US Army Corps
of Engineers.
Philadelphia District

DELAWARE RIVER MAIN CHANNEL DEEPENING PROJECT

SUPPLEMENTAL INFORMATION TO JUNE6, 2001 PUBLIC WORKSHOP

4. ADDITIONAL SUPPORTING DOCUMENTS

VOLUME 2

AUGUST 2001

INDEX

1. Purpose

This supplement provides both clarifying and additional information in conjunction with the Delaware River Main Channel Deepening Project public workshop, which was held in Dover, Del. on June 6, 2001.

The supplemental information includes:

- Additional and clarifying information to questions and statements included in the official transcript of the June 6, 2001 public workshop.

- Corrections to Corps responses (i.e. inaudible, grammar and misspelling) included in the official transcript of the June 6, 2001 public workshop.

- Responses to letters submitted at the June 6, 2001 public workshop.

- Additional reports and letters requested at the June 6, 2001 public workshop.

- A comprehensive list of all those who attended the June 6, 2001 public workshop.

2. Clarification/Additional Information – Public Workshop Transcript

Clarification/ Responses to 6 June 2001 Transcript Reference is made to the particular page and line of the transcript. Spelling corrections, and additional clarifications or responses are provided.

1. Page 14, line 20. Spelling error. Change the word "starring" to staring.

2. Page 21, Lines 3-6. While the Corps does not require commitments from the benefiting facilities, the fact is that all four refinery companies---Sun has three of the six facilities---have expressed varying degrees of intent to take advantage of the 45-foot federal channel by deepening their berths.

In its April 14, 2000 letter Sun Oil said, "Based on our preliminary studies and under current economic conditions, it would be economically feasible for Sunoco to dredge and make certain other dock changes." This statement was repeated in a December 20, 2000 New York Times article.

Valero Refining Company has publicly stated (Courier-Post, August 10, 1999) it would pursue a $10 to $15 million project to upgrade its docking areas to save $6 million per year. "Thus, as with many of the businesses on the channel, we would benefit from the ability to bring larger vessels into our berthing area."

Tosco, which announced in February 2001 that it would be acquired by the Phillips Petroleum Company, had left open the possibility of doing the work at some point. "As the project gets closer to reality and we see things move forward, that's really what would drive our decision." (Courier-Post).

Coastal Eagle Point's facility is already at the 45-foot depth or greater based on the Corps' hydrographic surveys and would not need to deepen its berth.

3. Page 25, Lines 10-15. All confined disposal facilities (CDFs) operated by the Corps of Engineers are approved for use through the water quality certification program of the State where the site is located. No Corps CDFs have been identified as significant ongoing sources of contamination in the Delaware River. It is important to note that these facilities are not used on a continuous basis throughout the year, and do not continuously discharge water. The most frequently used sites discharge water approximately 45 days every one to two years.

4. Page 27, Lines 6-15. As currently planned, the project would not include economic loading of barges or hopper dredges. Economic loading has never been considered in the riverine portion of the project. However, in Delaware Bay, where sand would be dredged and used for beach nourishment, there would be cost savings with economic loading of hopper dredges. The Corps will consider the benefit of using economic loading when a final determination has been made with the State of Delaware regarding which beaches will be nourished. The benefit of economic loading increases as the distance between the dredging site and placement site increases.

5. Page 27, Lines 15-21. The Corps did not prematurely stop its pre-construction monitoring. The plan was to perform the monitoring under a one-year contract leading to the start of construction of the deepening project. The one-year pre-construction monitoring was completed in April 2001 ending the contract. Because of the uncertainty of the start date for construction, it was decided that we would not resume the monitoring until we have a more definite idea of when construction will begin. Prior to construction three months of monitoring data will be collected to see if conditions have changed since the one-year collection of pre-construction data. This decision will be made in coordination with the State and Federal resource agencies and educational institutions that assisted the Corps to develop the scope of work. If changes in conditions warrant it, an additional one-year of pre-construction data will be collected prior to work commencing in the oyster area.

6. Page 40, Lines 13-17. The Corps has no future plans to deepen the project to 50 feet. In fact the Corps'1992 Interim Feasibility Report demonstrated that a 50-foot depth is not economically justified.

7. Page 50, Lines 16-18. Responses were provided to the Delaware River Keeper's FOIA's dated 1 May and 8 May 2001.

8. Page 56, Lines 16-20. Bulk sediment data were compared to sediment quality guidelines used by the New Jersey Department of Environmental Protection (NJDEP). These guidelines were established to provide a basis for evaluating levels of chemical contamination and the associated risks to human health. Contaminant concentrations below the residential guideline allow maximum unrestricted use of property, including residential use. Contaminant concentrations below the non-residential guideline are also acceptable for certain uses, such as a work site. The overwhelming majority of the 153 bulk sediment samples were below the residential guidelines. Based on this data it was concluded that placement of this material in confined disposal facilities (CDFs) and use of bay material for beach and habitat restoration would not result in any adverse effects. PCBs and PAHs only exceeded residential guidelines in one of the 153 samples analyzed. No other organic contaminants including pesticides were detected above residential guidelines, and no non-residential guidelines were exceeded. Antimony, arsenic, selenium and thallium were the only inorganics to exceed residential guidelines. Exceedences were few and only arsenic (3 samples) and thallium (6 samples) exceeded non-residential guidelines. Multiple samples taken in the vicinity of these higher detections indicate that these areas are not contaminated hot spots. Considering this material would be placed in CDFs, which are non-residential facilities receiving limited visitation, there is no perceived risk to human health. Considering the few exceedences of residential guidelines, and that the material enters the CDFs in a slurry form and is mixed to a degree before settling, it is most probable that no contaminants would be at concentrations above residential guidelines within the CDFs. In Delaware Bay, all detected contaminants were below residential guidelines except selenium in one sample. This sample was collected in the Cross-Ledge Range where material would be used for habitat

Restoration at Kelly Island, which is not a recreational beach. No residential guidelines were exceeded in samples collected below this point, which is where sand would be obtained to nourish recreational beaches.

9. Page 59, Lines 21-22. Insert "for" for inaudible. Also, a spelling error, change "safety" to savings.

10. Page 60, Lines 15-17. Insert "part" in place of inaudible.

11. Page 61, Lines 11-12. We have contacted other Corps' offices to see if this type of data is available.

12. Page 64, Line 12. Delete "and".

13. Page 64, Lines 13-21. This statement reveals confusion about the difference between the project costs and the benefits. The initial construction of the Delaware River Deepening Project (includes actual dredging and costs related to dredged material placement) is $311 million dollars. The project is cost- shared with the federal government paying approximately $211 million and the non-federal sponsor, Delaware River Port Authority, contributing approximately $100 million. When construction is completed, the improved channel will provide over $40 million annually in transportation savings to the Nation (or $2 billion in total savings over the 50-year project life) through the following:

- Accommodating more efficient container and bulk vessels.
- Reducing the need for lightering (transfer of crude oil from tankers to barges, which involves double handling) in the Delaware Bay by the larger tankers.

