997 SEIS, the EPA has questioned whether the Army Corps sufficiently considered the environmental impacts of private channel deepening and spoil disposal: “[I]mpacts related to the dredging of the private facilities and several port facilities owned or operated by the local sponsors, and potential impacts associated with the development of new sites for dredged material disposal were not fully evaluated in the original EIS. Accordingly, these activities will have to be evaluated under NEPA...” (*Attached Letter 2*).

To the extent the Army Corps has done sampling of sediments in the private channels, it did not include sampling at Motiva (a facility that was included in the 2002 economic benefits calculation of the project). The sampling that was done found that sediments contained a variety of toxins and metals such as PCBs, DDE and pesticides including DDD, DDT, and Endrin. In addition, while the Army Corps provides multiple dismissive explanations for these findings, the SEIS did find that NJDEP residential soil clean up criteria were exceeded for cadmium, thallium, ideno (123-cd) pyrene, 2,4-dinitro toluene, and N-nitrosodi-n-propylamine. (*See Delaware River Main Channel Deepening Project, Supplemental Environmental Impact Statement, July 1997, pgs 4-52 thru 4-77*). The Army Corps minimizes the significance of these findings by stating that they are at levels comparable to what was found in the main channel and that the sediments would be disposed of on land. In light of the questions and information provided herein, including the questions raised by other federal and State resource agencies, the Army Corps has clearly not adequately answered the question of whether dredging the private channels, including upland disposal of contaminated sediments, will have adverse environmental impacts.

More recently, Delaware has confirmed the expert perspective that areas to be widened (including spur channels and private berthing areas), that will be undertaken as part of or as a direct result of the Deepening Project, may have higher contaminant concentrations than the main channel. Therefore, to present a complete picture of the contamination impacts of the Deepening Project, the Army Corps must review how dredging these areas will affect water quality. (*Attached Report 79*).

In 2003, the USFWS also expressed concerns about other aspects of the Deepening Project on both bald eagle and peregrine falcon – essentially revoking its previous findings of no harm.

In a letter to the Philadelphia District dated January 18, 1996, the Service concluded that the Delaware River Main Channel Deepening was not likely to adversely affect the Bald Eagle or Peregrine Falcon (*Falco peregrinus*). ... the Service has acquired new information on the contaminants in the Delaware River, suggesting that the previous not likely to adversely affect determination may no longer be appropriate. (*Attached Letter 6*).

While the Army Corps' 2009 EA cites a 1996 USFWS letter in section 4.1.4 to suggest that USFWS is not concerned with the issues of toxicity in sediments and associated environmental effects, including impacts on birds, the Army Corps neglects to cite a more recent letter issued after USFWS had received additional information on the project and toxin issues. In that later letter the USFWS says:

[T]he question of wildlife exposure to hazardous sediments placed in CDFs remains unanswered. ...the [US Fish & Wildlife] Service cannot dismiss concerns regarding the possible exposure of wildlife to hazardous toxicant concentrations, because reliable estimates of the toxicant concentrations in the dredged material remain unknown. Such estimates depend upon (1) the volume of bend material to be dredged relative to the volume of main channel material to be dredged and (2) the delegation of dredged material from specific areas to certain CDFs. (*Attached Letter 1*).

These concerns raised by USFWS will be exacerbated by the new plan that places more contaminated spoils in each of the CDFs. Yet the Army Corps doesn't, in its NEPA documentation and analyses, acknowledge receiving these reassessments by the USFWS, nor does it attempt to address these known and serious questions.

Similarly, New Jersey's Division of Fish & Wildlife has stated: "concern exists that the current levels of toxins in the fisheries resources of the river to both migratory and nonmigratory populations may increase due to the re-suspension of contaminated sediments during dredging operations and surface discharges from the upland CDFs." (*Attached Misc 1*). New Jersey also asserted the need for an evaluation of the "relative risk of contaminants in the dredged material to human health, wildlife, and especially endangered species such as bald eagles and peregrine falcons." According to New Jersey, such an evaluation should include sediment data collected by NOAA, NJDEP and others after the Athos I Oil Spill of 2004. (*Attached Misc 1*). The Delaware River Basin Commission also asks for consideration of sediments in response to the Athos I spill. (*Attached Letter 10*).

Based on the serious and substantial concerns raised by State and federal resource agencies, as documented by information already in the Army Corps' possession and/or provided herein, the Army Corps must undertake a new and up-to-date analysis of the environmental impacts of the Deepening Project on wildlife species and their prey species/forage habitat with a special emphasis on the heretofore-unconsidered impacts from environmental contamination resulting from private channel deepening and bend widening.

M. The Army Corps' Assertion that there is no Submerged Aquatic Vegetation at or near the Project site is Misleading, Incorrect and Not Based on the Best Available Data. This Issue Must Be Re-analyzed Based On Current and Accurate Information.

In project materials, the Army Corps asserts there is no submerged aquatic vegetation at or near the project site. This is entirely inaccurate.

Currently wild celery is rebounding in the freshwater areas of the River, according to NJDEP Division of Fish & Wildlife, and so “concerns exist about possible negative habitat change and loss of this protected species by siltation and/or deepening.” (*Attached Misc. 1*).

A 2004 study by NMFS, highlighted in its April 16 2009 letter (post 2009 EA):

identifies the presence of large patches of wild celery (*Vallisneria Americana*) throughout the project area. Wild celery provides important refuge and forage habitat for fish. ... [T]he ACOE should undertake a comprehensive SAV survey of the Delaware Deepening Project area to identify the location and extent of SAV that may be affected directly or indirectly by the deepening and widening of the federal navigation channel.” (*Attached Letter 14*).

The USFWS, in 2009, also expressed concern about the

lack of survey information regarding the presence of any submerged aquatic vegetation (SAV) in the project area. SAV is vital habitat for many of the life stages of prey base, young-of-the-year striped bass, and river herring. (*Attached Letter 11*).

The Army Corps’ response -- that it did not find SAV in the Pedricktown north section of the project and that it will conduct surveys as the project moves forward – fails to address the concerns regarding SAV. Nor does has the Army Corps provided the data and information necessary to understand what harms may occur to SAV, whether those harms are acceptable, how they might be avoided, minimized or mitigated, how they will affect River ecology and quality, and how they fit into a consideration of cumulative impacts of the Deepening Project.

As part of the documentation associated with the Southport Project, in May 2007, Versar concluded that the effects of industrial development and shipping traffic were so significantly affecting aquatic vegetation that they didn’t find much, if any, SAV present in the project area (the Southport Project is located a bit up River of the Navy Yard and neighboring property). However, in June 2010, studies identified 1 acre of slip area with established SAV at the project site largely dominated by wild celery, as well as patches of musk grass and algae species intermixed with wild celery in patches along the eastern shore of the Navy Yard property. (*Attached Report 48*). This new study and updated information regarding SAV from 2007 to 2010 in this reach of River shows that either the earlier data collection for SAV in the 2007 time frame was insufficient or that there has been a sharp increase in SAV in these reaches of the River that will be affected by the Deepening Project. This is information known and readily available to the Army Corps, as it received a copy of this information with the Southport Project application materials that were publicly noticed in the Fall of 2010.

Either way, this new 2010 information collected in the Southport and Navy Yard reaches of the River, areas solidly within the zone of the Deepening Project, shows there is significant and increasing SAV that must be considered in a new NEPA

analysis of project impacts for the Deepening Project. This burgeoning population of SAV and its associated ecological values need to be protected; the Army Corps must assess the impacts of the Deepening Project on its continuing growth and existence.

According to a Normandeau Associates report, aquatic vegetation found in the proposed Southport Project area “is important for its function as a substrate for macroinvertebrates and as cover for small fish as well as a source of dissolved oxygen for the water. Vegetated intertidal and shallow subtidal habitat is not common along the Delaware River Philadelphia waterfront and should be considered ecologically important along this shoreline.” (*Attached Report 46*). The Delaware Riverkeeper Network agrees. Clearly the impacts of the Deepening Project on SAV and the resulting implications for water quality and species require careful consideration.

In documents we have seen, NMFS has expressed particular concern about the presence of water celery (*Valisneria*) because it has high wildlife value and it is not clear how readily it can be established at mitigation sites. NMFS, in its 2010 letter regarding the airport project, also talks about the tremendous value of wild celery (*Vallisneria americana*) identifying it as valuable nursery, forage and refuge habitat for a variety of fish including striped bass, American shad, alewife, and blueback herring. (*See Attached Letter 37*).

The Army Corps has not adequately addressed the impacts to SAV through the NEPA process. Although the issue has been brought to the Army Corps’ attention by multiple federal and State resource agencies, as well as through expert reports commissioned by the Southport Project proponents, the Army Corps has yet to undertake an adequate NEPA review through an SEIS process of what is a very important ecological issue for the River and region. SAV is an important source of food, habitat and oxygen for River species, including sturgeon as discussed above. The resource agencies’ and expert reports’ information demonstrates the Army Corps’ failure to use the most up-to-date, available data in its consideration of the Deepening Project’s environmental impacts to important species and to the water and habitat qualities of the River. The importance of and impacts to SAV from the Deepening Project are significant enough, whether in their own right or whether considered cumulatively with other issues raised in this comment, to demonstrate that the Army Corps must undertake a new and comprehensive SEIS.

N. The Ramifications of the Army Corps’ Plans to Ignore Biological Windows May Be Significant and Require SEIS Review.

The Army Corps has admitted it must violate biological windows in order to proceed with the Deepening Project. The Army Corps has yet to evaluate the full environmental impacts of such violations and waivers. (*Additional detail on this issue can be found in attached Reports 23.*)

O. Army Corps' Assumptions Regarding Sea Level Rise Are Not Based upon the Best Available Information and Necessitate Full SEIS Review.

That a deepened channel will combine with sea level rise to change salinity levels and move the salt line of the Delaware Estuary further up river and that tidal fluctuations in the Estuary will be affected, increasing the amplitudes of the tides, are known, foreseeable, and predictable outcomes of the Deepening Project. In order accurately to assess the implications of the alterations to estuary dynamics the Deepening Project will cause, the Army Corps must use the most up-to-date information on sea level rise and the Deepening Project itself. The ramifications of a changing salt line and changing tidal fluctuations are highly significant. The Deepening Project, standing alone as well as in combination with sea level rise, will move the salt line and change the tidal range of the River affecting a variety of species and habitats, such as oysters, sturgeon, freshwater mussels and freshwater wetlands, that are ecologically, economically, recreationally and culturally important to Delaware River communities. The impacts to wetlands and flood amplitudes are also critically important because of potential flooding and flood damages in estuary communities. Implementing the Deepening Project without a comprehensive and accurate analysis of these issues could have substantial safety, economic, ecological, cultural and social consequences for the region and ripple effects across the country.

The Army Corps has not conducted the level of review necessary to assess the implications of sea level rise for the various elements of the Deepening Project. Like the DRBC (*Attached Letter 10*) and others, DNREC is on record (*Attached Letter 34*) questioning the Army Corps' lack of assessment, clarity and transparency on the array of calculations, claims, and analysis of the Deepening Project and sea level rise. DNREC and others are on record challenging the Army Corps' assumptions and scenarios regarding sea level rise that have led it to dismiss the concerns raised. None of the EAs or EIS documents to date fulfills the need for discussion, transparency and outside expert review of the adequacy of the Army Corps' assumptions and analyses. As DNREC put it in its June 15, 2010 letter, issued after the 2009 EA, and not responded to in the 2011 Draft EA, "the most up-to-date and reliable data has not been utilized in the model, and that calls the modeling results into question." (*Attached Letter 34*).

The Army Corps has not appropriately or defensibly, using the most up-to-date data and assessment practices, considered how much (1) movement of the salt line, (2) increases in salinity levels and (3) changes to tidal fluctuations will result from the combination of sea level rise and the Deepening Project, as well as the contribution of the 2011 Flexible Flow Management Plan for the NY City reservoirs and increased water withdrawals anticipated upriver from new industry such as gas drilling.

One of the major deficiencies in all of the Army Corps' work when it comes to these matters is that the Army Corps has failed to use the most current predictions on what sea level rise will be for our river and region and it has failed to consider alternative sea level rise scenarios that need to be assessed in order to ensure full understanding of the Deepening Project's long-term impacts.

There continues to become available new, pertinent, and more regionally accurate information about sea level rise, the rate at which it is increasing and the heights it is most likely to achieve in the Delaware Estuary region. The Army Corps fails to include this vital information in its assessments. (*E.g. Attached Article 17*). But this issue is of such significant importance that it clearly mandates, on its own and in combination with the other issues discussed in this comment, that an up-to-date SEIS be prepared for the Deepening Project.

The EPA, in a report to Congress, has stated: “Published estimates of sea level rise due to global warming generally range from 0.5 to 2.0 meters (1.5 to 7 feet) by 2100.” (*Attached Report 81*). In order to assess the costs of climate change for the country on habitat alterations, economic costs and more, EPA includes in its scenarios three possibilities for sea level rise – 50 cm (1/2 m), 100 cm (1 m) and 200 cm (2 m). (*Attached Report 81*).

“The MidAtlantic States are anticipated to experience sea-level rise greater than the global average.” (*Attached Report 53*). The Executive Director of the DRBC, referencing today’s science on the matter, said at a February 2010 public discussion on global climate change that the figure for our region will more appropriately range from 2.3 feet (.72 m) to 5.5 ft (1.67 m). (*Attached Misc 5*).

The Delaware Estuary Program, in a report focused on sea level rise for the Delaware Estuary, talks about an anticipated rise of .5 to 1.5 meters “or more” and goes on to say that, for the Delaware Estuary, its “best estimate for RSLR [relative sea level rise] by the end of the century is .8 to 1.7 m.” (*Attached Report 53*) (.8 m = 2.62 ft; 1.7 m = 5.58 ft)

The Estuary Program report (*Attached Report 53*), discusses some of the many actions being taken, or recommended, to protect our estuary and its resources from the harms of sea level rise, including salt water intrusion and tidal fluctuation. How the Deepening Project will magnify and contribute to these harms and the actions needed to avert, prevent, and protect against them are significant ecological, social, safety, cultural and economic considerations that the Corps must analyze in a new SEIS.

The concerns about the failure to use the most accurate and up-to-date information on sea level rise has been made known to the Army Corps on multiple occasions on the record, including in comments from the Delaware Riverkeeper Network submitted in response to its December 17, 2008 notice for public comment and through Delaware Riverkeeper Network’s comment submitted in the Summer of 2010 as part of the public process associated with the Army Corps’ application to the State of Delaware for needed permits. Yet the 2011 Draft EA makes no attempt to address the issue.

To ensure best protection of our communities and environment, one must assume and use the most conservative figures for sea level rise, i.e. those in the higher end of the range, when determining what would be the likely salinity, salt line and tidal fluctuation effects of sea level rise combined with the Deepening Project. To this end the Army Corps should be using the figure of an assumed 7 ft rise as

opposed to the 1 ¼ ft. rise assumption the Army Corps uses. Currently, the Army Corps' figure in its 2009 EA seems to be 1.27 feet over the course of the century which is a figure lower than the lower end of the ranges used by others.

At a minimum, the Army Corps should

- a) (1) use the most recent and readily available scientific information regarding sea level rise – those figures put forth by the congressionally recognized Delaware Estuary Program, by the Army Corps' sister federal agency the EPA and by the DRBC; and (2) use the figures at the upper end of the range to ensure a level of safety and a risk averse approach considering the dramatic ramifications of getting it wrong; or,
- b) at a minimum, adopt the approach of the EPA and do a multi-scenario consideration of sea level rise using the high, medium and low projections and for each assessing the implications for salt water intrusion, changed salinity levels throughout critical habitat areas in the estuary, habitat alteration, modifying tidal fluctuations and the associated ramifications for erosion of coastal lands and wetlands, changed circulation patterns, and flooding.

The Army Corps, at best, has used the lowest end figure for what sea level rise may be in the Delaware Estuary (and it is not even clear to us that they are using a figure this high). For wetlands it seems to use a figure below the minimum, and it is certainly not using the high range of potential sea level rise for the region (i.e. 5.5 to 7 feet) in order to ensure the most protective level of decision-making. Nor is it even using figures in the mid-range of what is currently being predicted for sea level rise in our region. As a result, the Army Corps will underestimate how far up river the salt line is likely to move as the result of the Deepening Project, it is underestimating changes in salinity levels in the River, and it will underestimate the changes in tidal fluctuations that will result. Thus, the Army Corps has failed to accurately assess the impacts on oysters, sturgeon, mussels, wetlands and other affected species and habitats, in violation of NEPA.

Army Corps documents have asserted that changes in data regarding sea level rise have affected its spoil quantity calculations. As a result, the Army Corps has significantly altered its calculation of the dredged spoils that will result from the Deepening Project and significantly modified its dredged spoil disposal plans. So the new and readily available information regarding sea level rise is also of great significance regarding this key element of the project – i.e. dredged spoil disposal plans and whether or not the plans currently in place are truly feasible and will, in fact, effectively manage the Deepening Project's spoils. The DRBC, in a December 31, 2008 letter, talks about the need for more explanation and discussion and for third party evaluation of the Army Corps' spoils calculations including the methods by which the Army Corps arrived at its conclusions and calculations. (*Attached Letter 10*).

The ongoing development of new data regarding sea level rise for our region, its implications for critical estuary habitats and species, the effect it has had on the

Army Corps' spoils calculations and disposal plan, and the EPA's demonstrated approach of considering multiple scenarios when providing Congress with information on the subject, heightens the need for reevaluation of this matter by the Army Corps using the most up-to-date, readily available information and a multi-scenario approach to considering the matter and its implications for the Estuary and the Deepening Project.

P. The Modeling Done for the Effect of the Deepening Project on Salinity Levels in the River is not Based Upon Best Available or Current Scientific Information and Undervalues the Significance of the Resulting Harms.

The Army Corps continues to rely upon dated information regarding salinity in the River. The data it uses from 1996 on salinity and upriver consumptive uses of water (both actual and projected) are no longer representative of the most up-to-date current science, knowledge, and understanding of salinity levels and freshwater consumption in the Delaware River basin. Likewise, the Army Corps' consideration of sea level rise and the effect it, coupled with the Deepening Project, will have for salinity levels and saltwater intrusion up estuary does not include the most up-to-date and readily available information. The Army Corps' information on precipitation for our region, present or predicted, as the result of global climate change is not up-to-date or currently accurate either. The result is a very inaccurate consideration of salinity changes that will accompany deepening.