The result of this $311 million expenditure is that taxpayers will reap $1.40 benefits for every $1.00 in project costs.

14. Page 71 Lines 23-24 and Page 72 Lines. The deepening project will not increase deposition of silt at the Motiva's refinery's docks, cooling water intake channel and dispersion area. Our findings are based on the following information.

At the workshop, Motiva stated: "preliminary results from the refinery's study as well as actual experience from the Chesapeake Bay indicate that the dredging would cause an increase in deposition of silt at the refinery's docks, cooling water intake channel and dispersion area."

Motiva contracted with Coast Watch, Inc., of Timonium, MD, to evaluate shoaling in the spur channel off the Delaware River Main Channel that allows vessels to berth at their refinery. Philadelphia District staff met with Motiva and Coastwatch personnel on 17 April 2001 at the Motiva refinery. At this meeting, Coast Watch stated that salinity increases induced by the Delaware Deepening project would exacerbate the shoaling problem in the Motiva channel

where they typically dredge about 2.2 million cubic yards on a three-year cycle. Coast Watch referred to salinity-induced "flocculation" as the cause of the expected shoaling increase. Laboratory experiments that date to the 1960s show a tendency for dispersed clay particles to flocculate (clump together) when salinity increased above a threshold value.

As a follow-up to the April meeting, the Philadelphia District has provided prototype and model salinity data to Coast Watch to assist in their evaluation of the salinity regime and shoaling. The Corps' hydrodynamic-salinity modeling indicated that the additional five foot deeper channel leads to small but finite increases in salinity for most locations in the estuary, regardless of the hydrologic scenario considered. The Motiva channel is located at DRBC River Mile 59 to RM 60. The closest data save locations from the model are upstream at RM 69 (Delaware Memorial Bridge) and downstream at RM 54 (south end Reedy Island.) There are also 35 years of observed salinity data from the USGS at the Reedy Island Pier (RM 55.) Our modeling, supplemented by the USGS prototype salinity data at Reedy Island, indicate that the Motiva channel is exposed to long-term variations in salinity that range from 0 parts per thousand (fresh water) to as much as 13 to 15 ppt. It is unlikely that the extreme range from 0 to 15 ppt is experienced during most years. Nevertheless, there is a very dynamic salinity regime at the site reflecting the natural variability - from season to season and from year to year - in the freshwater inflow to the estuary.

If salinity-induced flocculation was a primary mechanism influencing the shoaling rate in Motiva's channel, there should be a correlation between the rate/frequency of required dredging and the antecedent hydrologic conditions that largely control salinity distribution in the estuary. Coastwatch did not indicate that they had observed such a relationship (between dredging and hydrologic conditions) in the Motiva situation.

The major shoaling areas of the Delaware River Main Channel are located in the Marcus Hook, Deepwater, and New Castle Ranges. Together these three ranges account for about 85 per cent of the annual volume of maintenance dredging in the Delaware River, Philadelphia to the Sea project. These ranges extend over a distance of about 20 miles (Marcus Hook shoal ~ RM 80; New Castle shoal ~ RM 60), and experience a large variation in salinity, both between sites at any given time, and over any given period with varying fresh water inflows. The Delaware Estuary salt line (7-day average location of the 250 ppm isochlor, which is equivalent to a 77:1 dilution of sea water) is typically located downstream of the shoal in Marcus Hook Range. In contrast, the salt line is typically located upstream of both the Deepwater and New Castle shoal areas. The centroid of the New Castle Range shoal is about one mile east of the centroid of the Motiva channel shoal, at the downstream end of the shallows surrounding Pea Patch Island.

Hydrographic surveys and dredging records show that shoaling in the three Delaware River Main Channel ranges is essentially independent of antecedent hydrologic conditions. This is not the same as stating that there is "zero" contribution from salinity/flocculation effects at these sites. However, if there is a salinity effect on shoaling, it appears to be negligible. Shoaling at these sites is dominated by other factors, including underlying tidal flow characteristics, adjacent estuary bottom geometry and sediment type. It appears probable that the shoaling situation at

Motiva is similarly controlled by tidal flow characteristics and adjacent bottom geometry and sediment distribution. It is likely that the background, natural salinity variability in the vicinity of Motiva's channel is so large, and the salinity changes attributed to deepening so small, that the deepening project will have no practical impact on their shoaling problem.

15. Page 75 Lines 4-8. The statement " There is no question that a GAO audit stops a project authorized by Congress" is incorrect. In reviewing the videotape of the public workshop, the actual statement by LTC Brown was: To include getting a permit; they include working beneficial reuse options (inaudible) to include what we needed for the PCA. That is a given. That is a given. There is no precedent that a GAO will stop a project authorized by Congress. There is no precedent to do that.

16. Page 85, Lines 11-15. A letter from DRBC on jurisdiction over the deepening project was recently received and is attached.

17. Page 86, Line 5. Spelling error, change "Shed" to Basin.

18. Page 88, Line 1. Spelling error, change birthing to berthing.

19. Page 90, Lines 1-9. The cost of placing sand on the Reach E, Delaware Bay Coast sites ranges from approximately $8-$10 per cubic yard with an additional $1.50-$2.00 per cubic yard to handle the sand after it is placed on the beach.

20. Page 91, Lines 22-23, Page 92 Lines 1-12. A letter was provided by Ms. MacArtor. Responses are provided in this supplement in Section 3 entitled: "**Responses to Public Workshop Letters.**"

21. Page 95, Lines 2 and 3. Change feet to miles.

22. Page 96, Lines 14 to 24 and Page 97, Lines 1-4. Bulk sediment data was collected from all channel bends that would be dredged as part of the deepening project. Mr. Rick Greene of the Delaware Department of Natural Resources and Environmental Control conducted a separate analysis of the Corps' complete sediment quality data set. His conclusion was that the level of contamination in the main channel and bends is low to moderate. His analysis did identify two channel bends where the data showed some heavy metal concentrations that were higher than what was generally observed in the overall channel. One of these bends, located at the confluence of the Delaware and Schuylkill Rivers, would not be dredged as part of the deepening project. The other bend is located north of Pea Patch Island. A total of 17 individual sediment samples were collected from this bend and analyzed for bulk concentrations of heavy metals. The majority of heavy metal concentrations in these samples were either below the ERL value or in between the ERL and ERM values (16 out of 17 samples), which are guidelines that Mr.

Greene uses to screen sediments for contamination concerns. Contaminant concentrations below the ER-L value represent a minimal-effects range according to the researchers that developed the guidelines; a range intended to estimate conditions in which effects would be rarely observed. Contaminant concentrations above the ER-M value represent a probable-effects range according to the researchers that developed the guidelines; a range in which effects would frequently occur. These data do not suggest a contamination concern at this bend location. These data support the conclusion that contamination in the main channel and bends is low to moderate.

23. Pages 97 and 98 (Line 24 on Page 97 and lines 1-5 on Page 98). The movement of dredged materials to abandoned Pennsylvania mines is not part of the Delaware River Main Channel Deepening Project. As answered by Liz Murphy on Page 66 (Lines 1-6) any costs related to the movement of dredged materials to the Pennsylvania mines will be borne by the Delaware River Port Authority and will have no impact on the overall cost of the project.

24. Page 100, Lines 16-24, and Page, 101 lines 1-3. There is no specific documentation that determined the dredging practices to be used in different reaches of the river. Different dredges are better suited for certain types of work, and are more economical to use for that work. In the Delaware River, where confined disposal facilities are relatively close to the dredging locations, hydraulic pipeline dredges are most efficient. In Delaware Bay, where the distance between dredge site and placement site is greater, hopper dredges are most efficient. Bucket dredges would be less efficient (that is they would move a smaller quantity of material in a given period of time), and thus more expensive, in both situations. The project did not include economic loading or thin layering because these are not approved practices in the Delaware. Although, in Delaware Bay, where sand would be dredged and used for beach nourishment, there would be cost savings with economic loading of hopper dredges.

Concerning best management practices for Kelly Island, the Corps has developed a number of "goals" in coordination with DNREC and the Federal resource agencies to achieve the goals and objectives of the wetland restoration at Kelly Island. Specific physical and biological parameters will be measured prior to and after construction to determine if these goals and objectives can be met. If these goals and objectives are not been met, appropriate actions will be undertaken.

25. Page 101, Lines 12-16. As currently planned, the project would not include economic loading of barges or hopper dredges. Economic loading has never been considered in the riverine portion of the project. However, in Delaware Bay, where sand would be dredged and used for beach nourishment, there would be cost savings with economic loading of hopper dredges. The Corps will consider the benefit of using economic loading when a final determination has been made with the State of Delaware regarding which beaches will be nourished. The benefit of economic loading increases as the distance between the dredging site and placement site increases.

26. Page 102, Lines 22-24, and Page 103 Lines 1-7. The term "clean sand" can be defined in two ways. Concerns raised with regard to the deepening project mostly relate to the level of contaminants in the sand. The sand would not be considered clean if there were high levels of contaminants. Bulk sediment testing of this sand indicates that contaminant concentrations are low and that there are no concerns related to human health or protection of environmental resources. From a contaminant perspective the sand is clean. Typically, with beach nourishment projects, the concerns are more directed to the grain size of the material. If there is a high percentage of material that is finer grained than what is considered sand size, then there is the concern that the resulting beach will look muddy or dirty. The material would not be considered clean from an aesthetic perspective. Delaware Bay channel sand that would be used for beach nourishment is greater than 90 percent sand and will provide an aesthetically pleasing, clean beach.

27. Page 107, Lines 12-15. The Corps has no regulatory authority over point source discharges of effluent. Point source discharges fall under the authority of the United States Environmental Protection Agency and in this particular case, the State of Delaware (DNREC).

28. Page 109, Lines 16-18. Mr. Brady responded to Ms. Fleming that the draft of the pre-construction oyster study would be available by June 30. Due to the large amount of data that needed to be evaluated and other tasks given to the contractor that required field work this spring, the draft study will not be available until August 2001.

29. Page 113, Lines 8-9. The Oldmans CDF was the most recent site to be monitored. Monitoring occurred during the fall of 2000. A draft report is currently being reviewed by the States of New Jersey and Delaware and the Delaware River Basin Commission prior to preparation of a final report. The only parameter that exceeded Delaware River acute water quality criteria at the point of discharge was aluminum. Aluminum was also found in Delaware River background water samples at similar or higher concentrations. In the Pedricktown study there were individual samples that exceeded Delaware River acute water quality criteria for aluminum and zinc. Aluminum was also found in Delaware River background water samples at higher concentrations. In the Killcohook study there were individual samples that exceeded Delaware River acute water quality criteria for copper, silver, zinc and cyanide. Copper was also found in Delaware River background water samples at about the same concentration. For each of these studies, water samples were also taken within the discharge plume in the river to monitor the immediate river concentrations that resulted from the discharge. Except for cyanide in one sample, concentrations of parameters that exceeded acute criteria at the point of discharge were below acute criteria within the immediate discharge plume. This excludes aluminum and copper, which had background concentrations already above acute criteria. This suggests that the discharges do not adversely affect ambient water quality within the river.

30. Page 115, Line 10. Spelling error, change Egy to Egg.

31. Page 116, Lines 10-18. Spelling error, change O'Hueron to O'Herron.

Also, the following additional information is provided.

The following discussion explains where the information concerning juvenile shortnose sturgeon was found and presents the logic for reaching the conclusions that were presented in the biological assessment. Information from the National Marine Fisheries Service's Biological Opinion on juvenile shortnose sturgeon is also presented.

In order to put answers to these questions in perspective, it is noted that shortnose sturgeons are not known to heavily use the blasting area (River Mile 76.4 to 84.6) from available data. As stated in the Biological Assessment, tagging studies done by O'Herron et al. (1993) show that the most heavily used portion of the river appears to be between river mile 118 below Burlington Island and the Trenton Rapids at river mile 137. In the early 1980's a few juveniles were found by O'Herron (Personal Communication, June 20, 2001) between Trenton, New Jersey and Petty Island (River Mile 102), north of the channel deepening project; however, no other information on juveniles in the Delaware estuary exists (McDaniel, C., National Marine Fisheries Service, Personal Communication, June 19, 2001; John O'Herron, Personal Communication, June 20, 2001).