According to Ray Najjar, Associate Professor of Meteorology at Penn State, the Army Corps' modeling regarding salinity increases up-estuary is not proving to be accurate under real world conditions. The Army Corps' models predict smaller increases (upriver movement of salinity levels) than are in fact observed. The reason for the inaccuracies may be the result of changes in bathymetry such as from dredging. This information and line of research, characterized in a March 2010 paper not addressed in the Army Corps' latest NEPA analysis, is readily available information that demonstrates fallacies in the Army Corps' modeling and the Army Corps' failure to use the best assumptions on key issues. As stated by Professor Najjar:

Two numerical modeling studies were conducted under low-flow conditions with sea-level rise in order to quantify a worst-case scenario of salt water intrusion in Delaware Bay. 1-D modeling by Hull and Tortoriello (1979) found that the maximum 60-day salinity increase near Reedy Island during a 15-month simulation was 0.38 for a sea-level rise of 0.13 m, corresponding to $DS/DH = 2.8 \text{ m}^{-1}$. 3-D modeling by US Army Corps of Engineers (1997) estimated a salinity increase of 0.3 at a location 23 km upstream of Reedy Island as a result of a 0.3 m sea-level rise, yielding $DS/DH = 1 \text{ m}^{-1}$. **Thus models predict much smaller long-term increases than have been observed**, which suggests that other factors, such as bathymetric changes (e.g., resulting from dredging) may be important. *(emphasis added, Attached Report 82)*

Professor Najjar also noted that “With an increased tidal range, we can expect an increase in the salinity range over the tidal cycle.” (*Attached Report 82*). So, to the extent it is known that deepening increases tidal ranges in the Delaware Estuary, we also know it will increase the salinity range over that increased cycle, bringing the salt line further up river.

In addition, 1996 data regarding issues of global climate change and its effects on the region has long since been superceded by more current scientific thinking, such as Professor Najjar’s 2007 report “Climate simulations of major estuarine watersheds in the Mid-Atlantic region of the United States.” (*Attached Report 78*)

As part of a letter in 2010 (*Attached Letter 32*), DNREC questioned the use of 1996 bathymetry data for existing conditions and 1965 data for the model – noting that there are significant differences between 1965 and 1996 bathymetry, particularly for river miles 20 to 70 and 100 to 130. Other questions and concerns were also raised as part of that document. The serious scientific issues raised by DNREC have not been addressed in the 2011 Draft EA, and yet are significant for the issues of salt line movement and salinity changes, tidal fluctuations induced by deepening, and deepening-induced changing circulation patterns. The April 22, 2010 letter attachment from DNREC regarding the salinity model is filled with information and issues raised since the 2009 EA that are left unaddressed by the Army Corps. (*Attached Letter 32*).

Furthermore, the modeling done to look at the issue of the Deepening Project and its effects on salinity levels in the River assumes a 5 foot deepening, but fails to consider the over-dredge of 1 to 2 feet (depending on which iteration of the project one is looking at) and fails to look at the over-overdredge that might happen as part of the Marcus Hook blasting and dredging portion of the project.

As the EPA acknowledges in its report to Congress: “[A] rise in sea level would increase the size and salinity of estuaries and would increase the salinity of coastal aquifers.” (*Attached Report 81*). As discussed previously in this comment, the Army Corps is not using the most up-to-date information regarding sea level rise for the Delaware Estuary region. As a result the Army Corps has clearly underestimated and inadequately anticipated and considered the consequences of the Deepening Project for changing salinity levels and increasing salt water intrusion in a way that will affect water quality, flooding, and a wide variety of critically important species and habitats among other issues. The ramifications of this issue alone warrant the preparation of an up-to-date SEIS with a full review and comment by experts, federal and State resource agencies, the affected communities, and the general public.

Q. Known, Anticipated, and Foreseeable Changes in River Flows Have Not Been Addressed by the Army Corps.

1. There will be a foreseeable change in consumptive loss of freshwater flows from the River that drains to the Estuary; the Army Corps has failed to consider this change and its effects.

The level of freshwater consumption from the upper reaches of the Delaware River watershed is about to change dramatically. At this time, there is a tremendous press for new withdrawals from the River, withdrawals that are both consumptive and depletive to the River and therefore will further affect saltwater intrusion and movement of the salt line. New practices are being employed in drilling for natural gas: hydraulic fracturing and horizontal drilling. Each natural gas well, when drilled and hydraulically fractured (“fracked”), will require the use of between 1 and 9 million gallons of water, an average of 5 million gallons per well. Wells in the upper watershed will get their water from the mainstem Delaware River, its tributaries, or groundwater supplies. (*Attached Misc 30*).

The DRBC estimates 18,000 as the minimum number of wells expected to be drilled in the Delaware River basin, while federal representatives recently projected as many as 30,000 wells could be drilled (*Attached Article 12*). A National Park Service petroleum engineer, Patrick O'Dell, estimates that the PA and NY shale plays can be expected to be developed at 40 to 80 acres per well: in the Delaware River Basin at 80 acre spacing this will mean 32,000 wells; at 40 acre spacing this will produce 64,000 wells. (*Attached Report 87*). Professor Terry Engelder of Penn State University forecasts that the Marcellus will be a “super giant” of gas production⁷ and some industry websites project huge productivity that could mean many more wells. This means that, in the foreseeable future, billions of gallons of freshwater will be robbed from the Upper Delaware River system, affecting the volume of freshwater that enters upstream and thereby affecting the downstream movement of the salt line in yet-to-be-determined ways.

The effects of all this lost freshwater flow and what it means for the salt line and salinity effects caused by the Deepening Project has never been assessed or even considered by the Army Corps. Yet given the significant consequences of the Deepening Project’s contribution to changes in the salinity and salt line of the River, the Army Corps must consider the upstream demands of the natural gas industry in revising its analysis in a new SEIS.

2. The Army Corps Has Failed to Consider the Effects of the 2011 Reservoir Management Plan In Evaluating the Impacts of the Deepening Project.

Flows in the Delaware River are carefully managed to protect drinking water supplies. When managing releases from the three New York City reservoirs, the DRBC, along with the River Master, are seeking not only to protect the drinking

⁷ “Natural gas reservoir may hike U.S. output”,
<http://www.geosc.psu.edu/~engelder/>
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water supply of 7-9 million residents in New York City, but also to deflect salt intrusion at Philadelphia and Camden in order to protect water supply quality for the 8 million downstream people who rely on the Delaware River for water.

In recognition of the river flows that need to be protected from salt water intrusion for drinking water users as far down as Philadelphia and Camden, as well as other users of the River, the DRBC has been engaged in a highly publicized and involved process to create a new Flexible Flow Management Plan for the River. A new reservoir management plan went into effect in June 2011.

Because the Deepening Project will result in a movement upriver of the salt line towards Philadelphia and Camden water intakes, what effect deepening will ultimately have on these intakes is linked with the implementation of this upriver FFMP process. Further, United Water Delaware's major water supply intakes on White Clay Creek and the Christina River are tidally influenced and therefore affected by changes in water quality, concentrations of salinity, and/or pollutants in the estuary that could be triggered by changes in upstream flow volume and flow regime. (see *Attached Report 30*, http://www.wr.udel.edu/publications/uwd_wcs_report.pdf).

The Army Corps has failed to consider the 2011 FFMP and its changed flows regimes, water release plans, or void space agreement for the reservoirs in any of its modeling or impact considerations for the Deepening Project. This is new flow information that is vital to an accurate assessment of Deepening impacts and has not been included in any of the NEPA analysis to date.

R. The Army Corps Has Failed To Analyze Increased and Cumulative Impacts Due to a Combination of Sea Level Rise, the 2011 FFMP for NYC Reservoir Management, Increased Up River Water Consumption and the Deepening Project.

The movement of the salt line has significant ramifications for the Atlantic sturgeon, oysters, freshwater mussels, freshwater wetlands as well as other species and habitats important for the Delaware Estuary system and communities. The movement of the salt line is affected individually and collectively by:

- ✓ NY City Reservoir releases – now guided by a 2011 Flexible Flow Management Plan agreed to by the Decree Parties of the Delaware River Basin;
- ✓ The level of freshwater consumption from upriver industry;
- ✓ Sea level rise; and
- ✓ The Deepening Project.

What effect the Deepening Project will ultimately have on the salt line is linked with these other three issues. The Army Corps must undertake a thorough, comprehensive, up-to-date cumulative impacts analysis in a new SEIS to address the interactions and linkages between these issues and the combined impacts of

the Deepening Project on the River, drinking water supplies, the salt line, and affected fish and wildlife species and their habitats.

S. The Army Corps has Failed to Address the Concerns Raised by Experts and to Use Up-to-date Scientific Assumptions to Evaluate the Risks Posed by the Deepening Project to Drinking Water Supplies.

The University of Delaware's Sea Grant Program has expressed concerns about the leaching of heavy metals from CDFs to aquifers below. Noting that in much of the regional groundwaters of the Delmarva peninsula "...concentrations of several heavy metals...are very close to the EPA's potable water limits," the authors point out that metals reaching groundwater from disposal sites (by leaching action of acid rain or from oxidized sulfide in the spoils themselves) "can potentially make...concentrations in shallow groundwaters exceed limits." (*Attached Report 22*). Assertions by the Army Corps that it will conduct on-going monitoring during project implementation are entirely adequate to address or avoid this harm. Further, monitoring done to date has failed to consider the increased pollutant concentrations coming from dredged spoils from the bend widening areas, as discussed above.

As also discussed in detail above, the Army Corps has neither properly reviewed nor adequately addressed the concerns about salt water intrusion into Philadelphia and New Jersey drinking water supplies.

In the 1997 SEIS, the combined impacts of the Deepening Project and sea level rise were identified as requiring analysis and consideration. The concern identified was primarily related to the impacts on salinity levels in the Estuary – and whether the Deepening Project, coupled with sea level rise, would move the salt line up the River far enough to threaten drinking water supplies. Concerns for impacts to oysters, mussels, sturgeon and wetlands are now also paramount. To date, the Army Corps has failed to complete a thorough and credible analysis of the impacts of the Deepening Project on movement of the salt line when combined with the reasonably foreseeable impacts of sea level rise, the new FFMP, and proposed water consumption for gas drilling and the resulting impacts to drinking water intakes.

In response to pressure for consideration of the threat to Philadelphia's drinking water intake on the Delaware River the Army Corps submitted to DRBC a study in 2008 that purported to consider the Deepening Project combined with sea level rise. Review by the Delaware Riverkeeper Network, which secured this document through right-to-know requests, demonstrates that, when considering the threat of salt water intrusion into Philadelphia's drinking water intake, the Army Corps failed at that time, and continues to fail, to use current science and findings on the level of sea level rise for the Delaware Estuary. (*Attached Letter 9 – note that since this letter was written, important new science and data have been released that more accurately reflect what we can expect for sea level rise in our River and region as discussed in this comment*). The study has never been publicly released or subject to federal and State resource agency review and input.

The Army Corps report submitted to the DRBC assumes a sea level rise of only 14 inches by the year 2040. But as we have discussed the more appropriate figure for the region is 1.7 meters (5.58 feet) by century's end, which by 2040 should well exceed the 14 inches the Army Corps attempted to use. (27 inches would be more in keeping with the end of century projection – i.e. 5.58 feet X 12 inches X 40%). Clearly, using a date that is only 40 years out (at the time of the report; 30 years now), and a figure that is on the low end of current thinking on sea level rise for the region, does not allow for accurate information, analysis and decision-making on the threat to drinking water from the Deepening Project and sea level rise.

Additionally, while the report provides information regarding 30-day averages for salinity level changes, the Philadelphia Water intakes would be affected by absolute maximums; therefore, the required analysis needs to consider also the absolute maximums as opposed to just the averages.

The Army Corps' research into the short- and long-term ramifications of the combination of sea level rise and the Deepening Project, especially considered in light of increased water consumption patterns and the revised FFMP, for salinity levels and movement of the salt line is flawed and as a result fails to properly consider these cumulative threats to drinking water supplies. The only analysis the Army Corps has done on this front has been submitted only to one agency (the DRBC), which has never released its analysis of the report. That report uses dated sea level rise information, fails to include the current reservoir release program, fails to consider the predictions for global climate change and its effects for changing weather conditions in our region (including more intense periods of rain and drought) and fails to consider anticipated new water withdrawals from the gas drilling industry. Accordingly, the Army Corps must undertake a new SEIS process on this issue, based on the best available scientific data and model assumptions.

T. The Army Corps' Continued Reliance on Outdated Data Regarding Water Quality Harms Fails to Fulfill the Requirements of NEPA or to Provide an Accurate Assessment of Water Contamination Risks.

Throughout the life of this project the Army Corps has represented that according to their data, levels of toxins in River bottom sediments are not high enough to pose any adverse environmental impact. Army Corps studies that indicate no water quality concerns have been challenged in a variety of ways by a number of sources.

Most recently, in a detailed letter dated April 11, 2011 from the New Jersey Department of Environmental Protection to the Army Corps, coupled with a rigorous data analysis by the State of New Jersey, it is demonstrated that spoil disposal associated with the Deepening Project continues to be a source of water quality contamination. The NJDEP, in their letter and supporting analysis, identified numerous contaminants for which DRBC or NJ Water Quality Standards were in fact exceeded/violated. As a result of the analysis NJDEP concluded:

“Despite the limitations of the available data, analyses have identified potential adverse impacts to water quality resulting from the discharge of dredged material dewatering effluent from the Killcohook Upland CDF with elevated concentrations of selenium, copper (dissolved), mercury, aluminum and cyanide.” *(Attached Letter 38)*

The NJDEP analysis also identified multiple problems with the data collection performed by the Army Corps regarding spoil disposal at Killcohook which impeded their ability to determine if there were pollution violations, including:

- ✓ “In order for the sample data to be usable, the reporting and analytical detection limits for non-detected (“ND”) sample concentrations must be less than the applicable DRBC or NJ” Water Quality Standards. The Army Corps reporting limits were greater than the applicable standards for at least 8 contaminants including cadmium, cyanide, PCB Aroclors, Pesticides (such as chlordane, dieldrin, endosulfan, endrin and heptachlor), toxaphene, PAHs, parathion, and chloropyrifos.
- ✓ Sample collection and preservation did not follow proper procedure.
- ✓ Background samples collected were collected at times and locations when the effluent of concern from the CDF may have been present, rendering the sampling inaccurate for comparison purposes.

(Attached Report 38).

This new data, information and analysis, provided to the Army Corps before the release of its 2011 Draft EA, is not included in any of the Army Corps’ NEPA analysis or documentation. Standing alone, as well as in combination with the other new information and issues raised in this comment letter mandates an up-to-date SEIS analysis.

In addition, the Army Corps has now expanded the volume of dredge spoils they plan to place in the existing confined disposed facilities (from deepening and maintenance thereof) to be used. This increased volume of spoils means an increased level of toxins placed in the CDFs. Further, we now know that the Army Corps has significantly underestimated spoils resulting from the Deepening Project. This could result in even larger volumes of spoils in each CDF – and if these spoils do not go to existing CDFs, then, of course, they have to go to different spoils disposal locations necessitating new NEPA review. We do not believe the Army Corps has done an analysis of the water quality effects of discharges from each of the CDFs with the increased volume of spoils and therefore increased level of toxins concentrated therein. It has also not considered the impacts to birds and wildlife species of increasing the volume of spoils and therefore toxins in the CDFs to which wildlife and bird life are attracted.

Additionally, according to New Jersey, “the sediments to be dredged have not been adequately characterized.” *(Attached Letter 17).* New Jersey has documented for the Army Corps numerous technical manuals the Army Corps should have used

(but have not used) to evaluate the sediments that will be dredged and placed in the upland CDFs. The failure of the Army Corps to undertake this analysis results in an omission of information that renders its NEPA assessments highly deficient and prevents accurate assessment of the ramifications for water quality of the project.

Further, according to New Jersey:

“The sediments to be dredged as part of the proposed Project are predominantly located in channel side banks and bend widening areas, and are not located in the main navigation channel that is subject to regular maintenance dredging operations. These sediments have significant potential to be contaminated by toxic and bioaccumulative chemicals at levels of concern.”

“However, the ACOE has not adequately characterized the sediments to be dredged The ACOE has relied on outdated (i.e. pre-1997) sediment sampling and analytical activities.... More recent data from 2003 to 2005 consist of only a limited number of maintenance dredging sediment samples collected at limited locations in the Project area; in addition, only limited types of analyses were performed on these samples.”

(Attached Letter 17.)

New Jersey’s review of the 1997 SEIS data so heavily relied upon by the Army Corps showed that those data were poorly evaluated, showed exceedances of NJ standards, and in some cases were analyzed and presented in such a way as to be of limited value in predicting potential impacts to water quality (groundwater or surface water). *(See discussion in Attached Letter 17.)*

New Jersey analysis shows “it is not possible to predict the potential impacts to the aquatic ecosystem resulting from the dredging operations or the disposal of dredged material at an open water disposal site using the bioassay data presented in the 1997 SEIS.” *(Attached Letter 17.)*

In a 1998 review of Army Corps data, Rick Greene of DNREC found that the Army Corps’ data showed that among the areas to be dredged (especially the bends to be widened) there are toxic “hot spots”. According to Greene's presentation at the time, the Army Corps improperly used mean values (averages) to assess the level of toxics in River sediments. The result was that toxic “hot spots” were hidden in the numbers. Toxics found at levels indicating possible to probable impacts include: antimony, arsenic, copper, lead, mercury and zinc. *(Attached Reports 6).*

The 1997 SEIS itself acknowledges that over time contaminants could accumulate in the bend widening locations and as such they are the areas that “provide a ‘worst case’ picture of contaminant concentrations.” (see discussion in *Attached Letter 17*). NJDEP also observed in its August 2009 letter that sediment samples collected in the navigation channel were not evaluated separately from those

collected in the bend widening areas. (*Attached Letter 17*). This supports the findings of Dr. Greene noted above.

Delaware's recently released report looking at toxic and heavy metal issues (*Attached Report 79*) also notes that the bends to be widened as part of the Deepening Project, as well as the spur channels and berthing areas that would be deepened in connection with the Deepening Project, likely contain higher contaminant concentrations and so their water quality implications should be analyzed.

In a 1998 white paper, the University of Delaware's Sea Grant Program states:

the "Corps' heavy metal and pesticide data disagree with ADL [Arthur D. Little] data by 800% to 2800% for similar parts of the river -- ADL values being higher, and that Corps conclusions are "doubtful" because Corps data "is often lacking many of the details, or appropriate references, as provided by ADL..." (*Attached Reports 22*).

A cornerstone of the Army Corps' position denying that increased contamination loads are of concern has been that not enough sediment would be redistributed during dredging to raise water quality concerns as a result of the dredging process itself.

Concerns were raised on the public record in Delaware and elsewhere that the Army Corps relied on expert judgment, rather than empirical data, to establish the standard of 250 mg/l of total suspended solids (TSS) a distance of 200 feet from the point of excavation as a basis for much of the agency's analysis of the sediment and water quality issues. Preliminary data, reviewed by Rick Green and included in a June 7, 2010 report, seem to be bearing out that TSS levels fall below 250 mg/L at all depths at a distance of 200 feet behind the dredge cutterhead. For purposes of permit decision-making, this information should be finalized before decisions are made on key issues. But, in the Delaware permit application, the Army Corps asserted it is now using a figure of 25-250 mg/L within 100 feet of the point of excavation and yet provides no reference for the basis of this determination – other than to say that the U.S. Army Corps of Engineers' Improvement of Operations and Maintenance Technique Research Program has documented it. We do not see in the June 7, 2010 report confirmation of these figures for that distance or those conclusions. Regardless, this kind of analysis and review needs to be conducted in a new NEPA document; having a single review and analysis in a state permitting context does not replace the value of or need for NEPA review that would allow review, consideration and comment by other federal and State resource agencies, experts, concerned communities, and the general public.