Response: Section 5.3 (Juvenile Shortnose Sturgeon) of the biological assessment (May 2000) reads as follows:

"***5.3 Juvenile Shortnose Sturgeon.***

Very little data exists about the location of juvenile shortnose sturgeon. In other river systems, they are found upstream of the salt water- freshwater boundary (0.5 to 1.0 ppt) (Dadswell, et al., 1984). In the Delaware River, the location of the juvenile shortnose sturgeon is not known, but is believed to be on the fresh side of the oligohaline/fresh water interface (0.5 ppt). During the year, juvenile sturgeon could be found between Artificial Island (rm 54) and the Schuykill River (rm 92) (O'Herron, 2000). The locations of selected isohalines were modeled for monthly average inflows and for regulated drought conditions from August to November (Philadelphia District, 1997). The average location of the maximum intrusion of the 0.5 ppt isohaline during monthly average infows for November was river mile 73.9 under current dredging and at river mile 88.9 during regulated drought conditions. Although no information is available, the 0.5 ppt isohaline would likely be downstream of the November location during December through March since larger freshwater inflows enter the river during this period. Nevertheless, it is possible that juvenile shortnose sturgeon could be present in the vicinity of the blasting and could be impacted."

A 3-D hydrodynamic/salinity model was used to predict the locations of the 0.5 ppt isohaline locations. This model is described in Section 5 of the Supplemental Environmental Impact Statement (Philadelphia District 1997).

These are the references quoted above:

Dadswell, M.J., B.D. Taubert, T.S. Squiers, D. Marchette, and J. Buckley. 1984. *Synopsis of biological data on the shortnose sturgeon (Acipenser brevirostrum) (LeSueur, 1818)*. NOAA Technical Report, NMFS 14, National Marine Fisheries Service. October 1984. 45 pp.

McDaniel, C., National Marine Fisheries Service, Gloucester, MA, Personal Communication with John Brady, Philadelphia District, U.S. Army Corps of Engineers, June 19, 2001

O'Herron, J.C. II, Able, K.W., and Hastings, R.W., 1993, *Movements of the Shortnose Sturgeon (Acipenser brevirostrum) in the Delaware River,* Estuaries 16 (2): 235 - 240.

O'Herron, J.C. , O'Herron Biological and Environmental Consulting, Mount Holly, NJ. 2000. Personal Communication with John Brady, Philadelphia District, U.S. Army Corps of Engineers. 28 March 2000.

Philadelphia District, 1997, *Delaware River Main Channel Deepening Project (Pennsylvania, New Jersey, and Delaware) Supplemental Environmental Impact Statement*, U.S. Army Corps of Engineers, Philadelphia District.

The following information was presented in the Biological Opinion by the NMFS (February 2, 2001) concerning the location of juvenile sturgeon:

" Due to the limited information on juvenile shortnose sturgeon, it is difficult to ascertain their distribution and nursery habitat (O'Herron 2000, pers. comm.). In other river systems, juvenile sturgeon (less than 10 years) move downstream to tidal areas and concentrate at, or just upstream of, the salt front during the summer months (June through August). However, there is no evidence that this population moves into the region of the freshwater-saltwater interface during the summer. In the Delaware River, the oligohaline/fresh interface can range from as far south as Wilmington, Delaware, north to Philadelphia, Pennsylvania, depending upon meteorological conditions such as excessive rainfall or drought. As a result, it is possible that in the Delaware River, juveniles could range from Artificial Island (river mile 54) to the Schuylkill River (river mile 92; O'Herron 2000, pers. comm.). O'Herron (2000, pers. comm.) believes that if juveniles are present within this range they would likely aggregate closer to the downstream boundry in the winter when freshwater input is normally greater. However, due to a lack of data, the exact status of juvenile shortnose sturgeon in the Delaware River has yet to be determined. Hypotheses constructed about juvenile shortnose sturgeon distribution in the Delaware River have been based on comparisons of sturgeon in other river systems."

The Corps, in coordination with NMFS, is presently helping to fund a study with the primary purpose to obtain an estimate of the shortnose sturgeon population in the Delaware River. The study also includes sampling for juveniles. The three-year study should be completed this year (2001). Based on the results of this study, the Corps will consider funding other studies suggested by the NMFS.

Copies of all sources referenced above are enclosed, except for the Supplemental EIS that has been previously provided to the Delaware Riverkeeper .

32. Page 119, Lines 14-24 and Page 120 Line 1. Page 119 lines 14-23 ask for a copy of the study or studies regarding the University of Delaware Sea Grants Program concerns about ***the potential for toxins in the dredged spoils in the confined disposal facilities to leak into drinking water supplies.***

The studies that address the above concerns were performed by the United States Geological Survey. In particular, a report entitled Evaluation of Ground-Water Flow from Dredged Material Disposal Sites in Gloucester and Salem Counties, New Jersey (USGS, 1996) was published which studied this concern. A letter dated 23 January 1996 was then issued by the USGS, which summarized and referenced this and other relevant USGS reports. This letter is attached. A copy of the referenced USGS letter and report are provided in **Section 4-Additional Supporting Documents.**

The USGS concluded that ***the concern that fluids leaching from the dredged-material disposal areas could infiltrate to the aquifer with recharge water can also be set aside.***

33. Page 124,Lines 6-7. The Corps has no future plans to deepen the project to 50 feet. In fact the Corps' 1992 Interim Feasibility Report demonstrated that a 50-foot depth is not economically justified.

Delaware River Basin Commission
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Carol R. Collier
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July 3, 2001

Lieutenant Colonel Timothy Brown
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Wanamaker Building, 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390

Dear Colonel Brown:

This is in response to your letter of June 7, 2001 regarding the DRBC's jurisdiction over the Delaware River Main Channel Deepening project.

With respect to this matter, the DRBC Compact and statements made at the Congressional Hearing on the approval of the Compact support the conclusion that the intent of Congress was to retain Congressional authority and control over the navigable waters within the basin (as per Section 1.4 of the Compact). Thus, it appears the proposed channel deepening by the Federal Government is not subject to Section 3.8 review by the DRBC. Non-federal deepening projects are subject to DRBC review.

Your letter makes reference to Section 11.1(b) of the Compact and the assertion made by the Mid-Atlantic Environmental Law Center (MAELC) that the deepening project must be included in the DRBC's Comprehensive Plan (CP) pursuant to that section. It appears that Section 1.4 of the Compact is controlling with respect to the DRBC's project review jurisdiction under both Sections 3.8 and 11.1(b).

In its Final Interim Feasibility Report (February 1992), the Corps agreed to process the project consistent with the DRBC Compact. The Compact provides that each of the signatory parties, including the Federal Government, will prohibit and control pollution of the basin's waters and will cooperate fully in control of future pollution in and abatement of existing pollution from the rivers, streams and waters flowing through the signatory States. Further, each of the parties agrees to enact any legislation necessary to enable each to maintain the waters of the basin in a satisfactory condition for use as public and industrial water supplies. *See* Delaware River Basin Compact, Art. 5.3. Consistent with these principles, Section 313 of the Federal Water Pollution Control Act (33 U.S.C. § 1323) provides that agencies of the Federal Government "shall be subject to and comply with, all Federal, State, *interstate* and local requirements . . . respecting the control and abatement of water pollution." 33 U.S.C. § 1323(a) (emphasis added).