The Reedy Point South Water Quality Modeling study did find that at least "four contaminants, copper, lead, mercury, and nickel, may exceed water quality criteria near the point of dredging and at the weir discharge." The Army Corps dismissed these findings by asserting that the model over-predicted the level of

contaminants that will enter the water column and that TSS concentrations will be lower than the 250 mg/l assumed. The Army Corps needs to substantiate what the appropriate TSS level is, use that in its modeling, and then share the findings for peer, agency and public review.

The PCB Mobilization During Dredging Operations and Sequestration by Upland Confined Disposal Facilities study is another effort that has not been subject to the review and vetting of other resource and regulatory agencies and their experts. The study assumes a 99.9% efficiency rate in terms of keeping PCBs on site at CDFs based on Army Corps' review of three operating CDFs. The rate of sequestration is based on site-specific conditions of a particular CDF and therefore it is inappropriate to apply a uniform figure to all CDF locations. Separate sampling should have been conducted for each of the 8 CDFs that are proposed for use and then these site-specific figures should have been applied. In addition, it is not clear what assumptions were made regarding the concentration of contaminants in the spoils – i.e. did the study consider the higher levels expected to be in the spoils from the bend widening areas with respect to those locations where those spoils will be deposited? In light of the many serious questions and concerns raised by various resource agencies (as discussed above), such accurate, site-specific data is necessary for informed review and decision-making.

In addition, this study does not address the questions and concerns that have been raised by other experts who have conducted similar sampling; the Army Corps merely dismisses those other studies and findings. Moreover, the study fails to consider the existing PCB total maximum daily load requirement (TMDL) in place for the Delaware River, as well as the phase II TMDL requirement that is under construction, and all of the research, discussion and analysis that has been conducted by the DRBC (including its Toxics Advisory Committee and Implementation Advisory Committee) on the issue of PCBs in the Delaware Estuary including river bottom sediments. Finally, that the Army Corps' analysis is deficient and not representative of the true potential water quality ramifications of spoil disposal in the CDFs has been demonstrated by the NJDEP Killcohook analysis, which shows that that Army Corps CDF (along with Fort Mifflin and Money Island as reported on by Dr. Tom Fikslin) is a source of contamination to the River from Deepening Project spoils.

U. A Deepened Channel Will Increase, Not Reduce, the Risk of Hazardous Spills, Putting Fish, Wildlife, Birds and Habitats at Increased Risk of Harm.

The cost of attempting to remediate the environmental and recreational harms inflicted by the 2004 Athos I oil spill was \$26,474,470; \$1,319,097 in the form of lost recreational value, and the rest being the cost of restoring environmental resources that were significantly affected by the spill. (Final Restoration Plan and Environmental Assessment; for the November 26, 2004 M/T Athos I Oil Spill on the Delaware River



Near the Citgo Refinery in Paulsboro, New Jersey, September 2009,
http://www.darrp.noaa.gov/northeast/athos/pdf/Athos_Final_RP.pdf

In addition, we believe clean-up costs for the region exceeded the \$45 million cap placed by federal law.

The Army Corps has wrongly claimed that a deepened channel will reduce the risk of hazardous spills on the River. In fact, deepening is likely to increase the risk of harm if there is another catastrophic spill event.

- ✓ “According to the model, a marginally greater number of hazardous-commodity spills are projected for the deepened channel than for the channel at its current depth. These findings are for the years 1990-2010.” (*Attached Reports 2*).
- ✓ “In considering the environmental impact of a deeper main channel, the same number of crude oil tankers would have to be lightered at Big Stone Beach Anchorage, only the amount of crude oil transferred would be reduced. The most environmentally challenging aspect of lightering operations is the activities associated with bringing the barge alongside and hooking up and later unhooking the cargo hoses. These activities would not be changed as a result of a deepened main channel.” (*Attached Reports 5. Cape Gazette article restating that oil tankers come into Delaware Bay with a draft of 50 to 55 feet, thus still requiring lightering 10/10/08 Attached Article 5*).
- ✓ With a deepened channel ships will come up the Delaware River more heavily laden with oil or other chemicals; if there is another catastrophe like the Athos I spill of November 26, 2004 (a possibility not changed by a deepened channel), the volume of oil available to leak and wreak havoc on the environment and our communities will be greater and therefore more dangerous.

The Athos I catastrophe exposed 115 miles of River, 280 miles of shoreline, 16,500 birds, as well as many species of fish, shellfish and wildlife and a variety of important habitats to the heavy crude it dumped into the Delaware River. Habitats, wildlife, water quality, air quality, industry, recreation, and communities were all significantly harmed by the spill. Any project that will increase the magnitude of such a tremendous level of damages in the event of a future catastrophe is a danger to all of these natural and human resources.



Because lightering will necessarily continue on the Delaware River with or without deepening, the potential for oil spills as the result of that process will continue. Claims that the Deepening Project will displace the need for lightering and therefore minimize or eliminate any lightering-associated risks of oil spill are simply inaccurate. Lightering will continue with or without a deepened channel, the associated hookup and detachment will therefore also continue, and so any

associated risk of spill therefore continues as well. Because the Army Corps' NEPA analysis of this issue to date has been based on false and inaccurate premises, it must undertake a new SEIS consideration of this significant and historically plausible risk of environmental impact.

V. The Deepening Project Will Change River Circulation Patterns, Tidal Fluctuations and Sediment Transport in Ways that Threaten Wetlands and Other Sensitive Habitats. The Army Corps Has Failed to Consider the Implications of New Science and the Resulting Risks of Significant and Irreparable Harm to these Vital Ecological Processes.

There are increasing amounts of significant scientific data, evidence and concern that the Deepening Project will affect ecologically important wetlands and marshes and the ongoing ecological processes on which these sensitive areas depend in the Delaware Estuary.

The marshes of the estuary are critical both ecologically and economically for the many fish and wildlife species they support, for storm protection, for community quality of life, and for the health and safety of the region. Ecologically, the marshes provide vital habitat to a large number of fish and wildlife species. These species support not only the recreational and commercial fishing industries but also a tremendous ecotourism industry that helps to sustain our region. The marshes are part of the life of the Bayshore area, providing a variety of beneficial qualities to the region's communities. And as communities and regulators are appreciating with increasing vigor, wetlands provide important protection from floods and dramatic storm events. The consequences of the Deepening Project's causing or contributing to the decline of the marshes of the estuary are significant and, to date, not adequately analyzed by the Army Corps.

There is growing scientific information that the Deepening Project will affect the sediment supply needed to sustain tidal marshes in the Delaware Estuary:

“Past studies and ongoing research ... has shed light on the impacts of past dredging on the morphology, hydraulics and sediment transport in the Delaware estuary. These impacts are significant and have not been adequately addressed by USACE environmental impact statements (1) and modeling studies (2) designed to assess potential effects of the 45' shipping channel.” Potential effects include drinking water impacts, higher disease mortality in oysters, a change in the natural deposition and scouring patterns of the estuary, a change in the hydraulic geometry of the estuary and impacts to tidal wetlands. (*Attached Misc 3*).

“The axial channel is now about twice as deep as it was prior to dredging, and the adjacent flats are generally shallower due to deposition. Sediment budget estimates indicate that, on average, maintenance dredging removes more sediment from the estuary than that supplied by rivers, suggesting that the system as a whole has a deficit of sediment. This could be crucial, because tidal marshes require a suitable supply of sediment to accumulate at pace with sea

level rise. This raises the possibility that maintenance dredging, which will be even more vigorous with a 45' channel, could accelerate the demise of estuary's tidal wetland coast." (*Attached Misc 2; Attached Misc 3*). The Science and Technical Advisory Committee of the National Delaware Estuary Program too questions the effects of deepening on marshes and urges its serious consideration. (*Attached Misc 27; see also Attached Letter 56*).

The Army Corps' failure to make appropriate sea level rise assumptions and calculations, coupled with this new science and understanding of the relationship between the tidal marshes, sea level, sediment transport and deepening, underscores the significance of the agency's failure to analyze the impacts of the Deepening Project. The Army Corps has simply failed to give appropriate consideration has not been given to these questions or to the research that is being conducted at the University of Delaware's College of Marine and Earth Studies. The May 21, 2010 letter from the Army Corps to DNREC suggests the Army Corps has dismissed the findings of these respected researchers and experts based on its preference for its own model. We understand the Army Corps model to be the 3d hydrodynamic modeling that was the basis of the 2008 report sent to the DRBC. But as this comment and those of other agencies and experts demonstrate, the information in the Army Corps model is sometimes dated, often questioned, and in many ways not peer-reviewed and therefore is not a solid basis upon which to be dismissing concerns about the moving salt line, sediment issues, altered tidal amplitudes, and the increased losses to wetlands created and/or exacerbated by the Deepening Project.

As already discussed, sea level rise will change the salinity levels in the estuary; deepening will change salinity levels in the estuary; global climate change will significantly modify how, when, where and how much rain falls in our region and therefore the level of freshwater flows and will affect salinity levels in the estuary; new consumptive water withdrawals in the nontidal reaches of the River will affect the salt line; and fresh water flow releases from the NY City reservoirs has implications for salinity levels and a moving salt line in the estuary. For all of these issues there is new information and changing conditions. Each individually has implications for salinity levels and the salt line in the Delaware Estuary – and cumulatively the effects are magnified. Freshwater tidal wetlands are vulnerable to changes in salinity and amplified tidal ranges. (*Attached Report 53*)

A moving salt line and changing salinity levels in the estuary have a wide range of implications including for degrading and transforming fresh water marshes. The Army Corps must carefully consider, study, model and analyze these cumulative impacts with respect to their implications for freshwater marshes, wetlands, and other sensitive estuarine habitats.

The NEPA documents released to date by the Army Corps fail to do this and so are highly deficient in this regard. The 2011 Draft EA similarly fails to address the new expert data and information readily available on this issue. (*See Attached Misc 33 for information on recently released science, released at the Delaware Estuary Science & Environmental Summit attended by a number of Army Corps personnel*).

NJ DEP's Division of Fish & Wildlife has expressed the importance of modeling, "monitoring and mitigating for any freshwater marsh conversions to salt water marshes that will occur due to increased salinity. The freshwater wild rice marshes are critical wildlife habitat" including for a "wide array of T&E species and are valuable to waterfowl (Federal trust species) as migration and wintering areas." Currently wild celery is rebounding in the freshwater areas of the River according to NJDEP Division of Fish & Wildlife, and so "concerns exist about possible negative habitat change and loss of this protected species by siltation and/or deepening." (*Attached Misc 1*).

The Army Corps' assertion that, because sea level rise also affects salinity levels and therefore affects wetlands/marshes in the estuary, the impacts of the Deepening Project and its ramifications for salinity levels and the wetlands and marshes should be altogether discounted is deeply troubling. This is highly flawed logic; even children know that two wrongs don't make a right and that a first wrong doesn't obviate a second wrong. The effects of the Deepening Project for changing salinity levels will be increased and magnified by sea level rise. That sea level rise has an effect on salinity levels and marshlands does nothing to discount the effects of the Deepening Project on salinity levels and marshlands. The world as affected by global climate change and sea level rise is the world within which the Deepening Project will take place and therefore must provide the base parameters for assessing the salinity changes and other effects of the Deepening Project.

Sea level rise in the immediate present is not something over which we or the Army Corps has direct control. But the Deepening Project and its contribution to harmful impacts to wetlands (as well as to fish and wildlife species and drinking water supplies) is absolutely within the Army Corps' control; we can choose proceed with deepening and allow the harms to happen or choose not to proceed and avoid inflicting these additional level of harm on the environment and our communities. Simply because there are other contributions to changing salinity levels in the marshes does not mean that the contribution of the Deepening Project can be ignored or discounted. Quite the opposite: it makes it all the more important that we make the more protective decision regarding the Deepening Project at this critical juncture.

The Army Corps' assertion that because it is proposing a project it deems to be wetlands restoration it may therefore discount the adverse effects of deepening on marshes (see 2009 EA at p. 95) is further flawed logic – even if the restoration projects were of value, they could be done independently of deepening without needing to inflict the overall levels of harm to result from the Deepening Project. Further, as discussed, the projects to be carried out in fact will not be beneficial, but harmful, and so provide no support for an argument that these so-called mitigation projects obviate the need to consider or analyze the cumulative impacts of deepening on wetlands and marshes.

The Water Resources Development Act states that

costs of constructing projects or measures for the prevention or mitigation of erosion or shoaling damages attributable to Federal navigation works shall be shared in the same proportion as the cost sharing provisions applicable to the project causing such erosion or shoaling. The non-federal interests for the project causing the erosion or shoaling shall agree to operate and maintain such measures.

The prevention or mitigation of the damage to the marshes of the estuary as the result of accelerated erosion and/or degradation resulting from deepening and future dredging of the channel and associated dredging is nowhere included in project plans for the Deepening Project: not in the EIS or SEIS, not in the EAs, and not in the cost sharing agreements as required in the quoted paragraph.

The project summary asserts that 44% of the 102.5 mile project is already deeper than 45 feet and so won't require deepening or maintenance dredging. We know that past dredging, deepening and fill projects have changed circulation patterns in the River – forcing it to seek sediment to balance out its sediment needs:

- ✓ “Changes in tidal range of the Delaware Estuary over the past century have been attributed to channel deepening by dredging...”
- ✓ “... the documented changes in accretion and erosion during Period 2 are interpreted to be a natural adjustment of the estuary, an attempt to retain a balance between cross-sectional area and tidal discharge.”
- ✓ “This study has revealed that natural erosion during Period 2 has removed 1.4×10^{11} kg of sediment from the estuary bottom and, for the first time, shows that bottom erosion is a major source of fine-grained sediment in the sediment..”
- ✓ “Estuarine erosion has important implications not only to the sediment budget, but also to the balance of particle-associated nutrients and/or pollutants within this urban estuary.”

(See *Attached Report 10*).

That the tidal range of the Estuary has been increased as the result of the deepening of the Estuary channel has also been found by DiLorenzo et al., *Dredging Impacts on Delaware Estuary Tides, Estuarine and Coastal Modeling III, Proceedings of the 3rd International Conference, Sept 1993 (Attached Reports 3)*. The Army Corps has not done the necessary research regarding how these changed dynamics will affect the already-deeper areas of the Estuary and whether they may actually experience sedimentation in the future as a result of the changed dynamics. Previous deepening of the estuary resulted in “an immediate response of a 0.3 to 1.2 m increase in tidal range between Philadelphia and the head of tides at Trenton, and a 3-hr decrease in the time of tide propagation from mouth-to-head.” As recently as April 2010, DNREC asked what the effect of going to 45 feet plus the 1 or 2 foot overdredge will have on the tidal amplitude and the

time of tidal propagation in the estuary. (*Attached Letter 32*). The Army Corps has yet to answer this significant set of questions in a manner that has been offered up for public and agency review and comment.

The Army Corps unjustifiably relies on an analysis it conducted in the 1970s to discount the more recent research and analyses by Walsh and Sommerfield. Yet it is incumbent on the Army Corps to respond to this new information with an appropriate level of data, analysis and further study. The agency may not lawfully continue its “*Army Corps-trumps-all*” attitude towards research conducted by any agency, entity or expert that is not by or in total agreement with the Army Corps’ viewpoint.

What consideration has been given to the effects of the identified bottom erosion on bottom dwelling organisms, and the associated sedimentation on habitat for species such as oysters?

The changed flow dynamics from deepening and the effect on the friction and drag of the water moving through the water column vis-a-vis the channel could “further increase estuary flood dominance under non-storm flow conditions.” (*Attached Letter 32*). Flooding in the Estuary poses major safety risks and costs for our communities. The Army Corps has not spoken to this issue with facts, figures and information, as clearly it must do. EPA’s report to Congress on climate change and sea level rise goes into great detail about the increased costs inflicted by sea level rise and resulting flooding. (*See Attached Report 81*). The Army Corps should most certainly be considering the same, including for both sea level rise and the Deepening Project.

The Science and Technical Advisory Committee of the National Delaware Estuary Program has also urged the consideration how the Deepening Project will affect the tides and how that change will interact with sea level rise, changing storm patterns, and changes in freshwater flows from upriver. (*Attached Misc 27*). The Army Corps has been aware of these concerns for over 3 years and yet still fails to consider them in the NEPA context.

W. Impacts From Foreseeable Actions Relating to the Deepening Project of Constructing Berths and Dredging Lateral Access Channels Remain Unaddressed.

Over 50% of the claimed benefits of deepening will accrue to 6 oil facilities. It is well known that these benefits can never be realized without additional private channel deepening, berth work and associated infrastructure work. In addition, there may be private channel or infrastructure work that needs to be done in other industries to take advantage of the Deepening Project. Therefore, the effects of this work must be considered in the context of the Deepening Project and be a part of a new NEPA analysis through an SEIS.

X. The Army Corps Has Failed to Consider the Deepening Project's Impacts to Public Recreation and Aesthetic Enjoyment.

The Deepening Project is predicted to introduce toxic contaminants into the River and food chain. The Delaware River and Estuary are major destination points for recreational fishers. Exacerbating the already contaminated conditions of the fish, subjecting them to extended fish advisories due to the addition of more contaminants into the River system, or resulting in new advisories, are potential harms to this major recreational use of the River. Spending in the Delaware River and Estuary region by recreational anglers is valued at \$62 to \$100 per angler per day. (*Attached Misc 9*). NOAA reported in 1991 that roughly 155,000 people spent almost \$60 million fishing in Delaware's waters resulting in \$29 million in earnings, and supporting 1,605 jobs. In that same year, 950,000 people spent more than \$630 million fishing in New Jersey's waters, resulting in \$400 million in earnings, and supporting 16,750 jobs. (*See Attached Report 37*) While the Delaware Estuary is not responsible for all of this fishing and related jobs and income, it is responsible for a fair share of it. Further contamination and/or even the perception of additional contamination from the Deepening Project could create significant recreational and economic harms.

In addition to the contamination risks, the Deepening Project will harm critical habitat for a variety of fish species that are important economically and recreationally to our region – habitats including SAV, wetlands and *Sabellaria vulgaris*, as discussed extensively above.

The Deepening Project also puts at risk horseshoe crabs and therefore dependent migratory shorebirds. These creatures are a significant source of recreation and ecotourism dollars for Delaware and the region. Aesthetically, the crabs and the shorebirds are an essential element of the Bay landscape. Their dramatic arrival to the Bay beaches each Spring is a major tourist destination, not just for people in the region but for folks around the world. In addition, they are a source of \$34 million of economic benefit to the region; 1/2 to 1/3 of which is estimated to go to Delaware. The Deepening Project puts these recreational and aesthetic values of the Bay at tremendous risk.

Exacerbating the risk of oil spills also increases the risks that recreational values will be harmed. The Athos I oil spill inflicted significant recreational damage on the River. In an effort to address the 41,709 lost trips to the River because of the oil spill, \$1,319,097 is being invested in enhancing future access. (Final Restoration Plan and Environmental Assessment; for the November 26, 2004 M/T Athos I Oil Spill on the Delaware River Near the Citgo Refinery in Paulsboro, New Jersey, September 2009, http://www.darrp.noaa.gov/northeast/athos/pdf/Athos_Final_RP.pdf). To the extent that the Deepening Project increases the risk of oil spills (as discussed in Section J of this comment) it becomes a risk and harm to recreation and to aesthetics.