In the view of DRBC staff, formal Section 3.8 or 11.1(b) review of the deepening project is not essential to ensuring that the project complies with the applicable water quality standards. Consistent with Articles 5.3 and 5.5 of the Compact, when the States exercise authority over aspects of the Main Channel Deepening Project, standards equivalent to or more stringent than the Commission's apply.

The DRBC believes that a cooperative approach to finding solutions to issues raised in the MAELC letter is the most effective way to resolve them. To that end, the DRBC will continue to provide technical services and consultation to the states and the Federal Government on this project and invites you to work with us to ensure that compliance with the applicable water quality standards is demonstrated.

Please feel free to contact Dr. Jeffrey Featherstone or me at your convenience to discuss how we may proceed.

Sincerely,

Carol R. Collier

Carol R. Collier
Executive Director

c: DRBC Commissioners

3. Responses to Public Workshop Letters

Letters Provided at the 6 June 2001 Workshop Actual letter is included with numbered responses.

DELAWARE RIVER MAIN CHANNEL DEEPENING PROJECT

RESPONSES TO QUESTIONS IN A LETTER DATED 5 JUNE 2001
FROM DELAWARE RIVER KEEPER

Q1. How much more crude oil have you predicted will come up the river if this project takes place?

R1. The channel deepening will not induce additional crude oil tonnage into the Delaware River navigation system. The equivalent amount of crude oil will navigate upriver for both the 40-foot and 45-foot channel depth conditions.

Q2. Does the cost benefit analysis for this project include the cost to deepen the private channels of the oil facilities which have to be deepened for those facilities to get the benefits attributed to them? If not, why not?

R2. Yes.

Q3. Figure 13 in your permit application shows blasting only to occur in and around the Marcus Hook area, but the text of the application discusses blasting that continues in Reaches C and D. Where exactly will blasting be occurring?

R3. As shown on Figure 13, rock blasting will only occur in and around the Marcus Hook area. This area is located in Reach B as stated in the text of application. No rock blasting will occur in Reaches C and D.

Q4. Where do the spoils presently dredged from Reach E of the River/Bay during maintenance dredging presently get disposed of? Could sediments be used for beach replenishment? If not, why not?

R4. Dredged material from current maintenance dredging in Reach E is disposed of at Buoy 10. There is insufficient quantity of dredged material during a single maintenance cycle to economically utilize the material for beach replenishment.

Q5. What benefits did you attribute to the containership industry from this project?

R5. Average annual container benefits to the containership industry are estimated to be $4,546,000.

Q6. How much oil has been spilled during lightering in Delaware Bay in the last 50 years?

R6. U.S. Coast Guard would be the proper source for this type of data.

Q7. How did you include the benefit of reduced oil spillage in your cost/benefit analysis? Did you use this same approach for including things like the cost of potential decimation of oyster populations on the cost side of your calculation?

R7. No benefits were claimed for reduced oil spillage in the economic analysis. This category was discussed qualitatively only. Our studies concluded that there would be no significant impacts to the oyster population. As a result, no costs were included. An analysis of oil spill contingency planning is provided in the July 1997 Corps SEIS. According to the Environmental Protection Agency, the oil spill response network established by the U.S. Coast Guard, Marine Safety Office, Philadelphia is long established and is considered to be as adequately prepared for oil spill response as any in the Nation (Marie Jenet, Personal Communication, U.S. Environmental Protection Agency, Region 2, April 29, 1996). However, monitoring of the oyster beds will be conducted before, during and post-project construction.

Q8. How is the company that does the dredging selected? How many companies that operate and employ within this region are capable of participating in that process? Who does the current maintenance dredging? Can you/do you dictate that the project employees be hired from within the region where the project is ongoing?

R8. For each dredging contract, the Corps solicits bids. Contracts are awarded to the responsive and responsible low bidder. Typically 2 to 4 contractors provide bids. Various dredging companies using the low bid process perform current maintenance dredging. The Corps cannot demand that the contractor hire employees within the region, but the contractors usually go to the local union hiring halls.

Q9. You did not calculate economic benefits to the Port of Wilmington because existing side channels are less than 40 feet. Why then did you calculate benefits to oil facilities who have private channels that are also less than 40 feet? What is the current depth of the private channels for the 6 oil facilities that will benefit from the project?

R9. Benefits are not claimable for vessels serving the Port of Wilmington because of the 38-foot Christina River Federal navigation channel. Currently, there are no plans to deepen the Christina River Federal navigation channel to 45 feet.

Benefiting refinery locations are taking advantage of the current 40-foot depth through periodic maintenance or natural depths at their berths. The benefiting refineries are expected to commensurately deepen their berths to take advantage of a deeper Delaware River Main Channel. Concerning berth depths at the 6 oil facilities, Coastal Refinery has natural depths of 45 feet and deeper while the other 5 refineries have depths of 40 feet.

Q10. Please share the details regarding the model used for the economic calculations with regards to the State of Delaware-the model, assumptions made, data used, and outcomes. Where else has this model been used?

R10. A regional input-output model to assess the impact of project construction was applied. This analysis was for regional impacts on jobs, personal income, and tax revenues only and was not included in the national benefit account or the benefit-cost ratio for the project.

This input-output model was first applied to the State of Delaware by Latham and Stapleford (1986) in a study entitled, "Economic Impacts of the Delaware Estuary". The model was expanded in the Greeley-Polhemus Group project for the "Assessment of Selected Delaware Estuary Economic and Natural resource Values" (1993), for the Delaware Estuary Program. The model was expanded to include the New Jersey and Pennsylvania portions of the lower Delaware River Basin for the 13-county region and was then applied in the 1996 assessment by the Greeley-Polhemus Group for the Delaware River Main Channel Deepening Study.

Q11. While you have done analysis of discharges from the Pedricktown and Kilcohook CDFs, what studies have you done on the levels of pollution discharging from the National Park, Oldmans, Artificial Island, Penns Neck, and Reedy Point sites? For the record, please supply copies of any such studies and associated findings.

R11. Water quality monitoring at Delaware River confined disposal facilities (CDFs) in New Jersey was initiated as a result of the August 1997 Water Quality Certification and Acknowledgement between the New Jersey Department of Environmental Protection and U.S. Army Corps of Engineers, Philadelphia District for Delaware River dredging operations. The previous water quality certification did not include a monitoring requirement. Since 1997, the Pedricktown, Killcohook and Oldmans CDFs have been used for Delaware River maintenance dredging operations, and water quality monitoring data have been collected for these sites. The National Park, Artificial Island, Penns Neck and Reedy Point CDFs have not been monitored. Reedy Point South was used and monitored for deepening of the Salem River navigation channel in 1995. Copies of the Pedricktown, Killcohook and Salem River monitoring reports are enclosed. A draft report for Oldmans CDF has been completed and is being circulated for comments.

Q12. Are discharges to the Delaware River and tributary streams from the confined disposal facilities current subject to Clean Water Act permits? If not, why not? Are their discharges regularly monitored? If yes, by whom? Please provide any data for the record.

R12. The Corps acquires water quality certifications for all confined disposal facilities (CDFs) used for maintenance of navigation channels in the Delaware River and tributary streams prior to their use. The requirement to monitor CDF discharges is made as a condition of the water quality certification. Not all certifications require monitoring. When monitoring is required, the Corps develops a scope of work that satisfies the

monitoring requirement and contracts the monitoring to an environmental consultant. **Refer to Response 11** for available reports.

Q13. We have been repeatedly told that the Corps has studied drinking water impacts associated with the confined disposal facilities, but we have yet to see these studies. Could you please supply a copy as part of the record of this workshop?

R13. At the request of the Corps, U.S. Geologic Survey conducted a study on ground-water flow from dredged material disposal sites (existing Federally owned Confined Disposal Facilities (CDFs) used for placement of maintenance dredging of the 40-foot Delaware River channel as well as proposed sites for the deepening project). This study entitled ***"Evaluation of Ground-Water Flows from Dredged Material Disposal Sites in Gloucester and Salem Counties, New Jersey"*** was completed in 1995. In addition, in a letter dated 23 January 1996, USGS summarized their findings on dredging the channel, saltwater encroachment, and disposal effects to nearby wells. A copy of the referenced USGS report and letter are provided in **Section 4-Additional Supporting Documents.**

Since the completion of that study and in cooperation with NJDEP and DNREC, the Corps has installed monitoring wells at all Federally-owned CDFs that are or will be used for placement of dredged material from the maintenance of the existing 40-foot Delaware River Main Channel Project as well as from the deepening project in the States of New Jersey and Delaware. Also, groundwater-monitoring wells will be installed at the new upland disposal sites that will be developed for the deepening project. Groundwater monitoring plans have been submitted to NJDEP and DNREC for their approval. Upon approval, the Corps will commence the groundwater monitoring.

Q14. In the SEIS and other supporting materials for this project you state that 4 new CDFs are necessary to accommodate the dredge spoils, why now do you only list 3?

R14. The dredged disposal plan identified in the July 1997 SEIS provided sufficient disposal capacity for initial construction and 50-year of maintenance. The sponsor is only required to provide capacity for construction and 20-years of maintenance. Loss of previously identified sites does not affect project implementation.

Q15. Do you plan to use a process known as economic loading whereby sediment laden water is allowed to spill over the side of the dredge barge to the River? When will this decision be made? What studies have been done on the water quality impacts of this action? On the impacts to oyster beds? What approvals would be necessary for this practice to be put into use assuming all other permits and approvals for the project as a whole have already been received?

R15. As currently planned, the project would not include economic loading of barges or hopper dredges. Economic loading has never been considered in the riverine portion of the project. However, in Delaware Bay, where sand would be dredged and used for beach nourishment, there would be cost savings with economic loading of hopper dredges. The Corps will consider the benefit of using economic loading when a final determination has been made with the State of Delaware regarding which beaches will be

nourished. The benefit of economic loading increases as the distance between the dredging site and placement site increases. In 1998, a field study was conducted with the hopper dredge McFarland. Monitoring was conducted at two sites, one of predominately coarse-grained material, and the other of predominately fine-grained material. As the hopper was filled to an economic load, monitoring quantified the degree of suspended solids and contaminant release generated by overflow, and the dispersion of the overflow plume. Potential impact to oyster beds through increased sedimentation was evaluated with sediment profiling camera system. Photographs of the bottom, sediment-water interface were taken before and after overflow, and analyzed to measure any recent sedimentation. The States of Delaware and New Jersey would have to approve economic loading relative to compliance with their Section 401 Water Quality Certification Programs and Coastal Zone Management Programs.

Q16. The Delaware River Basin Compact requires all projects that will affect the River to be incorporated into the Comprehensive Plan. Has this project been incorporated into the Comprehensive Plan? If so, was public input solicited? If not, why not?

R16. In a recent letter, DRBC determined it has no jurisdiction over the deepening project. Specifically, DRBC *stated that "DRBC compact and statements made at the Congressional Hearing on the approved of the Compact support the conclusion that the intent of Congress was to retain Congressional authority and control over the navigable waters with the basin (as per Section 1.4 of the Compact). Thus, it appears the proposed channel deepening project by the Federal Government is not subject to Section 3.8 review by DRBC". The letter further states that the requirements for inclusion of the deepening in the Comprehensive Plan pursuant to Section 11.1 (b) is overcome because "It appears that Section 1.4 of the Compact is controlling with respect to DRBC's project review jurisdiction under both Sections 3.8 and 11.1 (b)."*

Q17. Your permit application says the Corp is doing monitoring of oysters, pre, during and post construction in order to "attempt to determine if the project significantly impacted the oyster resources." What is the status of your pre-construction monitoring?

R17. The July 1997 SEIS provides the analysis, which concludes that the deepening project would not adversely, impact oyster resources in Delaware Bay. The Corps agreed to conduct a monitoring program to document that the long-term impacts have been accurately assessed. One year of pre-construction monitoring has been completed in April 2001. Prior to construction three months of monitoring information will be collected to determine if conditions have changed since the one-year of pre-construction data was collected. This decision will be made in coordination with the State and Federal resource agencies and educational institutions that assisted the Corps in developing the scope of work. If the parties determine that the conditions have changed significantly, an additional full year of pre-construction data would be collected prior to work commencing in the oyster area (River Mile 15 to 54).

Q18. What is your definition of a significant impact to the oyster seed beds and populations? At what point will you make a determination about whether or not there is a significant impact to oyster population from this project? Will there be any effort to identify impacts as the project moves forward so appropriate responsive action (or even a stop in the dredging) could take place if deemed necessary to protect the oyster?

R18. The July 1997 SEIS provides the analysis that concludes there will be no adverse impact to oyster resources in Delaware Bay resulting from the deepening project. The State and Federal resource agencies, and the Haskin Shellfish Research Laboratory will evaluate data from the monitoring program. This group will determine if the project has resulted in any adverse impact, and the degree of significance. If impacts are detected, appropriate restoration efforts (e.g. shell stocking, seedbed stocking) will be taken.