To comply with NEPA's requirements, the Army Corps must fully analyze and discuss the scope, significance, and magnitude of these actual and potential

recreational, aesthetic, and economic impacts from the Deepening Project in a new SEIS process.

Y. The Army Corps Has Failed to Consider or Discuss the Outstanding Safety Issues Associated with a Reduced Number of Bend Widening

Apparently as a cost savings, the Army Corps has reduced the number of bends that will be widened as part of the project from 16 to 11. If the Deepening Project is to attract larger vessels, this reduction in widenings becomes a safety risk that has not been discussed in the NEPA documentation. What is the justification for reducing the number of bends widened? What are the safety impacts for reducing the number of bends widened? What are the implications for increasing the risk of catastrophic spills?

Z. The Army Corps Has Failed Adequately to Consider the Unacceptable Levels of Air Pollution the Deepening Project Will Cause.

The level of air-polluting NOx emissions the Deepening Project will generate in its peak year are equivalent to having another power plant or petroleum refinery in the region, according to NJDEP.

The air quality implications of the Deepening Project, and the Army Corps' analyses regarding air quality, have not been included in the NEPA documentation. The 2009 EA says that it will deal with the matter separately and in the future; the 2011 Draft EA addresses the issue not at all. This is a serious deficiency. That the Army Corps has done work with EPA in another context does not displace the Army Corps' legal obligation to address this issue in a NEPA document on the Deepening Project itself.

In its consideration of air pollution impacts from the Deepening Project in this other context, the Army Corps has failed to include all foreseeable direct and indirect contributions from the Deepening Project. The Southport Port project is a foreseeable outcome and directly related project of the proposed Deepening Project. Southport includes dredging, filling, and construction. It is also being built with the stated objective to induce increased port traffic. And it will be built with deepening spoils. In the letter to the Army Corps dated April 16, 2009, NMFS stated its belief to the Army Corps that Southport was a related component of the Deepening Project and therefore its environmental harms needed to be assessed as part of the aquatic impacts of the project; this is no less true for the air impacts of the project. (*Attached Letter 14*). Furthermore, in an email from Barry Gale to Roy Denmark and others dated Jan. 5, 2009, the Army Corps acknowledged the foreseeability of Southport as an outgrowth of the 45-foot Deepening Project. (*Attached Misc 4*).

As the Southport Project is a foreseeable outgrowth of the Deepening Project, and according to its sponsors its implementation is dependent upon the 45-foot Deepening Project actually happening, and there are likely to be NOx emissions associated with its construction and associated traffic, the

Army Corps must consider air impacts of the Southport Project as a foreseeable outcome of the Deepening Project. Failure to include the known, anticipated and foreseeable air emissions of the Southport Project is a failure to fulfill the requirements of including consideration of the cumulative impacts of air emissions from the 45 foot Deepening Project.

Additionally, as discussed above, the most recently discussed Army Corps spoil disposal plan includes the use of existing CDFs to a much greater degree than originally proposed, which will necessarily require the berms at those sites to be raised significantly. According to an April 11, 2008 Army Corps document (*Attached Report 93*) and the 2009 EA, in order to accommodate all spoil disposal in existing Army Corps CDFs, the dikes on most of the federally owned facilities would need to be raised higher than was originally anticipated or planned for. The air quality impacts of this additional construction directly associated with the project are foreseeable and should be included in the air pollution analysis. The omission of this issue is a significant deficiency that can only be remedied in the context of a new SEIS process.

Moreover, the emissions associated with transporting deepening spoils to alternative locations in Pennsylvania is a foreseeable air impact of the 45-foot Deepening Project that must be included, considered, and addressed as part of the project Air Conformity documents. The agreement reached by the Governors of Pennsylvania and New Jersey in 2007 (*Attached Letter 8*), in which it was explicitly agreed that all spoils will go to Pennsylvania locations, coupled with communications including the August 11, 2008 and October 6, 2008 letters from NJDEP to the Army Corps (*Attached Letters 30 and 31*), the September 19, 2008 letter from the Army Corps to NJDEP Commissioner Lisa Jackson (*Attached Letter 28*) and the May 15, 2009 letter from Governor Rendell to Governor Corzine (*Attached Letter 27*), document that deepening spoils are intended for delivery to Pennsylvania. Whether that delivery will be immediate or after a period of de-watering does not negate the agreement by project sponsors. This agreement was a fundamental underpinning of the Deepening Project and the reason why it was transferred from the DRPA to the PRPA. Spoils to be transported to Pennsylvania locations as part of the project's implementation will create polluting emissions to the air associated with that transport. Failure to include these air impacts in the NEPA context is a significant deficiency. Failure to consider and discuss this dredge spoil disposal plan at all as part of the 2009 EA and/or the 2011 Draft EA is also a serious deficiency.

Furthermore, the air pollution impacts appear to only include the construction phase of the Deepening Project and associated private channel deepening. The Army Corps' NEPA analyses to date fail to discuss, to any degree, increased air pollution emissions that will result from maintenance dredging to an increased depth of 5 feet.

The use of Emission Reduction Credits does not alleviate or mitigate the increased air pollution contributions of the Deepening Project:

- ✓ The ERCs fall far short of balancing the air pollution contributions to be made.
- ✓ The use of ERCs will not result in a net reduction of air emissions; it simply justifies and rationalizes the Deepening Project's contributing air pollution to the region.
- ✓ According to New Jersey's assessment, "By relying 100% on emission reduction credits [] and by not providing for any emission controls on the pollution sources, there will be an actual increase in emissions caused by the Project that will contribute to a delay in attaining the health-based NAAQS...." (*Attached Letter 22*).

Furthermore, the primary reason that the Army Corps provides for relying upon an ERC approach to the air pollution problem - rather than identifying and implementing a direct strategy for taking action using admittedly "technically feasible" options to directly mitigate the air impacts of the 45-foot Deepening Project - is one of convenience. To carry forth the direct mitigation strategies the Army Corps identified in its air conformity submissions to the EPA would require 12 to 24 months to fully develop for implementation. The air conformity documents issued by the Army Corps for compliance with the Clean Air Act reveal a number of feasible options for achieving NOx reductions, and the Army Corps provides no valid justification for eschewing them, other than the need for additional time. (see, e.g., p. 4 of the General Conformity Analysis and Mitigation Report: "Each of the mitigations strategies studied was determined to be technically feasible.").

The belief that using alternative available strategies (whereby the Army Corps would be directly mitigating its air pollution harms through direct action in a reasonable level of time) would conflict with the pre-determined schedule for the 45-foot Deepening Project articulated by the Army Corps - a schedule no longer applicable -- is not a sound reason for failing to minimize its air pollution contributions. Just because it may be deemed to be technically in compliance with the Clean Air Act by some does not discount consideration of the air impacts with other environmental and health harms when considering this project in the broader context mandated by NEPA.

The Army Corps fails to use the most up-to-date information and the latest and most accurate analyses for assessing air emissions or mitigation options associated with the Deepening Project. As a result, the information that is provided is questionable at best. The November 2009 General Conformity Analysis and Mitigation Report and the associated Conformity Determination continue to rely in large part upon the analysis and findings of the 2004 documentation. In addition, the Army Corps explicitly states that its mitigation strategy focused on emission reduction technologies was primarily based on the same October 2000 Moffatt & Nichol study used previously. This study/analysis was purported to be updated through the review of a January 2003 document, which the Army Corps asserts demonstrated that there had been no significant changes to the emission reduction technologies considered in the October 2000 report. Both of these key

documents used to identify and assess the available options for mitigation of the 45-foot Deepening Project are well out of date – respectively 9 years and 7 years old.

Furthermore, by way of example, when considering mitigation strategy 4, action on the McFarland, an Army Corps hopper dredge used for maintenance dredging on the Delaware River, the Army Corps used daily running hours from 1999 to 2003, the same data used in the 2004 CAA conformity documentation. But, when assessing the most recent dredge spoil volumes and costs associated with the Deepening Project, all current Army Corps documents are relying upon more recent and assertedly up-to-date information regarding the volume of spoils that lie in the channel and need to be removed. It stands to reason that if there is new information regarding the volume of spoils associated with the Deepening Project, there should also be new information regarding volume of spoils for maintenance and therefore anticipated running times associated with maintenance dredging. This new and up-to-date information is what should have been used in considering the McFarland strategy.

Of course, to the extent that the air impacts were in large part based upon an anticipated volume of spoils, now that we have new data and information to demonstrate that the Army Corps' spoil disposal assumptions are very likely woefully inadequate – i.e. for Reach C they underestimated the volume of spoils by 38%, as discussed above. Therefore the air calculations are no longer defensible without further detailed analysis and NEPA review.

Whether or not there is a legal argument that its ERC strategy would fulfill the Army Corps' legal obligations under the Clean Air Act, the agency cannot rely on this argument to evade its responsibility under NEPA for a full analysis and public disclosure of these environmental impacts as well as viable alternatives that would mitigate or eliminate these impacts.

The Delaware Riverkeeper Network's comments regarding the Army Corps Clean Air Act Conformity submissions are attached for additional information. (*Attached Letter 19 & Attached Letter 21*)

AA. The Army Corps Has Failed to Consider Feasible Alternatives, including the No-Action Alternative, to Discharges of Dredge/Fill Material into the River

The Clean Water Act and its implementing regulations and guidance are clear that, when there is a practicable alternative that would inflict less harm on the environment and aquatic ecosystems, that alternative should be chosen. Discharges of dredge or fill material are not allowed if there will be a detrimental effect on critical habitat for endangered or threatened species; if it will result in or contribute to the significant degradation of the waters of the US; or if there are other appropriate or practicable steps that can be taken to minimize potential adverse impacts of the discharge to the aquatic ecosystem.

There is very definitely a feasible alternative for NEPA purposes that would avoid the harms the Deepening Project will inflict while at the same time allowing commerce to continue unimpeded, i.e. the existing process of lightering that allows oil and goods to transport up the River without the need for any deepening. According to the Army Corps itself:

“the mix and volume of cargoes coming to the benefiting terminals will be the same for either the current 40 foot or proposed 45 foot channel depths. The project’s navigation benefits from the channel deepening are based upon transportation cost savings from more efficiently managing vessel-operating costs. There is no induced tonnage as a result of the Deepening Project” (2009 EA)

As a result, the no-action alternative – the practice that has supported healthy and growing commerce on the River, as demonstrated by the last twenty years of not implementing the Deepening Project -- is still the best option.

This comment clearly documents that the standards of the Clean Water Act for protection cannot be met. The only way to disprove the evidence in this comment and now on the record is through a complete and thorough SEIS process that brings full, complete and up-to-date scientific, factual and legal analysis to the project. As part of this new NEPA process, a more thorough examination of the no-action alternative must be performed, especially in light of the no-action alternative’s best chance of meeting the legal requirements of the CWA and other statutes.

BB. The Army Corps Has Failed to Assess the Southport River Fill Project as Part of the Deepening Project and/or as Part of a Cumulative Impact Analysis

The Army Corps must assess the impacts of the Southport River fill project as part of the Deepening Project because of their substantial connections and because Southport is a known, foreseeable, and planned for project associated with and resulting from the Deepening, according to Deepening Project Sponsor PRPA. The Army Corps’ total failure ever to consider the Southport Project in any NEPA documentation violates NEPA’s requirements.

The Southport Project’s environmental impacts will combine with those of the Deepening Project to inflict myriad harms on the River and its resources. The Army Corps is obligated by NEPA to consider the ramifications of the Southport Project together with those of the Deepening Project in a cumulative impact analysis. The two massive construction projects will have complementary, synergistic, and irreversible adverse environmental effects that the Army Corps must address in an up-to-date SEIS for the Deepening Project.

The Southport Development project involves the filling in of 12.28 acres of open water (.2 of which is emergent wetlands, 1.08 acres of which is shallow water habitat, and 3.62 of which is deep water habitat); filling in 3.75 acres of nontidal wetlands; .73 acres of a tidal drainage area; filling in an unspecified amount of

floodplain lands with 3 to 4 feet of fill to raise the area to above the 100-year floodplain (in fact to raise it to the 200 year floodplain); dredging a 35-acre area within the River to a 40+2 foot depth; impacts to approximately 4600 linear ft of existing shoreline; the permanent loss of 1.08 acres of submerged aquatic vegetation; and having a 116 acre development footprint that will necessarily be on riverside lands and result in the loss of potential terrestrial habitat.

The Southport Project itself involves 35 acres of deepening and dredging. It also will have important water quality effects, including reducing dissolved oxygen levels by destroying water celery that makes significant contributions of oxygen to the water as well as introducing contaminants by resuspending contaminated sediments and by depositing dredged spoils in the Fort Mifflin CDF, known to be a source of contaminants from spoils previously dumped there. *(See Attached Report 7 regarding Fort Mifflin).*

Southport is a foreseeable and known outgrowth of the Deepening Project, as demonstrated by a June, 2005 Feasibility Assessment sent to the Army Corps *(Attached Report 1)*, as acknowledged by the Army Corps in email *(Attached Misc 4)*, as asserted by NMFS in its April 16, 2009 letter in which it asked for consideration of Southport as part of a cumulative assessment of the Deepening Project *(Attached Letter 14)*, and as demonstrated by ongoing agency meetings regarding this project *(Attached Letters 20, 23, 24, 29 50, 51 regarding the status and agency discussions regarding the Southport Project).*

1. Dissolved Oxygen Effects:

The Southport Project will cause damage and destruction to large swaths of essential fish habitat, including more than an acre of SAV dominated by wild celery. Because wild celery is a source of oxygen in this reach of the River where higher oxygen levels are needed, the adverse effects of its removal on Atlantic , shortnose sturgeon, and many other species is of great concern.

2. Other Harmful Water Quality Impacts:

According to the USFWS, samples of sediments to be used in the Southport Project demonstrate “that contaminants are leachable from the sediments at concentrations that would pose unacceptable ecological risk to aquatic organisms.” This means that these sediments should only be used in areas where they will not be inundated during high water events and in a way that reduces their potential for leaching from precipitation. Considering that spoils from this project are planned to be disposed of in the Fort Mifflin CDF, there is a high potential that these restrictions will be violated.

According to documents on the record the spoils from the Southport Project are planned for the Fort Mifflin CDF. Fort Mifflin has been shown to effectively dump pollution back into the River from sediments disposed there rather than filter it out prior to discharge.

Dr. Thomas Fikslin with the DRBC conducted a review of the overflow from CDFs associated with dredging projects in the Delaware estuary. Dr. Fikslin analyzed data from two existing CDFs -- Money Island and Fort Mifflin. These areas receive sediments and water from Delaware River dredge operations. Sediments settle out in the area and the water is returned to the estuary. According to Dr. Fikslin's findings, these two CDFs, independently and collectively, are a significant source of toxic pollution to the Delaware River. The findings demonstrate that these particular facilities do not effectively remove contaminants from the discharge water that goes back into the River. Among the toxics discharged to the River during the de-watering process at these facilities are cadmium, lead, copper, zinc and total suspended solids. In some instances, the discharge concentration exceeds the DRBC's acute and/or chronic criteria, although the DRBC criteria are for dissolved metals. *(Attached Report 7)*

For example, as cited above and reproduced here, the following discharges were identified at the two sites:

	Money Island	Fort Mifflin	Acute Criteria	Chronic Criteria
	(total)	(total)		
Metals (ug/liter)				
Lead	268.1	242.0	48	16
Copper	229.7	76.7	13.3	9.1

According to Dr. Fikslin, the two disposal facilities alone are the eighth largest discharger to the estuary and, in the case of lead, discharge more lead than all 78 point source dischargers to the estuary combined. *(Attached Report 7)*

Dr. Fikslin also found that these CDFs are a source of DDE to the River, and a potential source of PCBs that have been documented in the sediments of the estuary. According to Dr. Fikslin, his preliminary evaluation “indicates that CDFs have the potential to impact aquatic life through acute and chronic toxicity, and human health through the bioaccumulation of organic compounds such as PCBs and DDX.”

This research regarding Fort Mifflin CDF operations, coupled with the findings of the USFWS, demonstrate another threat to water quality posed by Southport, which must be analyzed by the Army Corps in a new SEIS that fully addresses the cumulative impacts of both the Deepening Project and its outgrowth the Southport Project.

According to NMFS, additional water quality concerns from Southport include “turbidity through the resuspension of sediments into the water column from dredging and port operations” degrading water quality, lowering dissolved oxygen levels, and potentially releasing “chemical contaminants bound to the fine-grained estuarine/marine sediments.” Alterations to sedimentation and wave patterns

caused by vessels entering and exiting the mooring area could also increase turbidity. “Suspended sediments mask pheromones used by migratory fishes, and can smother immobile benthic organisms and demersal newly-settled juvenile fish.” (*Attached Letter 42*). As with the impacts of contaminants, these serious and significant impacts to essential fish habitat and ecologically and economically important fish species must be fully analyzed in a new SEIS.

3. Dredging and Construction Harms:

The proposed listing for Atlantic sturgeon specifically identifies dredging as a factor in the destruction, modification, or curtailment of the Atlantic sturgeon’s habitat and range. “Environmental impacts of dredging include direct removal or burial of organisms, elevated turbidity or siltation, contaminant resuspension, noise or disturbance, alterations to hydrodynamic regime and physical habitat, and loss of riparian habitat.” (*Attached Misc 28*). NMFS further found:

Dredging and filling operations can impact important features of Atlantic sturgeon habitat because they disturb benthic fauna, eliminate deep holes, and alter rock substrates necessary for spawning. Deposition of dredge sediment has been shown to affect the distribution of Atlantic sturgeon. Dredging can also result in direct takes (killing and injuring) of Atlantic sturgeon. Such takes have the potential to affect the range of Atlantic sturgeon. (*Attached 28 (citations omitted)*).

According to PA Fish and Boat representatives, “the entire [Southport] area from the interpier areas at the north end of the site all the way around to the south end of the site is valuable for young-of-year sturgeon, shad and striped bass.”

In its October 22, 2010 letter about the Southport Project, NMFS said “In-water construction activities can affect Shortnose and Atlantic sturgeon through direct injury or mortality, displacing species from the area, or by altering the habitat and destroying forage items.” (*Attached Letter 42*).

The Southport Project involves significant amounts of dredging (35 acres), filling (over 12 acres in the River), and other in-water construction such as the installation of pilings, thus raising significant potential for harm to Atlantic sturgeon known to use this reach of the Delaware River Estuary.

These harms to sturgeon and other species need to be analyzed in the context of the Deepening Project – both as a direct and foreseeable result, but also as part of a consideration of cumulative impacts – in a new SEIS.

4. Harm From Vessel Strikes:

NMFS has determined vessel strikes to be a “significant threat” to the New York Bight DPS of Atlantic sturgeon of which the Delaware population is a part. Vessel strikes are also a significant threat to loggerhead sea turtles, as discussed above. According to project supporters, Southport will result in increased vessel traffic to

the Delaware River as far up as Philadelphia.⁸ Increased vessel traffic means increased risk of vessel strikes to both Atlantic sturgeon and loggerhead sea turtles. The change in traffic patterns and increased vessel traffic on the Delaware River resulting from the construction of the Southport Project under either a 40-foot and a 45-foot channel scenario were not part of any Army Corps NEPA or ESA analysis for the Deepening Project with regard to its effects on Atlantic sturgeon or loggerhead turtles.