Q19. When will you conduct a study and report regarding PCBs, metals and organic contaminants in berthing areas and private channels? We recommend this study and report include the kinds of information Rich Greene has included in his analysis on the main channel in his draft report dated February 1999.

R19. As part of the Preconstruction, Engineering and Design phase of study, the Corps collected sediment samples from the private berthing areas and analyzed them for PCBs, metals and organic contaminants. This data was presented in the July 1997 Supplemental Environmental Impact Statement, and provides an adequate characterization of these private areas. The data show that the material can be dredged and placed in a confined disposal facility without adverse environmental impacts. These areas are periodically dredged currently to maintain existing depths and proper permits and State approvals have been secured for this work in the past. Water quality certification normally comes from the State of New Jersey because material is normally placed in a privately owned confined disposal facility that is located in New Jersey. Comparing berthing area data to New Jersey guidelines suggests that the material would most likely be considered clean fill, and it could be reused for beneficial uses. The owners of the facilities would be required to obtain Federal and State permits for berth deepening. Additional data would be required, as part of the permit process, and approvals would be appropriately conditioned to protect the environment.

Q20. Why have you not used the SSfate model for your water quality standard analysis?

R20. SSFATE was developed as a tool to quickly simulate a variety of dredging scenarios and assess the potential risks to aquatic resources resulting from the re-suspension and resettling of sediments. Its intended application is to assist in determining the appropriate establishment of dredging windows to protect resources of concern from excessive siltation. As such, it is suited to predicting the far-field fate of suspended sediment, rather than suspended sediment concentrations in the water column at short distances from the dredge source. SSFATE cannot be used to accurately predict suspended sediment concentrations in the water column at 200 feet from the dredge source in its current form. While we believe that the analysis to date clearly demonstrates the ability of the dredging to be done as part of the deepening project to meet State water

quality standards, we are considering other alternatives for providing additional information.

Q21. What action will be taken to protect Sea Turtles from the dredging project?

R21. An analysis of potential impacts to sea turtles is provided in the July 1997 SEIS. The Federally threatened loggerhead sea turtle and the Federally endangered Kemp's Ridley, green, hawksbill, and leatherback sea turtles occur in the Delaware Bay. There is a concern that turtles may be impacted by hopper dredging. As required by the Endangered Species Act, the Corps consulted with the National Marine Fisheries Service (NMFS) about potential impacts from the channel-deepening project. A Biological Opinion was issued by the NMFS on November 26, 1996 for all dredging projects permitted, funded, or conducted by the District. The Opinion stated that dredging projects, where hopper dredges are used within the Philadelphia District, may adversely affect sea turtles and shortnose sturgeon, but are not likely to jeopardize the continued existence of any threatened or endangered species under the jurisdiction of the NMFS. The NMFS requires the Corps to monitor any impacts to sea turtles. NMFS-approved monitors will be employed on all hopper dredges working between 1 June to 30 November from the mouth of the Delaware Bay to River Mile 69 (near the Delaware Memorial Bridge). The DNREC has requested slightly different monitoring time periods as shown below:

1. Above Pea Patch Island: 15 May to 15 September.
2. Mid Bay, near Port Mahon to St. Jones River: 1 May to 31 October.
3. Lower Bay, near Broadkill Beach: 1 May to November 15.

Monitoring will be done during all of the required times within all required river/bay reaches. These monitoring requirements are also being followed for maintenance dredging of the existing 40-foot navigation channel. All monitoring data is coordinated with the NMFS.

Q22. In your sampling for female crabs why are the samples being collected by dragging the sampler for 1 minute at 3 knots? Would it not be more appropriate to sample by dragging the sampler for a certain, uniform, distance? Otherwise, depending on current and winds is it conceivable that the sampling boat could move a very small distance, even no distance, across the bottom of the River and yet still be traveling 3 knots for 1 minute?

R22. The sampling protocol for the winter crab survey followed standard fisheries sampling techniques and was modeled after methods that have been used in the winter crab survey conducted in the Chesapeake Bay for over 10 years. The tows were standardized based on time and the beginning and ending coordinates for each sample was recorded using a Global Positioning System (GPS) with sub-meter accuracy. The actual distance the crab dredge traveled was calculated using these coordinates and the number of crabs were adjusted to express crab densities per 1,000 square meters of bottom sampled. This is commonly referred to Catch Per Unit Effort (CPUE) in fisheries statistics. The New Jersey Department of Environmental Protection employs similar

methods to conduct clam surveys off of the Atlantic coast. In our study, the dredge was towed an average distance of 183 meters. The lowest recorded tow length was 43 meters and the highest tow length was 1,349 meters (towed for more than one minute). In addition, the movement of the vessel was monitored using the GPS plotter function to ensure the dredge was moving over the bottom. A commercial crabbing boat and crew was hired to conduct the survey with fisheries scientists on-board to direct the sampling.

Q23. "Why has Kelly Island been eroding? Is it a natural phenomenon or a manmade one? If manmade, what is the cause, and what action will be taken to address that cause?"

R23. The design of Kelly Island wetland restoration, including erosion, is presented in Sections 3.3 and 9.1.1 of the July 1997 SEIS. The shoreline history at Kelly Island has been characterized by persistent erosion for at least the past century. Topographic maps and nautical charts dating to 1878, and aerial photographs dating to 1937, demonstrate that this area has experienced one of the highest shoreline erosion rates of any location on Delaware Bay. The erosion rate at Kelly Island over the past century has averaged between 15 and 20 feet per year. The dash line in Figure 1 is the 1878 shoreline superimposed on a USGS aerial photograph from 1992.

Estuarine wetlands such as those at Kelly Island exist in a delicate balance between constructive and destructive forces. Marshes experience stability or growth when the rate of sea level rise is balanced by the supply of fine-grained sediments in a suitably low-energy wave environment. If one or more of these factors changes sufficiently, the marsh may become unstable and erode at its seaward margin, or "drown" as it is inundated by rising sea level. The loss of marsh at Kelly Island appears to be largely a case of marginal erosion due to wave and current effects coupled with rising sea level. It is well documented from tide gages within Delaware Bay as well as from other tide gages in the mid-Atlantic region that mean sea level has risen approximately one foot during the past century. Although no known investigation has identified the relative importance of sea level rise as compared to wave energy in causing erosion of the wetlands at Kelly Island, it is reasonable to conclude that the loss is essentially a natural, not manmade, phenomenon.

Q24. Is the Kelly Island project only implementable if the deepening project goes forward?

R24. Yes.

Q25. What action will be taken to ensure the restored Kelly Island will not be invaded by Phragmites?