Because Southport is a part of the Deepening Project – it was conceived of as an element of the Deepening Project and, according to project supporters, is moving forward solely because of the Deepening Project, all of its environmental impacts must be reviewed as part of a new and up-to-date SEIS on the Deepening Project.

For additional environmental effects that the Army Corps must consider on a cumulative basis, *see Attached Letter 47; and Attached Letters 50 & 51 from environmental organizations Delaware Riverkeeper Network, Delaware River Shad Fishermen's Association, Delmarva Ornithological Society, Delaware Audubon Society, Cooper River Watershed Association, National Wildlife Federation, South Jersey Land and Water Trust, NJ Environmental Federation, NJ Sierra Club dated Sept 23, 2010).*

CC. The Army Corps Has Failed to Undertake a Thorough, Comprehensive, and Up-to-Date Cumulative Impacts Assessment

In addition to the Southport Project there are other projects proposed for implementation in the near future that will affect the same reaches of the Delaware River as the Deepening Project and that would do direct and immediate harm to the River (including, *inter alia*, Atlantic sturgeon, SAV and wetlands). As a result, the individual and cumulative impacts of the Deepening Project must be considered on a cumulative basis with these projects that include, but are not limited to:

- ✓ Airport expansion project
- ✓ Natural gas drilling using hydraulic fracturing in the Upper Delaware and Schuylkill River watersheds

⁸ According to the NEPA documents on the Deepening Project, the Army Corps has explicitly stated that the deepened channel will not result in increased vessel traffic and so the Army Corps discounted the possibility that the Deepening Project would create increased risks to Atlantic and shortnose sturgeon from vessel strikes. (With respect to loggerhead sea turtles, the Army Corps has simply failed to consider the risk of vessel strikes at all.) Attached Report 80 makes clear that the size of the vessels traversing the Rivers matters as much as does the number of vessels. Contrary to the Army Corps' cavalier dismissal of this issue, the extent to which the Deepening Project will result in larger or more heavily laden vessels and the resulting change in risk vessel strikes to endangered and threatened species is, in fact, relevant to both NEPA and ESA analyses.

- ✓ LNG Crown Point project
- ✓ Magellan LP project
- ✓ Southport as discussed above

1. Harms Posed by Airport Expansion:

The airport expansion being proposed by the FAA is another River fill project, in this case the filling of 25 acres, that, according to NMFS' comments, will contribute to changes in the hydrodynamic and sedimentation patterns of the Delaware Estuary. To the extent these changes further contribute to the changes that will be caused by the Deepening Project, it becomes another addition to the cumulative effects that could affect Atlantic sturgeon and other fish species, wetlands and marshes, and other ecological resources of the River. (*Attached Letter 37*)

2. Harms Posed by Crown Landing LNG:

The Crown Landing site near Logan, New Jersey is believed to have been a historic spawning ground for Atlantic sturgeon. This reach of the River was approved by the Federal Energy Regulatory Commission for construction and operation of a Liquefied Natural Gas (LNG) import terminal. Construction of an LNG facility is likely to threaten the viability of the Delaware River population of Atlantic sturgeon. Dredging for construction and maintenance will be required for this facility. In addition, it is believed the facility will receive up to 150 shipments per year. LNG carriers take on ballast water as they offload in order to maintain stability. An estimated 8 million gallons would be pumped from the River over a 10 hour period while at the berth with an additional 5 to 11 million gallons being taken on after undocking downstream of the berth area. If still used by Atlantic sturgeon, entrainment and impingement of Atlantic sturgeon larvae is a foreseeable result.

3. Harms Posed by Magellan LP:

With regards to Delaware facilities, overall the Army Corps asserts that the Deepening Project will not provide benefits. And yet, in materials submitted to Delaware, they assert the Deepening Project will benefit Magellan LP, which has been considering a new berth in the naturally deep section of the Delaware River to access the existing channel. If the Army Corps wants to characterize Magellan as a project beneficiary, which it attempted to do earlier in the May 21 letter (*Attached Letter 46*) including Magellan in the list of "benefitting facilities," then it must also include in a new NEPA analysis any environmental impacts of the work associated with the Magellan project. But the agency cannot have it both ways – it can't say Magellan will benefit from the Deepening Project while at the same time claiming that the Deepening Project is irrelevant to this future proposal and therefore any associated environmental or other harms are also irrelevant.

These projects, individually, and cumulatively, pose present and threatened environmental impacts not only to Atlantic sturgeon but also to many of the ecological and economic resources discussed in this comment letter. The Army Corps must consider the full range of these impacts in a new NEPA analysis.

DD. The Army Corps has Failed to Demonstrate a “Need” for the Deepening Project.

NEPA requires a full consideration of need and justification as well as of the no-action alternative. Where there is no demonstrable need for a project, clearly the no-action alternative is the most beneficial path forward in an instance like this where there are so many harms to the communities, ecological resources, and economics of the Delaware River region that will result. The reality is that navigation up the Delaware River continues at a healthy level and there is no expectation that will change if the channel remains at 40 feet. There are not, at the 40-foot depth as compared to a 45-foot depth, impediments that are keeping goods and port deliveries from progressing up the River or impeding successful port operations and growth on the River. According to the Army Corps:

- ✓ **“the mix and volume of cargoes** coming to the benefiting terminals **will be the same for either the current 40 foot or proposed 45 foot channel** depths. The project’s navigation benefits from the channel deepening are based upon transportation cost savings from more efficiently managing vessel-operating costs. There is **no induced tonnage as a result of the Deepening Project**” (*2009 Environmental Assessment*)
- ✓ “The future volume of cargo passing through the Delaware River port system is determined by macroeconomic factors that are not affected in any measurable way by the channel depth. **With the deeper channel, fewer total vessel calls will be required....**” (*Attached Letter 14; this same perspective also included in Attached Letter 46*)

The Deepening Project is demonstrably not needed to support port economic growth. In fact, since 1990 the Port of Philadelphia has seen its container port traffic grow by nearly 300%, an increase exceeded by only three ports on the East Coast. Similarly, the Port of Wilmington has grown nearly 200% in container port traffic since 1990 without the “benefit” of a main channel deeper than 40 feet. This growth has come despite the lack of a deepened channel and the recognition by all that deepening may never come to pass because of the stiff opposition it faces. By contrast, in 1990, the Port of Baltimore was deepened to 50 feet. Since that time, Baltimore has experienced growth of only 29% in container port traffic, a fraction of the growth experienced in our region. (*See Attached Misc 7*).

The Army Corps fails to account for the reality that primary project beneficiaries (i.e. the oil companies) are unwilling and/or unlikely to make investments needed to benefit from a deepened main channel. If the primary project beneficiaries have no irreplaceable need for the project, so much so that it is unclear if they will take advantage of it, then clearly there is no demonstrated public need for the project.

According to the Army Corps' 1998 Limited Reevaluation Report, more than 80% of the project's benefits are attributed to six oil facilities (*Limited Reevaluation Report, February 1998, p. 21*); in its 2002 Economic Reanalysis, sixty percent of the benefit from the proposed Deepening Project accrues to seven oil facilities (*Delaware River Main Channel Deepening Project, Comprehensive Economic Reanalysis Report*, US Army Corps of Engineers, Philadelphia District, December 2002). According to the 2004 Economic Reanalysis 50% of the benefit of the Deepening Project accrues to Delaware River oil facilities. (*Delaware River Main Channel Deepening Project, Supplement to Comprehensive Economic Reanalysis Report December 2002, Army Corps Philadelphia District, February 2004*). In each case the oil facilities are the largest beneficiaries of this project.

Current Army Corps economic analyses continue to give 50% of the benefits to the oil industry (*See Attached Report 28 & Report 99*). And yet:

- ✓ The Eagle Point refinery was idled in the Fall of 2009. And on March 29, 2010 Reuters reported that Sunoco Inc permanently shut down its idled 145,000-barrel-per-day refinery in Eagle Point, New Jersey. Sunoco had idled the plant the previous year due to weak demand for refined products. (*see Attached Article 13*). This had nothing to do with the channel depth or a failure of plans to deepen, this was a business decision based on other factors. Because this facility is no longer in operation, the benefits claimed for this facility cannot be realized. The Army Corps has failed to include this changed reality in its claim of need or benefits as part of any NEPA documentation. Clearly, the Army Corps must revisit its assessments of the 1997 SEIS by undertaking a new and updated SEIS.
- ✓ As recently as 2010, "Officials from all three refinery firms told [the GAO] ... that they would need to analyze the project's benefits and costs for their firms to determine whether they would commit to making the improvements necessary to take advantage of the project. These improvements could be substantial: deepening their ship berths, retrofitting their docks, or expanding their storage capacity." (*Attached Reports 17*). In light of the multiple statements on the record and in the public arena, as described in bullets below, that the oil facilities are not really very interested in, in some cases won't use, and in other cases would even be harmed by, the Deepening Project, this continuing lack of commitment when put in context shows a high likelihood of not making the investment to take advantage.
- ✓ "With regard to the project's B/C ratio, the original project scope included six petroleum facilities as project beneficiaries. However, we have seen no documentation that any of these facilities plan to dredge their private channels. To the contrary the limited documentation we have indicates that one or more of the petroleum companies believe that it is not in their best economic interest to participate. Accordingly we would like to see additional documentation showing any commitments made by the companies involved and more explanation of how their participation (or lack thereof) affects the B/C ratio calculations. Moreover, if these facilities are not committed to participate, we would argue that the scope of the project would be modified,

which would require the Army Corps' to recalculate the B/C ratio." (*Attached Letter 2 From the Environmental Protection Agency 1999*)

- ✓ Prior owners of the Eagle Point facility repeatedly expressed concerns about the impacts of the Deepening Project on their operations. This indicates that even if the facility were to reopen it is unlikely the new operations would experience benefit from, or want to invest to take advantage of, a deepened channel – there has been no River change or structural change that would undermine these previous assessments by facility owners. In a September 2003 letter to the Army Corps the Eagle Point Refinery (formerly owned by Coastal, and most recently owned by Sunoco) wrote:
 - “Coastal is physically limited to process approximately 140,000 bbl/day of crude; while refinery processes and products may change slightly over time this will not increase with a deeper channel.”
 - “Coastal uses Suezmax ... and Panamax tankers. ... A deeper channel would not benefit the ship by allowing it to load more and claimed savings by the ACOE due to this are not realistic.”
 - “In summary, the potential for significant savings from crude lighterings exist, however, not to the extent stated by the ACOE and subject to any increase in rates or reduction in equipment which would significantly reduce or eliminate these savings.”
 - “While Coastal understands that a deeper channel would be beneficial to some users ... Coastal is unable to support the stated savings and considers it possible that their transportation costs could increase under with-project conditions.”
 - “Coastal other main concern is with the docks and notes that ... costs associated with berth modifications necessary to accommodate deeper vessels are unknown at this time and may be prohibitive.”

(*Attached Letter 7*).

- ✓ Motiva refinery, a Delaware based facility, which was ascribed benefit in the 2002 economic reanalysis (nearly 3% of overall project benefit and nearly 5% of the oil facilities' benefit) has said that “the dredging project will increase shoaling at the refinery by a factor of 1.5 to 2.0 (Mantzanius, 2001).” As a result, their annual maintenance costs will be increased (*Attached Reports 8*) and they are not supportive of the project. The Army Corps has removed them, it seems, from the claim of benefits, but of course the added cost to the facility has not been included in the costs of the project, nor is it even discussed as a detriment resulting from the project.
- ✓ “Three oil refineries along the river won't commit to dredging their ships' berths to match the deepening of the channel to 45 feet. The largest refinery is interested but would have to blast through a granite shelf at a cost

exceeding its benefits to reach the new channel depth. The Westville-based Coastal refinery has 'no plans to deepen' the spur channel to its dock, said Greg Clock, a company spokesman. Richard H. Chlan, chief of public affairs for the Army Corps, has said depth at Coastal's docks is already 45 feet, therefore 'Coastal doesn't need to dredge.' Clock says Coastal's dockside depth is 40 feet. ... Patrick Prosser, a spokesman for Tosco refinery in Marcus Hook, PA, said 'At this point in time, (Tosco) is not committing any resources to improve the dock in order to support ships of greater tonnage.' He added that Tosco hasn't made a decision whether to dredge its berth. Claire Riggs, a spokesperson for Valero's Paulsboro refinery, said, 'Our position is if this project goes through, we'll definitely consider dredging our docks. We don't have any capital funding allocated to it, because it's not something out there for us to consider (now).' (*Attached Article 2*)

- ✓ "...the Courier surveyed the four companies that operate five Philadelphia area refineries to gauge their interest in the project. Only Valero Refining Company in Greenwich – the region's smallest refinery – says it is considering deepening its own berths to take advantage of a deeper channel. The others – Sun, the largest refiner on the river with plants in Marcus Hook, PA and Philadelphia; Coastal in West Deptford; and TOSCO in Trainer, PA – all say they have no plans to deepen berths in the vicinity of their docks." (*Attached Article 18*) "Coastal is worried deepening its berths could undermine the integrity of its docks. 'We have no plans to deepen,' said Coastal Spokesman Greg Clock.....Sun, which refines more than 40% of the crude shipped up the river, said it would have to do a detailed economic analysis to determine if the project would benefit the company, spokesman Gerald Davis said. ... TOSCO said the deepening should benefit the port in general, but the company has concerns about undermining its docks. 'We would need to do studies' ... spokesman Pat Prosser said." (Courier Post On-line, "Questions Haunt Economics of \$311 Million Dredging Project", by Lawrence R. Hajna, <http://www.southjerseynews.com/river/m041600b.htm>, April 16, 2000 – in original version)
- ✓ "The position of Sun is that due to overall concern for the economics of deepening the Delaware River to 45', the company won't support the project.... An internal Sun report estimates that Marcus Hook and Ft. Mifflin facilities would save only \$2-\$2.5M per year in crude oil lightering costs. This figure does not reflect the impact of additional berth area costs. This low figure presents no economic advantage to Sun. ... Based on actual experience when the Delaware River was dredged to 40', Sun has a significant concern over the costs to deepen their berthing/access area to 45'. A ledge of intrusive rock (granite) outcrops over one half of their berthing area. In addition they have breasting cells that sit as a gravity structure on rock at 40'. Deepening would cause these structures to become unstable and necessitate replacement. This impact would raise berthing area costs...." (*Attached Misc 44*)

- ✓ “Sun Pipe Line Company has indicated that they see no advantage to a 45 foot deepening at their facility at this time and the tanker berths will remain “as is”” (*Attached Letter 55*)
- ✓ “Sun Pipe Line Company sees no advantage to a 45 foot berth at their Fort Mifflin Terminal at this time.” (*Attached Misc 45*)
- ✓ Mobil Oil Corporation, Paulsboro Refinery, Paulsboro, NJ - “Mobil Oil Corporation has indicated that they see no advantage to a 45 foot deepening at their facility at this time and the tanker berth will remain “as is.” (*ST Hudson Engineers, Correspondence to Army Corps of Engineers, August 17, 1994*) “At this time, the tanker berth will remain “as is”. ... Mobil sees no advantage to a 45 foot berth at their facility at this time.” (*Attached Misc 46*)

And yet, despite all of this information spanning all of these years by various owners and operators that a number of the oil facilities are very likely not going to make the investments necessary to take advantage of the Deepening Project, the Army Corps has failed to provide a cost-benefit calculation that represents a scenario where one or more of the Delaware River oil facilities do not take advantage of the project.

In fact, channel deepening is not necessary for the oil facilities. Currently the oil companies effectively and cost-effectively engage in a lightering process that allows them to move full volume of the oil they need up to their facilities. In so doing they support important local jobs that are part of the lightering operations. There is no assertion that this process is in any way inhibiting the transport of oil up the Delaware River. To fully comply with the requirements of NEPA, the Army Corps must undertake – as it has entirely failed to do to date – an updated SEIS reflecting accurately the true costs and benefits of the Deepening Project.

EE. The Army Corps has Failed to Substantiate Benefits To Support the Massive Public Investment of Scarce Tax Dollars and to Justify Inflicting the Myriad Environmental and Economic Harms of the Deepening Project

The economic discussion provided by the Army Corps in its 2009 EA does not reflect the agency’s most recent discussion on the economics of the project. (*See Attached Report 28 & Report 99*). No economic analysis is provided in the 2011 Draft EA. There are multiple (3) economic reviews by the Government Accountability Office (GAO), the most recent issued March 2010, which have determined that the Army Corps’ economic claims for the project are incomplete and do not accurately reflect current conditions. (*Attached Reports 17, 26 & 27*). By way of example, but certainly not a full listing, the GAO in its March 2010 review of the Army Corps’ claims of economic benefit for the project found:

- ✓ “Because of these and other omissions, decision makers do not have sufficient updated information to judge the extent to which market and industry changes would affect the project’s net benefits.”

- ✓ “...market and industry conditions have changed significantly in ways that raise questions about the Army Corps’ project benefit estimates going forward.”
- ✓ “Consequently, decision makers do not have the updated information necessary to indicate whether the market and industry changes that have occurred would affect the project’s net benefits.”
- ✓ “The reanalysis’ crude oil benefit assumptions are not consistent with current market and industry conditions and future outlook, which raises questions about the reliability of the reanalysis’ crude oil benefit estimate.”
- ✓ “In the reanalysis, the Army Corps chose a 0.2 percent annual growth rate as the basis for its long-term forecast for crude oil imports into Delaware River ports. The Army Corps based its growth rate on the expected growth in long-term capacity for refineries in the East Coast region. This forecast came from the Department of Energy’s Energy Information Administration (EIA) as part of its Annual Energy Outlook. However EIA’s long-term outlook for East Coast refinery capacity has declined from 0.2 percent annual growth in its 2002 outlook to a 0.1 percent annual decline in its 2009 outlook, and the early-release version of EIA’s 2010 outlook has predicted a steeper decline of 2.0 percent annually.” (EIA = Department of Energy’s Energy Information Administration)
- ✓ “...instead of the ... 0.2 percent annual growth [for crude oil imports] assumed by the Army Corps, EIA’s 2009 and 2010 long-term outlooks forecasted annual declines of 1.6 and 0.4 percent, respectively.” (EIA = Department of Energy’s Energy Information Administration)
- ✓ “... according to an independent economic expert with experience analyzing the Delaware River crude oil market, demand for crude oil imports has declined in the Northeast because of high oil prices, changing consumer preferences, and gasoline imports from Europe.... In his assessment, the Army Corps’ crude oil forecasts are therefore likely outdated, and while the Army Corps’ assumptions about projected crude oil growth may have been reasonable in the early 2000s, they do not reflect current and expected future conditions. “
- ✓ “The Army Corps has acknowledged that changes since the reanalysis could affect its crude oil benefit model but has not analyzed this potential effect. “
- ✓ “[] according to OSG officials, two of the three ships in the firm’s current Delaware River lightering fleet are different from those the Army Corps modeled in its reanalysis, which suggests that fleet operating costs and other characteristics, such as pumping efficiency, may now be different. In 2010 the composition of OSG’s lightering fleet is expected to change even more from the composition of the fleet used in the Army Corps’ model, which could further influence the Army Corps’ estimate of crude oil benefits.” “The [Corps] consultant also said that changes to vessel operating costs in the lightering firm’s fleet could have a significant effect on the crude oil benefit model. “ (OSG is the firm that replaced/took over Maritrans and is now lightering in Delaware Bay.)

- ✓ “The reanalysis’ containerized cargo benefit assumptions may not fully reflect current conditions and cannot be adequately assessed without additional information.”
- ✓ “The reanalysis’ steel slabs benefit assumptions are not consistent with current market conditions.”
- ✓ “...given the market and industry changes since the modeling was performed, the benefit estimates may not be reliable.”
- ✓ “...others have suggested that a 45-foot channel would actually increase the amount of trade in the Delaware River by making its ports more marketable globally.... However, these potential benefits would need to be analyzed by the Army Corps before they could be used to support the project’s economic justification. This analysis would also need to assess the potential effect of an expansion of Delaware River trade in relation to other East Coast ports to ensure that any Delaware River benefits claimed are not merely transfers from those ports.”
- ✓ “The Army Corps’ 2008 and 2009 economic updates do not account for the market and industry changes that have occurred since the completion of the reanalysis or verify certain benefit categories that were expected to develop by 2009. ... However, neither update analyzed the extent to which changes in, for example, the market for crude oil might affect the net benefits of the project. Such information would be useful to establish whether the changes have affected the Army Corps’ estimate of the project’s economic justification.”
- ✓ “However, since the reanalysis was completed, market and industry conditions have changed significantly in ways that raise questions about the Army Corps’ project benefit estimates going forward.”
- ✓ “It has now been more than 7 years since the Army Corps has asked the refineries about changes to their facilities. Since the reanalysis, some refinery facilities have undergone significant structural and operational changes that could affect the associated costs of the project, which are the private costs that would need to be incurred, in addition to project costs, to achieve the project’s full benefits. Associated costs account for about 10 percent of the project’s total economic first costs.”
- ✓ “Officials from all three refinery firms told us that they supported the Deepening Project. However, they also told us that they would need to analyze the project’s benefits and costs for their firms to determine whether they would commit to making the improvements necessary to take advantage of the project. These improvements could be substantial: deepening their ship berths, retrofitting their docks, or expanding their storage capacity. “

The Army Corps’ representation to DNREC in that State’s permitting process that the GAO findings were merely the result of a recent economic downturn resulting in changed circumstances is a deliberate and obvious mischaracterization of the GAO’s 2010 report. A review of the quotations above and the report in total belies

the Army Corps' assertion and its obvious attempt to dismiss the findings of the GAO.

On the economic claims of the project made to DNREC, it is striking to note that, while the Army Corps includes in its benefits calculation \$464,000 for the Delaware-located Magellan facility, the Army Corps is very clear that "construction of the [Magellan] berth is not dependent on implementation of the 45-foot project" and "the Delaware River at that location is naturally deeper than 45 feet, so no additional dredging from 40 to 45 feet is necessary in order to realize benefits." (*Attached Letter 46*).

Each time the GAO has done a substantive analysis and/or public assessment of the project, the Army Corps has responded with a new review that is similarly challenged by the GAO and other economic experts. It is time that the economic assertions for the project be subjected to a full and public discussion via the SEIS process. The ongoing approach of public challenges responded to by private "redos" by the Army Corps has not ensured Congress has the full, fair, and accurate information it needs to be informed as part of the NEPA process.

FF. Economically the Deepening Project has Not Been Accurately Characterized or Assessed -- the Project Does not Provide the Public Benefit Asserted by the Army Corps.

The Army Corps has asserted that implementation of the project will result in a high level of public benefit. In the materials submitted to DNREC in 2010, the Army Corps asserted economic benefits from the project with a benefit cost ratio of 1.35 – i.e. \$1.35 of benefit for every \$1.00 invested. This is a flawed claim at best; we believe that the public record actually demonstrates that this claim is a gross misrepresentation of the project's outcomes as well as of the impacts to the public interest and to the River itself.

It is important to be clear about what form the Army Corps' claimed benefits would take in the first instance. These putative benefits are not in the form of increased jobs, goods or services, but in the form of increased efficiencies and cost savings. As the Army Corps states:

- ✓ **"the mix and volume of cargoes** coming to the benefiting terminals **will be the same for either the current 40 foot or proposed 45 foot channel** depths. The project's navigation benefits from the channel deepening are based upon transportation cost savings from more efficiently managing vessel-operating costs. There is **no induced tonnage as a result of the Deepening Project**" (*2009 Environmental Assessment*)
- ✓ "The future volume of cargo passing through the Delaware River port system is determined by macroeconomic factors that are not affected in any measurable way by the channel depth. **With the deeper channel, fewer total vessel calls will be required** because it will be possible to handle more cargo per ship." (*Attached Letter 16*)

- ✓ “The project benefits quantified include the reduced cost of transportation realized through operational efficiencies (reduced lightering and lightloading), and the use of more efficient vessels. The design vessel for the channel will not change with the proposed deepening.” (*Wetlands and Subaqueous Lands Application, 3/12/10*).
 - ✓ “A deeper channel will allow vessels to more efficiently apportion vessel operating costs over the same magnitude of tonnage, resulting in transportation savings.” (*Wetlands and Subaqueous Lands Application, 3/12/10*)
1. It is demonstrably false to assume the needed 100% participation of the primary project beneficiaries necessary to support Army Corps financial benefits claim:

According to the Army Corps, the few economic benefits claimed for the Deepening Project would be enjoyed primarily by six oil facilities. And yet, one of these claimed beneficiaries is now shut down (Eagle Point refinery) and therefore the “benefits” claimed for this facility will never be realized. Furthermore, none of the other facilities has invested in the project, some have gone on record stating it would provide them with little or questionable benefit, and none have committed to investing the tens of millions needed to deepen their private channels and modify their infrastructure to hook into and take advantage of a deepened main channel – as a result realizing the benefits for these facilities too is highly questionable.

Removing any or all of the claimed benefits for these facilities dramatically alters even the Army Corps’ claim of benefits and should be assessed. The Army Corps has failed to do a cost and benefits calculation that reflects diminishing participation by the oil facilities.

2. The Government Accountability Office (GAO) Has Spoken to the Deepening Three Times and Three Times has Questioned and Challenged Army Corps Economic Analyses and Claims:

After an in-depth review of the proposal in 2002, the Government Accountability Office (the investigative arm of Congress) determined that the U.S. Army Corps of Engineers’ analysis of project benefits was based on “miscalculations, invalid assumptions, and outdated information.” Correcting the Army Corps’ flawed analysis resulted in a reduced estimate of the project’s annual benefits from \$40.1 million⁹ to only \$13.3 million. Using the GAO’s corrected figures demonstrated

⁹ The Army Corps in 2009 reduced even its economic benefits claims for the project down to only \$30,091,000 a year, further reducing the regional benefit possibilities. As a result of its previous economic analysis, the GAO determined that the Army Corps had overstated project benefits by 3 to 1, if that past finding were applied to the \$30,091,000 figure, benefits would be even lower than the \$13 million figure from the GAO reducing even further the cents on the dollar return that would apply.

that the benefit-cost ratio of the Deepening Project was only 49 cents of benefit for every dollar spent. (*See Attached Report 27*)

In 2006 the GAO examined the Deepening Project again, using it as an example in testimony before Congress as to how the Army Corps failed to properly characterize the economic costs and benefits of its projects, and in so doing once again reviewed the flawed information put forth by the Army Corps for the Deepening Project:

- ✓ “GAO’s recent reviews of four Corps civil works projects [including the Delaware Deepening] and actions found that the planning studies conducted by the Army Corps to support these activities were fraught with errors, mistakes, and miscalculations, and used invalid assumptions and outdated data. Generally, GAO found that the Army Corps’ studies understated costs and overstated benefits, and therefore did not provide a reasonable basis for decision-making.” (*Attached Report 26*)
- ✓ “..the Army Corps’ three-tiered internal review process did not detect the problems GAO uncovered during its reviews of these analyses, raising concerns about the adequacy of the Army Corps’ internal reviews.” (*Attached Report 26*)
- ✓ “In closing, Mr. Chairman, we have found that the Army Corps’ track record for providing reliable information that can be used by decision makers to assess the merits of specific Civil Works projects and for managing its appropriations for approved projects is spotty, at best. ... the Army Corps’ planning and project management processes cannot ensure that national priorities are appropriately established across the hundreds of civil works projects that are competing for scarce federal resources.” (*Attached Report 26*)

Then again in 2010 the GAO released yet another review of the Deepening Project. The GAO’s 2010 report confirmed that the Army Corps has still failed to provide an accurate picture of the Delaware Deepening and its ramifications for the River and for its associated communities to the decision-makers being asked to decide upon and/or fund the project. For example, among a multitude of concerns documented, the GAO determined, that based on the Army Corps documents:

Because of [] omissions, decision makers do not have sufficient updated information to judge the extent to which market and industry changes would affect the project’s net benefits. (*Attached Report 17*)

After 20 years of review and no fewer than 8 economic reviews of the project by the Army Corps, there is no reasonable explanation for such unwarranted and obvious oversights and/or misrepresentations.

Together these three reports provide reviews that substantively and credibly challenge the economic claims and findings the Army Corps continues to assert for this project and demonstrate that the claims of economic benefit the Army

Corps currently makes for the project cannot stand up to accurate and/or objective review. As a result, the agency's current economic claims cannot be relied upon as the basis for accurate or informed decision-making.

3. Other expert reviews document further, and in additional detail, the economic misrepresentations and/or flawed information used to calculate project benefits by the Army Corps:

The 2008 and 2009 economic reviews the Army Corps attempts to rely upon to assert economic benefits from deepening are merely rehashes of flawed analyses conducted in 2002 and 2004. Attached are multiple reports commissioned and issued by the Delaware Riverkeeper Network and the National Wildlife Federation. Dr. Bob Stearns is a recognized expert in this field and so rather than characterize his reviews we simply attach them to this comment so the Army Corps can see directly the multiple challenges he makes to the agency's economic claims. (*Attached Letter 13; Attached Letter 16, Attached Letter 18; Attached Reports 13; Attached Reports 9*)

- ✓ A review done for State of Delaware documented additional flaws in Army Corps claims of benefits. An economic review of the Army Corps 1998 analysis conducted for the State of Delaware found numerous issues the Army Corps had not addressed or had improperly addressed:
- ✓ "NED benefits from the project likely are much overstated because an overly optimistic growth rate was assumed from crude oil deliveries...."
- ✓ "Cost savings are overstated, since many vessels (even those recently purchased) do not require deeper drafts."
- ✓ "Benefits to steel and scrap metal shipments likely are overstated."
- ✓ "Costs of dredging and (perhaps) of disposal appear to be understated."
- ✓ "The USACE does not appear to include the cost of monitoring (and possible mitigation) in estimate of NED benefits."

This study, a review of possible project benefits to the State of Delaware found:

From the perspective of the State of Delaware, we question whether the project benefits to Delaware are adequate to justify the Delaware cost share. Several of the studies supported by, or information provided by, the Army Corps assert large benefits to Delaware, but rely upon faulty concepts and methods. For example, the USACE-supported input-output analysis is not based on well-founded principles of project analysis, and it violates the USACE own principles for project assessment.

In summary, we believe that the net benefits of the Delaware River Deepening Project are overstated, and the costs are understated....

Thus, we also find no compelling evidence that the project as planned is a good investment from the perspective of the State of Delaware.

(Attached Reports 8).

To the extent that the Army Corps' economic reviews and claims all build upon one another (as discussed by Dr. Stearns and by the Army Corps themselves) the findings of Dr. Grigalunas and Dr. Opaluch still have relevance and value.

4. Even the Army Corps admitted in one of its economic reviews that under one scenario – a scenario that has in fact come to pass -- the project would generate only 82 cents of benefit for every dollar spent:

In its December 2002 Economic Reanalysis, the Army Corps makes a number of assumptions that allowed it to reach its revised but still positive cost benefit ratio for the Deepening Project. One of its key assumptions is that the lightering company OSG (formerly Maritrans) would reduce its lightering fleet from three ships to two ships:

“In the most likely base case scenario, it is assumed that the lightering company will respond to reduced lightering volumes ... by reducing lightering resources and re-assigning one of their lightering vessels to other productive uses...”

The Army Corps has acknowledged that if in fact the lightering company retains a 3-ship fleet then the benefit cost ratio is significantly diminished:

“A second alternative lightering fleet scenario assumed that the fleet size would not change and all three vessels (the without project fleet) would continue to be used under ‘with project’ conditions to service the reduced lightering volumes (31 percent lower in base year). **The benefit cost ratio for the Deepening Project falls to 0.79 in this scenario, or 0.82 with no PED costs.**” (emphasis added)

In September 6, 2005 Maritrans/now OSG announced that it had signed a contract “to build three new articulated tug-barge units, each having a carrying capacity of 335,000 barrels” in order to replace the existing 3 vessel fleet the company current uses for Delaware Bay/River lightering operations. (*See Attached Article 9*).

Maritrans'/now OSG's current, without project (as the Army Corps calls it), fleet has a capacity of 910,000 barrels. Its new fleet will have a capacity of 1,005,000 barrels. OSG/Maritrans is clearly expanding its fleet carrying capacity and is not following the Army Corps' assumed scenario. Maritrans'/now OSG's actions are most closely aligned with the Army Corps' “second alternative” described above, and in fact exceeds that alternative in terms of cost and future services.

Therefore, by the Army Corps' own admission, the benefit cost ratio for the Deepening Project is significantly less than 1 and in fact is closer to 0.79 or 0.82 with no PED costs.

Based on the above comments and references cited therein, the economic costs and benefits of the Deepening Project, standing alone, warrant a new, up-to-date SEIS to address thoroughly the true economic impacts of the Deepening Project.

GG. Deepening Will Cause Economic Harms That the Army Corps Has Never Identified, Considered or Addressed in Any NEPA or Economic Assessments by the Army Corps.

In 2009 the Army Corps reduced its benefit claims for the project and now claims only \$30,091,000 a year in benefits – benefits that come in the form of increased efficiencies as opposed to more goods or services.

The very modest economic value the Army Corps claims pales in comparison to the economic values put at risk by the Deepening Project. The \$30 million of economic benefit in the form of increased efficiencies (not jobs) claimed by the Army Corps cannot compare to the hundreds of millions a year that could be lost in river jobs and economic returns (present and future) associated with the environmental resources put at risk from the project. The Deepening Project puts at risk the fish, shellfish, wildlife and habitats that are critical for providing hundreds of millions of dollars of income and jobs in the present and future.

The Deepening Project changes the movement and balance of fresh and salt water in a way that will move the salt line up river. A multitude of species rely on the Delaware River for spawning; a changing salt line could diminish available freshwater spawning grounds that puts at risk species like the Atlantic and Shortnose sturgeon already in jeopardy of extinction. A changing salt line also risks the transformation of freshwater marshes, damaging the food and habitat they provide to a variety of fish and wildlife species important both ecologically and economically to the region. The introduction of increased contaminants into the environment and food chain effects fish, both the reality of their pollution body burden but also the perception of it by fisherpeople.

A moving salt line is a major threat to the oyster populations of the Delaware Estuary. The shifting salt line threatens significant changes including the reintroduction of parasites and disease to the River's oysters which in the past decimated their populations. Oysters are vital to the ecology of the Delaware. Oysters act as a vital food source for many of the River's critters and are important filters for pollution found in Estuary waters. Not only are the oysters of the Estuary ecologically important, but they are economically important generating up to \$80 million of economic benefit for our region.

The Delaware Bay is home to the largest spawning population of horseshoe crabs in the world. Every season, migratory shorebirds descend on Delaware Bay to feast on the eggs of the horseshoe crabs, bringing with them a \$34 million boost to the region's ecotourism industry. Estimates are that Delaware and the Delmarva

Peninsula receive \$10 to \$15 million of ecotourism value from horseshoe crabs and migratory shorebirds. Nationally, horseshoe crabs represent a substantial benefit to the biomedical industry that uses the Horseshoe Crab blood (drawn non-lethally) for required safety testing of medical devices, vaccines and intravenous drugs used by all. The Deepening Project directly threatens the horseshoe crabs and as a result is also a threat to dependent migratory birds and associated ecotourism; and is an unacceptable risk to the biomedical industry.

The Deepening Project changes water patterns in such a way that it will exacerbate erosion of wetlands. Wetlands are important ecologically, aesthetically and provide important protection during catastrophic storm events.

As a result of the pollution, habitat degradation, changed circulation patterns, sedimentation ramifications, salt line effects, and other direct and indirect effects described in this comment, a wide variety of fish, shellfish, and other wildlife important for Delaware's and the region's economies will be harmed. As a result, the Deepening Project puts at risk the fish, shellfish, and wildlife that are critical for providing hundreds of millions of dollars of income and jobs.

The harms to recreational, economic and job interests of the public are significant considerations.

The Deepening Project will directly and interfere with the rights of the residents of the Delaware River Basin and all Americans to benefit from the healthy quality and ecosystems of the Delaware River. It interferes with the rights of individuals and their associated benefits to earn ongoing, stable and growing incomes and quality of life benefits from the River.

For instance:

- ✓ The annual harvest of oysters from the Delaware Estuary generates up to \$80 million of annual economic benefit for the region, much of this in some of New Jersey's poorest communities who could not tolerate the loss of associated jobs, revenue and benefit. In recognition of the economic, job and cultural importance of the Delaware Estuary's oysters they have been the recipient of over \$6.5 million of public restoration funds and resources. (See Letters 26, 41, 43 & 44)
- ✓ The \$34 million ecotourism industry dependent upon the horseshoe crabs and migratory shorebird phenomenon of the Delaware Bay, providing crucial support to local economies in the off-season, including the related jobs such as the documented 120 to 180 associated jobs in Cape May, NJ alone. (*Attached Report 54*)
- ✓ The \$150 million of annual revenue and social welfare value from the horseshoe crab-dependent biomedical industry to whom one pint of Horseshoe Crab blood is worth \$15,000 for required testing on medical devices, vaccines and intravenous drugs used by all. (*Attached Report 73*)

- ✓ Spending in the estuary region by recreational anglers valued at an average of \$62 to \$100 per day, and the almost \$60 million of spending from fishing in Delaware's waters resulting in \$29 million in earnings, and supporting 1,605 jobs. In that same year, 950,000 people spent more than \$630 million fishing in New Jersey's waters, resulting in \$400 million in earnings, and supporting 16,750 jobs. (*see Attached Report 37*)
- ✓ Historically Delaware River sturgeon fueled a massive caviar industry, generating a wealth of economic income and jobs for the region – at one time, 75% of the sturgeon harvested in the United States came from the Delaware River. \$16.4 million worth of sturgeon were caught along the East Coast in 1890, when the industry was operating full-bore -- most of that came from the Delaware. \$16 million today is worth over \$422 million using the Consumer Price Index. (*Attached Report 12*)

These jobs, this revenue, and the community economies dependent upon them are important to our region – and they are all put at risk by the Deepening Project. If the Deepening Project were to harm even one of these industries, the annual economic harm could well overshadow the claimed economic benefits of the Deepening Project. This significant harm – environmental, cultural and economic – requires a new and up-to-date NEPA assessment in the form of an SEIS.

See attached fact sheet for additional information on economic harms as well as the sources documenting the numbers provided *Attached Report 19*.

The Deepening Project also damages the cultural, social and other elements of the Delaware River important for attracting and sustaining economic development in our region. For more information on the many ways the Delaware River, when healthy ecologically, supports jobs and economies see attached *River Values Report* issued by the Delaware Riverkeeper Network, 2010. (*Attached Report 20*)

HH. The Deepening Project is Unnecessary for Port Economic Growth.

The Army Corps' claims of public benefit are clouded at best, unsubstantiated in the middle, and flat out not true at worst. But in any instance, the information provided by the Army Corps does not provide the level of demonstrated public benefit needed to support the level of public, economic, and environmental harms that will result from implementing the Deepening Project.

1. No Benefits to Delaware:

Beyond Magellan LP discussed above, there are no Delaware facilities considered by the Army Corps as beneficiaries from the Deepening Project in the State of Delaware. None of the Delaware facilities DNREC asked about (Port of Wilmington, the Delaware City Refinery, the Sunoco Refinery, Oceanport Industries, General Chemical, Delmarva Power and Light, the Logan Generating Station, and the DuPont Edgemoor and Chambers Works facilities), according to the Army Corps,

will benefit from the Deepening Project. In fact, the Delaware facilities are so unlikely to receive any benefits from deepening that the Army Corps says

there is no rational economic basis to postulate that they will dredge their access channels/berthing areas to 45 feet. (*emphasis added*). (See Attached Letter 46)

A previous Delaware-sponsored study found:

- ✓ “From the perspective of the state of Delaware, we question whether the project benefits to Delaware are adequate to justify the Delaware cost share. Several of the studies supported by, or information provided by, the Army Corps assert large benefits to Delaware, but rely upon faulty concepts and methods. For example, the USACE-supported input-output analysis is not based on well-founded principles of project analysis, and it violates the USACE own principles for project assessment.”
- ✓ “In summary, we believe that the net benefits of the Delaware River Deepening Project are overstated, and the costs are understated.... Thus, we also find no compelling evidence that the project as planned is a good investment from the perspective of the State of Delaware.”
- ✓ In the course of their analysis this report also considers a DRPA sponsored study regarding benefits of the project for the State of Delaware. The report largely dismisses the DRPA study as not helpful due to a number of serious shortcomings in the study methodology and approach.

(Attached Reports 8).

2. Port operations and growth elsewhere on the Delaware River are continuing despite the lack of a deepened channel or the questionable prospect of there ever being one:

Record port growth continues to take place along the Delaware without a deepened channel, or the imminent prospect of one.

For the year ending December 31, 2007, the Port of Camden recorded its third-highest volume in its history. In the Summer 2008, the Philadelphia Regional Port Authority reported that containership traffic in the region was up 12% over 2006 levels.

Since 1990, the Port of Philadelphia has seen its container port traffic grow by nearly 300%. This growth has come despite the channel not being deepened and the likelihood that the Deepening Project may never come to pass because of the stiff opposition it faces. Similarly, the Port of Wilmington has grown nearly 200% in container port traffic since 1990 without the “benefit” of a main channel deeper than 40 feet. By contrast, in 1990 the Port of Baltimore was deepened to 50 feet. Since that time, Baltimore has experienced growth of only 29% in container port traffic, a fraction of the growth experienced in our region.

Even according to experts commissioned by the Ports of Philadelphia and Camden: at 45 feet the Delaware does not become more attractive because 40 feet is not enough depth. Rather, the future of our region is as a feeder port which is well-served by a 40 foot channel; specifically, they said:

The growing importance of feeder ports is a role that is emerging for the Ports of Philadelphia and Camden. The vessels that are becoming available for the feeder trade require less than 40' draft. (*Attached Reports 4*).

This is the true future of ports of the Delaware River. Continued focus on the Deepening Project is preventing exploration of new ideas that truly could benefit the future of our ports and our region.

Attached are a series of newspaper articles that document new deals and growth that have occurred based on a 40-foot channel and demonstrating that the Deepening Project is not needed to grow the ports. (Labeled as *Attached Article 7*). The New Sydney Harbour Deal discussed in these articles is the playing out precisely of what the four consultants brought in by the Ports of Philadelphia and Camden recommended as a best future of the ports of this region, to operate as niche ports for a mega-containership hub that will be stationed elsewhere on the East Coast. (See *Attached Reports 4* for Ports of Philadelphia and Camden document).

And there continue to emerge other ways for the ports to grow that don't require a deepened channel and in fact are a carrying out of the niche port/hub and spoke vision experts have identified for the Delaware River ports. There is a brand new proposal to bring more cargo and jobs to Delaware River ports -- while keeping Philadelphia's one remaining shipyard in business.

American Feeder Lines intends to order ten ships for an American "hub and spoke" container service. Linking ports from Maine to Texas, this "marine highway" would transfer cargo from a large international container port to smaller ships for cost efficient distribution, avoiding the mounting congestion and infrastructure needs now plaguing rail and truck movement. Investment of our tax dollars in this model -- successful in Europe with 40% of all container cargo and in the Far East with 63% -- can bring the desired jobs for much less public investment and with a much smaller cost than the Deepening Project with its increased maintenance dredging for a 45' or 50' channel. At the same time it can protect the 7800 jobs dependent on the Aker Philadelphia Shipyard. (*Attached Articles 10 and 11*).

Additionally, other press reports in previous years on the ports and port growth include:

- ✓ August 9, 2001- Sunoco began using the largest ship ever in the port of Philadelphia to transport crude oil up the Delaware River. The new vessel is designed to float higher in the water and can travel up the Delaware's 40-

foot deep shipping channel with more crude on board than other tankers.
(*Ship Brings More Oil Farther Upriver*”, *Philadelphia Inquirer*)

- ✓ August 8, 2003 - Joe Balzano pointed to a 23% increase in plywood tonnage over the previous year coming into SJPC in Camden. (*Camden's Plywood Port Stacks up as Tops in US*”, *Courier Post*)
- ✓ August 21, 2003 - A new 50,000 square foot processing plant at SJ Port Corp, Camden, to process 1 million pounds of cashews each year. Nutsco, the importing company, signed a 20-year lease with SJPC. (*Importer's New plant will process cashews*”, *Courier Post*)
- ✓ Friday, Oct 2, 2003 -- SJ Port Corp announced international business opportunities are increasing along the Delaware River. Industry leaders announced record high freight and passenger traffic, a 13% increase over the previous year. (*Delaware River ports Traffic Booming*”, *Courier Post*)
- ✓ March 20, 2005 - DRPA invested \$15 million to create a festive functional terminal for cruise ships on the Philadelphia side of the River. Royal Caribbean, Norwegian, Celebrity, Deutschland, Radisson Seven Seas, Seabourn and Silversea are all cruise operators that have made Philadelphia a port of call. (*Sea Cruises in growth mode*”, *Courier Post*)
- ✓ April 14, 2005 - Del Monte Fresh Produce opened a third refrigerated warehouse in Camden. SJPC agreed to build it for them for \$5 million and Del Monte agreed to lease it for 20 years. It pays the port \$1.6 million in rent and employs 26 full time workers. (*Fresh Fruit a Port Staple*“, *Courier Post*)
- ✓ August 10, 2005 – “Through June 30, total cargo at the port reached 1.81 million tons, an increase of 8 percent over 2004 when the mid-year figure came in at 1.68 million tons, and far eclipsing the 2003 mid-year result of 1.56 million tons of cargo.” (*Mid-year figures point Port of Camden to third consecutive record year*”, <http://www.southjerseyport.com/news.asp>)
- ✓ August 10, 2005 -- “In my many years at the port I have never seen the demand for port access that we are experiencing today,” said Joseph A. Balzano, executive director of the SJPC with over 50 years tenure at the port. “ “There are significant increases in several cargo categories including steel, cocoa beans, scrap and Grancem, while containerized cargoes more than doubled from 77,847 container tons in the first half of 2004 to 167,564 container tons through June 30 this year, including all containers into and out of the port.” Balzano said, “The infrastructure investments we have made and continue to make at the Port of Camden are being rewarded by increased business that sustains good jobs at the port and at related businesses in the City of Camden, where the port is the largest source of private sector employment and business expansion.” (*Mid-year figures point Port of Camden to third consecutive record year*”, <http://www.southjerseyport.com/news.asp>)

- ✓ February 1, 2006 – “The South Jersey Port Corp. Tuesday posted record tonnages and earnings for 2005. Total cargoes, including imports and exports, reached 3.6 million tons in 2005, a 3.5 percent hike over last year. Revenues increased to \$23.6 million from \$21.5 million, with net earnings rising to \$3.7 million from \$3.4 million.” (*Record Year for South Jersey Port*, *Courier-Post*)
- ✓ February 2, 2006 – The South Jersey Port Corporation signed an agreement to construct docks and covered storage in Paulsboro, NJ. As a result Paulsboro “is on its way to becoming an international port on the Delaware River.” The Paulsboro waterfront has a natural depth of 35 feet and would therefore require minimal maintenance dredging. It is predicted the new docks will serve cargo of ships, building materials, chemicals, consumer products and military equipment from around the world. (*Agreement is Signed to Build Paulsboro Port*, *Courier-Post*)
- ✓ August 19, 2006 – Port of Camden received its largest load of plywood ever. “Increasing plywood imports are part of the reason the Camden port is on pace to break a record for cargo this year, according to Joseph A. Balzano, executive director. Last year, the port received cargo totaling 3.5 million tons. Wood products coming into the port from January through July increased more than 20 percent over the same period last year, he said. ‘The arrival of the Maroudio underscores the vitality of the Port of Camden and its position as the number one plywood port in the United States,’ said Balzano.” (*Plywood Pushing Port to Record*, *Courier Post*)
- ✓ December 31, 2007 – During 2007 the Port of Camden recorded its “third-highest volume in its history.” Despite the ailing economy and a nationwide decline in cargoes, in 2007 the “Port of Camden recorded an encouraging 2.8 percent increase in bulk cargoes ... a 3.2 percent increase in export containers and a 5.8 percent increase in important containers.” (*South Jersey Port Corporation 2007 Annual Report*)
- ✓ January 28, 2008 – The Philadelphia Regional Port Authority announced that a German-based carrier specializing in the transport of breakbulk, Rickmers Linie (America), Inc., was now regularly calling on the Tioga Terminal in Philadelphia. PRPA was expecting upwards of 40 vessel calls during the year. The increased traffic would increase export cargo activity for the port. Rickmers vessels on the ‘Pearl Strong’ service also have an 1800-TEU container capacity, allowing for container activity when required. A typical Rickmers call at Tioga involves substantial breakbulk/project activity, often with a rail component, and some additional container activity.” (*PRPA Press Release, Philadelphia Regional Port Authority Welcomes Rickmers-Linie to Tioga Marine Terminal; Major Increase in Exports and Rail Activity Among Benefits of New Services, Jan. 28, 2008*)
- ✓ Summer 2008 – Philadelphia Regional Port Authority reported that “container traffic at the Port of Philadelphia was up over 12% in 2007,

compared to 2006 levels.” (*Container Traffic Up, PortWatch, PRPA Newsletter Issue #25, Summer 2008*)

- ✓ February 2, 2009 – the Courier Post reported that the South Jersey Port Corp signed an agreement to build new docks accommodating ships up to 1,000 feet long and two million square feet of covered storage in Paulsboro. The new marine terminal could cost about \$185 million to build, could create 2,500 local jobs and result in \$2.5 million a year in new income.
- ✓ February 28, 2009 – the Courier Post reported that Camden International Commodities Terminal spokesperson said 160,000 tons of cocoa were imported in 2008.

(Other articles about the growth of the ports that is taking place without a deepened channel can be found at Attached Article 16)

3. The Deepening Project is not needed for Delaware River ports to remain competitive and to grow:

According to consultants hired by the Ports of Philadelphia and Camden, a deeper channel is not needed for Delaware River ports to remain competitive. In a report of their findings it states:

- ✓ “If Ports of Philadelphia and Camden terminals have all the elements in place – deep draft channel, deep water berths, adequate cranes and terminal facilities, and an efficient intermodal rail yard – no one can guarantee that the post-panamax container ships will ever call at Ports of Philadelphia and Camden terminals. In the meantime, the Port can accommodate the majority of the existing and newly-constructed container ships that are in service today and for the foreseeable future.” (*Attached Reports 4*)
- ✓ “For the foreseeable future, most of the breakbulk vessels in the world fleet will require water draft of 40’ or less.” (*Attached Reports 4*). “The growing importance of feeder ports is a role that is emerging for the Ports of Philadelphia and Camden. The vessels that are becoming available for the feeder trade require less than 40’ draft.” (*Attached Reports 4*)

The success of the Delaware River ports lies in developing themselves as a strong niche port:

- ✓ “The growing importance of feeder ports is a role that is emerging for the Ports of Philadelphia and Camden. The vessels that are becoming available for the feeder trade require less than 40’ draft.” (*Attached Reports 4*)
- ✓ “Delaware’s maritime future centers on the high value of North/South trades. Land area on the Delaware River can be developed to sustain a larger amount of niche cargoes in these trades which will not need a deeper

main channel. Public funds should be directed to developing these niches.”
(*Attached Reports 5*)

- ✓ “Smaller niche ports, on the other hand, are a far less costly and risky proposition if the natural advantages are not present.” (*Attached Article 1*)
- ✓ “In some cases, the mega-port might make sense. In most cases, however, a small niche port will be more successful as well as less costly to develop.” (*Attached Article 1*)
- ✓ “Only a handful of ports will emerge as container load centers in the future. Their emergence will be based largely on the factors I have outlined, and not on incentives.” (*Attached Article 1*)
- ✓ “As the East/West Atlantic container trades evolve to 4,000 to 6,000 TEU container carriers in the coming decade, these very large deep draft vessels ... will serve only one, two or three ports on the East Coast of the United States and Canada. These high-speed high cost ships will shuttle between a couple of these ports and a similar number of hub ports in Europe able to accommodate these ships with drafts of 50 feet or more. This will lead to increased use of feeder carriers to distribute containerized cargo to the smaller ports like Philadelphia and Wilmington, Delaware. The candidate main ports for this generation of container ships are Hampton Roads, Virginia, Halifax, Nova Scotia, Charleston, South Carolina and possibly New York.” (*Attached Reports 5*)
- ✓ Virtually all shipping companies say they will still have to off-load cargo in the lower Delaware Bay regardless of an additional five-foot channel depth. (*Attached Article 2*)

The Delaware River Ports are not likely to attract the deep-draft mega-container vessels. The mega-container ship owners/operators require large proprietary terminals that the Delaware River ports cannot provide.

- ✓ “The trend is toward carrier control of terminals. Port authorities can expect to get beat up by carriers that want preferential use or license agreements, to gain control over terminal availability and activities. Also, more and more alliances will lease or own their own terminals.” (*Attached Reports 4*)
- ✓ ‘A successful transshipment port must have substantial backland storage area for containers. A decade ago, a large container terminal would have been about 100 acres. Transshipment terminals under construction today range from 200 to 300 acres each.’ (*Attached Article 1*)
- ✓ “In order to handle this crush of traffic, modern-day container terminals must have 50 to 75 acres of back land per ship berth. Those with terminals with three or four berths require at least 200 acres.” (*Attached Article 8*)

A channel depth of 45’ is not enough to satisfy the demands and needs of the mega-containerships.

- ✓ “For post-Panamax vessels with a 42’ max draft, the normal design mean low water should be 46” (*Attached Reports 4*)
- ✓ “Ports that do not have channel depths in excess of 45 feet, and those without the financial resources to provide adequate road, rail, and terminal infrastructure, will be relegated to feeder port status.” (*Attached Article 8*)
- ✓ “They [mega-container ship operators] will also put greater pressure on some ports to deepen their channels to as much as 52 feet.” (*Attached Article 8*)

Terminals servicing the mega-container vessels need to be located near shipping lanes, not 108 miles from the sea as is the case with the Delaware River ports.

- ✓ “A key item on the list is geographical location. A regional transshipment port must be positioned for minimal deviation from the trade lane it serves. It must be in proximity to secondary ports along the route. For example, it should not require sailing upriver or up a lengthy coastline away from the main route.” (*Attached Article 1*)

Project supporters attempt to make many claims of benefits for the ports and for jobs. They assert that the Deepening Project’s primary beneficiaries are not the oil companies. But these claims cannot be reconciled with the Army Corps’ findings to the contrary and those of the GAO. If the primary beneficiaries are other than the oil companies why does the Army Corps never make that finding, in all of their economic reviews, and why has the GAO not issued a finding/concern in any of their reviews of the Army Corps’ economic reports that limited benefits claimed for other industries is a shortcoming?

II. Other Alternatives Can Best Support the Goals of Deepening Without the Harms It Will Cause; The Army Corps Has Failed to Accurately Assess these Options.

As the Army Corps has said:

- ✓ “**the mix and volume of cargoes** coming to the benefiting terminals **will be the same for either the current 40 foot or proposed 45 foot channel** depths. The project’s navigation benefits from the channel deepening are based upon transportation cost savings from more efficiently managing vessel-operating costs. There is **no induced tonnage as a result of the Deepening Project ...**” (*the Army Corps’ 2009 Environmental Assessment*)
- ✓ “The future volume of cargo passing through the Delaware River port system is determined by macroeconomic factors that are not affected in any measurable way by the channel depth. **With the deeper channel, fewer total vessel calls will be required....**” (*Attached Letter 14; this same perspective also included in Attached Letter 46*)

There are existing and proven alternatives that can accommodate the transportation of an equal volume of goods to and from Delaware River ports.

The primary beneficiaries of the Deepening Project are the oil facilities – over 50% of the benefits accrue to this industry if they choose to make the private channel deepening and infrastructure investments needed to do so (which is highly questionable, and I would posit is not likely based on the evidence on the record and in this comment). But they have another existing, used, cost effective, and successful strategy for accomplishing their goal of delivering, at full capacity, the volume of oil they can and do process at their plants. It is a process called lightering. Lightering is the process used today to move oil up the Delaware River to the oil refineries that continue to operate at capacity. There is no shortage of oil transportation up the River – lightering is a proved, proven, used and successful non-structural alternative that currently fulfills the needs of the oil facilities at reasonable cost. Lightering is a process that can allow for growth – if there is a need for a greater volume of oil then it simply might mean a greater volume of lightering, but it does not result in an impediment to bringing that volume up the River to its final destination.

Container vessels too can avail themselves of an existing and used alternative, and that is the adjustment of how and in what combination of vessels they bring goods to the ports of the region.

In addition, it is important to note that the Deepening Project does not replace the need for lightering, it merely reduces it. But there are also other ways to accomplish this goal. For example, in 2001, Sun Oil put into operation a shallow draft crude carrier. The vessel, a Stena Vision, carries “more crude oil than any other ship in the river’s history” – the tanker design allows cargo intake to be increased up to 70 to 100% more than Suezmax tankers. “This results in extremely competitive transport economy to ports with draft restrictions, with potential savings of 15-30 cents per barrel.” The vessel, which has a design draft of 16.76 m (nearly 55 feet) floats higher in the water and allows more oil to be carried directly to the refinery thereby reducing or avoiding altogether the need for lightering. These shallow draft vessels have double hulls and therefore are also safer from an oil spill perspective. (*Attached Article 6*). These vessels allow oil refineries to carry more oil up the River at lower cost with lessened and/or no lightering, just as a deepened channel, to some extent, offers.

JJ. Specific criticisms of some of the “new” studies the Army Corps is relying upon to move this project forward.

Here we provide some specific comments on some of the specific studies the Army Corps put forth at the time it was creating its 2009 EA.

1. General Criticisms:

Oyster studies were undertaken not to identify potential threats to oysters for purposes of determining whether undertaking the Deepening Project was a wise

decision, but merely to collect data to assess what was happening to the oysters as the Deepening Project progressed. The goal was not informed decision-making, but rather after-the-fact mitigation. The same can be said for the Kelly Island studies.

Concerns and deficiencies regarding the species specific studies and water quality studies have been articulated throughout this comment document.

The language used by the Army Corps to describe the new studies in the past, e.g. “Water quality modeling efforts to obtain additional information “to confirm that the project would not adversely impact water quality with regard to dredging and placement” and “Collection of sediment data and water quality monitoring of maintenance dredging to provide further validation of previous findings” supports the notion that much of the work conducted by the Army Corps with regard to the Deepening Project has been carefully designed to achieve a pre-determined outcome, rather than obtaining objective information for an objective decision-making process. (See USFWS letter, *supra*, recommending modification of certain Corps language because, “As written, the statement appears pre-determining.”)

The myriad deficiencies in the Army Corps’ more recent studies used to support the 2009 EA findings include, but are not limited to, the following: Most of the studies are already dated; they have not been subject to public, agency or expert review and input; they fail to address directly the questions and concerns raised by the variety of agencies and experts cited previously in this comment; and they fail to answer the critical questions that need to be answered for informed decision-making under NEPA and other applicable legislative and regulatory programs. Additional deficiencies in each of the studies are exemplified below; this is not a complete identification of questions, problems and concerns, but merely a demonstration of the wealth and variety of deficiencies in the Army Corps’ NEPA analysis and underlying scientific evidence.

2. Preconstruction Oyster Studies to assess condition of oyster populations prior to Deepening Project construction:

The Pre-Construction Oyster Study, according to the Summary Document, was not to identify potential harms to oysters from the Deepening Project, but merely to assess the condition of the oyster populations prior to construction of the Deepening Project. Thus, this study is unlikely to provide the kind of information needed for informed NEPA review or decision-making.

The Pre-construction Oyster Study is also outdated and needs peer review. For example, the assumptions used for sea level rise are significant. As this study was undertaken in 2000-2001, it obviously did not include the 2005 and 2008 sea level rise studies and reviews that have been released and the new information that has come forth since that time. (See *previous section of this comment discussing more applicable sea level rise figures*). These more recent figures are based on a new and more substantive body of science with regards to potential sea level rise and therefore are likely to be more informed and accurate figures for such a review.

In addition, the study could not possibly have included or anticipated the new Flexible Flow Management Plan in place for the New York City reservoirs as that effort was initiated only in recent years. And the study fails to consider the massive influx of natural gas drilling and the massive volumes of freshwater consumption it will entail. And yet, the freshwater flows from the NYC reservoirs and the nontidal section of the River are important in the location and assessment of the Estuary salt line, including its proximity to, and affect upon, the oyster populations of the Bay.

3. Species-specific studies for blue crab, horseshoe crab, *Sabellaria vulgaris*, shorebirds and sturgeon are needed to address habitat utilization and verify previous findings:

The Delaware Bay Winter Crab Surveys were conducted with data collected in the winter months of 2001 and 2002. Like so much of the information the Army Corps is referencing in this most recent public notice, the data is relatively outdated. In addition it is study and analysis that has not been subject to full agency, expert and/or public review and comment.

The findings of the Winter Crab surveys did demonstrate the presence of crabs in the main navigation channel. It talked about abundance of crabs being higher in areas that had not been subjected to maintenance dredging. There are areas of the channel that are naturally deeper and so do not undergo dredging or as frequent dredging. Going from 40 to 45 feet will increase the surface area of navigation channel that will need to be dredged repeatedly and therefore will increase the number of crabs affected; while the 2002 study focused more on these spatial differences the data in fact seemed to suggest that there would be a greater take as a result. And there does not appear to be a focus on the impacts of the loss of crabs to population, reproduction, species diversity and survivability – the greatest focus is on the distribution of the crabs, where they are located on the bay bottom as opposed to what would the ramifications be to the population by the increased volume of crabs the Deepening Project is likely to take on a repeat and regular basis.

While to the Army Corps a take of 22% of the crabs may not sound high; to the crab population this volume of take could have significant impacts. Study needs to consider the population effects in order to be truly helpful in understanding impacts and to support informed decision-making. In addition, the study was based on a limited data set, two years of data, with no discussion as to annual conditions that may have affected the location of the crabs during the limited period of the study. More frequent sampling and annual studies would be required to determine if the data obtained is representational of normal conditions.

The goal of the Kelly Island study in 2001 was not to further assess environmental ramifications of the proposed Deepening Project, but was merely to “provide a baseline ecological characterization of Kelly Island habitats prior to construction activities...” Again, this was not a study released and subjected to a full and informed review process, but was simply an Army Corps effort to collect data for assessing its Deepening Project after the fact.

The 2001 Preconstruction Shorebird Monitoring Study is, at this point, quite outdated. There has been a tremendous volume of research done on the horseshoe crabs and migrating shorebirds in the Delaware Estuary and Bay, but this study reflects none of that research. Since 2001, there have been and continue to be tremendous changes in the horseshoe crab and shorebird populations of the Delaware Bayshore in both number and location. Those changes have been recorded and studied by numerous experts, including an international group of ornithologists that gathers annually on the Delaware Bayshore to conduct research and collect data on the status of the horseshoe crab and shorebird populations.

The 2001 Pre-Construction Horseshoe Crab Egg Density Monitoring Study is also, at this point, outdated. Since 2001, as noted previously, there have been tremendous changes in the horseshoe crab and shorebird populations of the Delaware Bayshore. Those changes have been recorded and studied by numerous experts. None of that research and data is reflected in the Horseshoe Crab Egg Density Study.

The 2004 Horseshoe Crab Monitoring Study is also outdated. Events on the ground with regards to horseshoe crabs and dependent shorebirds are changing swiftly. Experts are monitoring and counting both the crabs and the birds annually, carefully tracking their behaviors and numbers. A 2004 study is not up-to-date and does not present the most current information and analysis available and necessary for making informed decisions on species that are already significantly depleted and at high risk from additional harms.

The goal of the 2004 Horseshoe Crab Monitoring study, as with previous studies, was to gather “baseline information of horseshoe crab use of the islands prior to reconstruction and to provide a means to compare post-construction conditions to gauge the effectiveness of the beneficial use of sediments.” The Study was not an analysis of the population harms (to horseshoe crabs and/or dependent migrating shorebirds) of the proposed spoil disposal activities proposed. As such, the Study does not address the array of concerns presented by other agencies and experts. Very obviously, the study fails to include the ramifications of proposed efforts on Broadkill Beach, part of the Army Corps’ project dredge spoil disposal plan. (As stated in the Army Corps Summary document “The principal objective of this study was to evaluate horseshoe crab spawning on Egg Island, New Jersey and Kelly Island, Delaware).

While this unreviewed project suggests that “impacts to horseshoe crabs will be unavoidable for at least one spawning season,” it fails to analyze the ramifications of such a loss of eggs to shorebirds that are already on the brink of extinction as the result of their inability to find enough horseshoe crab eggs to fuel their annual migration. It also fails to directly state that to undertake this effort as proposed requires violating biological windows that would be put in place for the Deepening Project. And it fails to address the concerns raised by the USFWS and DNREC regarding impacts and/or lack of benefits to horseshoe crabs as discussed in this comment letter.

The *Sabellaria vulgaris* monitoring studies confirmed the presence of *Sabellaria vulgaris* at proposed spoil disposal locations and confirmed that the *Sabellaria vulgaris* populations would be buried and thereby destroyed as a result of the project as proposed. These studies confirmed that as a result there would be a “substantial loss of this habitat.” One study then proposes 3 mitigation options, but no supporting data or research are cited in support of the untested mitigation actions. In addition, the cost of these plans has not been included in the cost of the Deepening Project. And it does not appear that those agencies who should be involved in reviewing this project ever were – for example, NMFS, which is responsible for consultation regarding Essential Fish Habitats.

The Winter 2005 Adult and Juvenile Sturgeon Survey did confirm the presence of sturgeon in the region of the River where blasting is to occur, during the time of year when the blasting would happen. The Army Corps Summary takes great pains to minimize these findings by asserting that “large aggregations of sturgeon do not exist in the blasting area” although it does acknowledge that “impacts to even a small number of Shortnose or Atlantic sturgeon may not be acceptable to fisheries agencies.” The summary of the study in the Summary Document concludes that measures would be required to move fish away from the blast zone.

What this summary fails to state is that the report also stated “At present, there is no ‘out-of-the box’ behavioral deterrent system for excluding sturgeon from an underwater blasting area.” The sturgeon study fails to discuss the very low numbers of Atlantic sturgeon surviving in the River – as few as 300, maybe even 100, as discussed in this comment – and the potentially devastating consequences of killing even a small number of Atlantic sturgeon. Further, this study was based on one winter’s data; this is not a large data set upon which to be making decisions regarding activities that could have such large and irreparable impacts to both the shortnose and Atlantic sturgeon species in the Delaware River. Finally, the Delaware, New Jersey and federal resource agencies that have questioned the level of threat and harm the Deepening Project could pose for sturgeon in the Delaware River were not a part of this commissioned study.

4. Water quality modeling and sediment data collection to obtain additional information “to confirm that the project would not adversely impact water quality with regard to dredging and placement” and “to provide further validation of previous findings”:

The Army Corps’ efforts notwithstanding, the 2003 and 2005 data collection by Versar in support of navigation channel maintenance work cannot be used by the agency in support of the Deepening Project. In its correspondence to the Army Corps dated August 25, 2009, New Jersey documents the deficiencies in this attempted use, including that: the samples were not collected from new work dredging areas that are part of the Deepening Project; the Army Corps failed to compare the data to the appropriate current requirements; and the Army Corps failed to undertake the appropriate elutriate, leaching and biological analyses required by New Jersey. Further, because when analyzing its findings the Army Corps failed to consider the volume of sediments in the samples versus the volume of sediments in the project total, they failed to recognize that “the small number of

criteria exceedances noted in the April 2009 EA may, in fact, be indicative of large (but as of the present date undetermined) volumes of contaminated sediment.” (*Attached Letter 17*).

New Jersey DEP’s analysis of the Versar 2003 and 2005 samples found exceedances or potential exceedances of the New Jersey Residential and/or Non-residential Soil Remediation Standards for compounds of concern including thallium, vanadium, heptachlor epoxide, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenz(a,h) anthracene. Further, “the data for Aroclor PCB-1221 indicate possible exceedances of the Residential Soil Remediation Standard for total PCBs in 14 of the 15 collected samples.” (*Correspondence, Attached Letter 17*). “Some of the samples analyzed within Reach C of the Project ... exceed New Jersey’s Non-residential Soil Remediation Standards for arsenic or benzo(a)pyrene. Most of the samples collected within Reach C potentially exceed New Jersey’s Residential Soil Remediation Standards for PCBs.” (*Attached Letter 17*).

It is clear to New Jersey DEP that Versar’s “2003 and 2005 data do not support the findings of the 1997 SEIS.” Their data found that a number of contaminants such as zinc, thallium, arsenic, beryllium, chromium, copper, nickel, lead and mercury have increased in areas of the River since the early 1990s. (*Attached Letter 17*).

Now, there is new data and information from New Jersey DEP documenting that pollution has resulted from Reach C spoil disposal; and the Army Corps has acknowledged that, in fact, there is a much greater spoils volume associated with the Deepening Project than the agency had previously calculated or assumed and upon which it has made its many assessments.

The Army Corps “based on apparent misinterpretation of the NOAA Injury Assessment” regarding the Athos I oil spill dismissed this spill as being of no concern regarding water quality issues and the Deepening Project. But the data collected during that assessment were limited in their overview of the degree and spatial extent of oiling. The Army Corps failed to evaluate the sediment that would be dredged during the Deepening Project and did not consider potential effects from dredging and dredge spoil disposal. Thus, it is wholly inappropriate to use the NOAA assessment of the spill as in any way addressing the potential impacts from the Deepening Project. (See discussion in *Attached Letter 17*). The DRBC also believes that evaluation of the sediments and residual oil from the Athos I is an issue to be addressed. (*Attached Letter 10*).

DNREC has done its own sediment sampling in portions of the River. With regards to Reach E, its data seems to contradict the findings of the Army Corps, leading DNREC to question the Army Corps’ findings. (*Attached Letter 34*). This contradiction, along with contradictions on other data sets with other agencies, adds to the body of knowledge that calls into question a great many of the Army Corps’ claims and scientific findings on this project. There are simply too many anomalies and inconsistencies, as well as contradictory information and data on too many fronts from the economic through the scientific.

In June 7, 2010, DNREC issued an analysis, “An Evaluation of Toxic Contaminants in the Sediments of the Tidal Delaware River and Potential Impacts Resulting from Deepening the Main Navigation Channel in Reach C.” (*Attached Report 79*). We anticipate the Army Corps is going to rely on some of the findings in this study to justify their claims of no water quality impacts from the Deepening Project, but such an effort would be misplaced, and in fact the release of this report bolsters the need for an updated SEIS. First, we note that while the DE Toxic Evaluation Report claims that it can be rationally extrapolated to issues in Reach E, this is countered by the fact that just one week later, DNREC questioned Army Corps data with regards to Reach E, thus suggesting extrapolation would not be wise and also suggesting that if there are questions about Reach E data there may very well be concerns about Reach C toxics data yet to be forthcoming from the Army Corps.

Second, the DE Toxic Evaluation Report draws as a conclusion that placement of Deepening Project spoils in CDFs will not raise health risks regarding metals or PCBs. But this conclusion flies in the face of the actual data set provided by the Army Corps and reviewed by NJDEP that shows that, in fact, there are pollution concerns with Reach C sediments from their disposal in a CDF – the actual data demonstrates flaws in the DE Toxic Evaluation Report conclusions.

Third, with regard to CDF disposal, the report presumes proper operation of a CDF, but we know from the Fort Mifflin and Money Island data discussed above that CDFs are, in fact, a significant and ongoing source of heavy metal and toxic contamination; coupled with the NJ Killcohook findings, this also counters claims and conclusions in the DE Toxic Evaluation report. And we also know that CDFs are not well protected from human access. In fact, access by humans and wildlife is easy.

Fourth, the DE Toxics Evaluation Report is clear that its findings are limited to Reach C, so to the extent they are accurate or flawed, that is the scope of their relevance, and the Army Corps cannot use this report to justify or demonstrate conclusions regarding water quality for deepening operations in other portions of the River, including upstream and most particularly berth areas and/or private channel deepening and dredging that will be necessary to take advantage of a deepened main channel. (*Attached Report 79*).

Also of note regarding the DE Toxic Report and its applicability to other segments of the project, as we understand it, the Army Corps selected Reach C to begin the project as it was most likely to have the least water quality effects.

KK. Additional Issues That Require Further NEPA Consideration.

In earlier iterations of the Deepening Project, there was projected a 2-foot over-dredge to provide a greater level of safety for ships coming up the river. In the most recent version, there is now only a 1-foot over dredge as we understand it. Neither a one nor two foot overdredge seems to be accounted for in the analysis provided. An additional foot of over-dredge is an approximately 15% increase in the amount of deepening to be done; 2 feet would be a 30% increase. This

additional level of dredging – both the 1-foot overdredge and 2-foot overdredge scenarios -- must be fully analyzed and accounted for in the reports and studies reflected in a new SEIS.

The Army Corps has provided contradictory information regarding the flow of Delaware River water through the C&D Canal. In two different reports, the agency concluded that the same water moved in different directions, corresponding to the direction most beneficial to the project being studied. In a 1999 study conducted by the Army Corps to assess deepening the channel of the Chesapeake and Delaware Canal, the Army Corps' conclusion "about the direction of water flow through the canal is totally reversed from the ... study performed to assess the impact of deepening the Delaware Shipping Channel. The Delaware River Study concluded net westward flow through the canal for the 1965 simulated period whereas the [C&D canal] study concludes eastward!" (*Letter from John M. Williams to Frank R. Master, Army Corps of Engineers/Philadelphia District, February 7, 2000. [Referring to, Assessment of Channel Deepening in the Chesapeake and Delaware Canal and Approach Channels in Upper Chesapeake Bay; A Three Dimensional Numerical Model Study; USACE/WES, August 1999, Draft Report; page 43; Assessment of Channel Deepening in the Delaware Bay; A Three Dimensional Numerical Model Study; USACE/WES, Tech. Report CHL-98-29, September 1998; page 45.]*). While the Army Corps has since developed an explanation for these contradictory findings, it again is a demonstration that unless all information is fully articulated and subjected to the rigors of expert and agency review and public comment through a NEPA process, it can be fraught with misinformation and/or misleading information.

LL. Deepening The Delaware River To 45 Feet Is Not At All The Same As Maintenance Dredging At 40 Feet.

The threats to fish, wildlife, wetlands, drinking water, and communities identified by the many agencies and experts that have reviewed this issue are associated with the Deepening Project. Deepening the River by an additional 5 feet changes water patterns in such a way that it will exacerbate erosion of wetlands which are important ecologically, aesthetically and for storm protection. The Deepening Project includes widening reaches of the channel into areas that are not now currently dredged – a number of which have been characterized as toxic hot spots. Deepening brings with it the need to dispose of more spoils — spoils laden with toxins which are going to be disposed of in areas and in ways that bring harm. Deepening the channel changes the movement and balance of fresh and salt water in a way that will move the salt line up river presenting threats to the oyster populations and drinking water supplies that have been so heavily invested in for our region and are so vitally important. Changing salt also threatens salt marshes of the estuary that provide important food and habitat. The findings of the agencies and experts cited in this document are speaking specifically to the Deepening Project issue, and their findings should not be dismissed under false characterizations that Deepening Project is no different in its effects than maintenance dredging.

For the foregoing reasons, and based on the information contained and the references cited herein, the Army Corps of Engineers must undertake a new, comprehensive NEPA process to generate a Supplemental Environmental Impact Statement on the full range of environmental impacts of the Delaware River Main Channel Deepening Project.

Please do not hesitate to contact me if I can be of any further assistance in providing the Army Corps with more information on any of the topics discussed herein.

Respectfully submitted,

A handwritten signature in blue ink that reads "Maya K. van Rossum". The signature is written in a cursive style with a long horizontal line extending to the right.

Maya K. van Rossum
the Delaware Riverkeeper

PUT IN LIST OF CCS

Attachments:

- ✓ All documents referenced in this letter and/or identified on the attached matrix titled Delaware Riverkeeper Network Comment Attachments.
- ✓ Abstracts from the 2011 Delaware Estuary Science and Environmental Summit that document a wealth of new science and research on multiple issues discussed in this comment.