R25. The Kelly Island wetland restoration project was planned in coordination with DNREC, NMFS, and USFWS. One of the goals for the project is that less than 1% of the marsh, as well as the berm and back dike be populated by *Phragmites* in monotypic stands. After construction, the area would be monitored using air photos and ground

surveys. If necessary, Phragmites would be controlled by an appropriate method such as spot treatment with herbicides and/or water level manipulation.

Q25 A. You have said that if phragmites does move in herbicides will be used for control we are opposed to this method of phragmites control and urge you to create plans which prevent invasion of phragmites in the first place by making the elevations, inundation periods, etc, to be not conductive to phragmites invasion. What steps have you taken in this direction?

R25A. *Phragmites* invades many wetlands in Delaware. At Kelly Island, water level manipulation will be an appropriate method to control this species since there will be a weir that can be used to control the water level. Spot treatment using herbicides may be necessary to control areas where water level manipulation can not be used such as on the sides of berms. Both the State of Delaware and the U.S. Fish and Wildlife Service use herbicides and controlled burning to control *Phragmites* on their lands. Only approved techniques would be employed.

Q25B. To the extent you are thinking of using herbicides, you have talked about "spot" treatment – New Jersey spot treatments have been included aerial spraying of over 2000 acres. What is your definition of "spot treatment"?

R25B. Since the Kelly Island wetland restoration is 60 acres, this is the most area that could be treated with herbicides. However, it is intended that much smaller areas will need to be treated since the project will be monitored and problem areas will be treated while they are small.

Q25C. Who will be responsible for the decision regarding phragmites? Who will be responsible for the costs of that decision? Who will be responsible for implementaion of that decision?

R25C. Decisions regarding *Phragmites*, will be made jointly by the Corps and DNREC in coordination with other State and Federal resource agencies that helped in the development of this plan. The Corps would be responsible for the cost and implementation of *Phragmites* control.

Q26. With regards to the shortnose sturgeon biological assessment:

R26. An analysis of impacts to the shortnose sturgeon is presented in Section 10 of the 1997 SEIS, including consultation with the National Marine Fisheries. The project is not expected to jeopardize the continued existence of the Delaware River subpopulation of the shortnose sturgeon. In order to put answers to these questions in perspective, it is noted that shortnose sturgeons are not known to heavily use the blasting area (River Mile 76.4 to 84.6) from available data. As stated in the Biological Assessment, tagging studies done by O'Herron et al. (1993) show that the most heavily used portion of the river appears to be between river mile 118 below Burlington Island and the Trenton Rapids at river mile 137. In the early 1980's a few juveniles were found by O'Herron (Personal

Communication, June 20, 2001) between Trenton, New Jersey and Petty Island (River Mile 102), north of the channel deepening project; however, no other information on juveniles in the Delaware estuary exists (McDaniel, C., National Marine Fisheries Service, Personal Communication, June 19, 2001; John O'Herron, Personal Communication, June 20, 2001).

The NMFS Biological Opinion dated February 2, 2001 states that:

"After reviewing the current status of the species discussed herein, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the NMFS' biological opinion that the proposed action may adversely affect but is not likely to jeopardize the continued existence of the Delaware River subpopulation of shortnose sturgeon. No critical habitat has been designated for this species, therefore, none will be affected."

The Biological Opinion also lists a number of reasonable and prudent measures that are necessary and appropriate to minimize impacts of incidental take of endangered shortnose sturgeon. These will be followed by the Corps when the project is constructed, and incorporated into the blasting plans and specifications and contract(s) that are awarded.

The Biological Opinion lists a number of conservation recommendations. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The NMFS has determined that the rock-blasting portion of the Deepening Project as proposed is not likely to jeopardize the continued existence of endangered shortnose sturgeon located in the project area. To further reduce the adverse effects of the blasting project on listed species, the NMFS recommends that the Corps implement these conservation measures. The Corps, in coordination with NMFS, is presently helping to fund a study with the primary purpose to obtain an estimate of the shortnose sturgeon population in the Delaware River. The study also includes sampling for juveniles. The three-year study should be completed this year (2001). Based on the results of this study, the Corps will consider funding other studies suggested by the NMFS.

Reference:

O'Herron, J.C. II, Able, K.W., and Hastings, R.W., 1993, *Movements of the Shortnose Sturgeon (Acipenser brevirostrum) in the Delaware River,* Estuaries 16 (2): 235 – 240.

Q26A. The assessment states: " South of Wilmington the shortnose sturgeon population is limited to adults due to increased salinity." What studies do you have to support this statement/assertion?

R26A. A letter from John O'Herron dated 2 February 1997 states that "All else being equal, shortnose sturgeon occurrence should lessen not as one passes south of

Wilmington, but rather as the distance within saline water increases from the oligo/mesohaline transition boundary, a seasonally variable boundary. The very infrequent occurrence of young should be expected on the seaward side of the transition boundary."

In their Biological Opinion (February 2, 2001), NMFS stated:

"Due to the limited information on juvenile shortnose sturgeon, it is difficult to ascertain their distribution and nursery habitat (O'Herron 2000, pers. comm.). In other river systems, juvenile sturgeon (less than 10 years) move downstream to tidal areas and concentrate at, or just upstream of, the salt front during the summer months (June through August). However, there is no evidence that this population moves into the region of the freshwater-saltwater interface during the summer. In the Delaware River, the oligohaline/fresh interface can range from as far south as Wilmington, Delaware, north to Philadelphia, Pennsylvania, depending upon meteorological conditions such as excessive rainfall or drought. As a result, it is possible that in the Delaware River, juveniles could range from Artificial Island (river mile 54) to the Schuylkill River (river mile 92) O'Herron 2000, pers. comm.). O'Herron (2000, pers. comm.) believes that if juveniles are present within this range they would likely aggregate closer to the downstream boundary in the winter when freshwater input is normally greater. However, due to a lack of data, the exact status of juvenile shortnose sturgeon in the Delaware River has yet to be determined. Hypotheses constructed about juvenile shortnose sturgeon distribution in the Delaware River have been based on comparisons of sturgeon in other river systems."

Q26B. What steps will you take to accurately quantify the number of shortnose sturgeon entrained during hydraulic dredging?

R26B. There is no requirement from the National Marine Fisheries Service as a result of the Biological Opinion issued for all Philadelphia District dredging projects to monitor for shortnose sturgeon in the reaches of the Delaware River that would be deepened. Nevertheless, it is the intention of the Philadelphia District to continue monitoring in soft-bottomed shipping channels such as the Delaware Estuary, when warranted. Sea turtle observer(s) shall be on board any hopper dredge working in areas of concern between 1 June to 15 November. In addition to sea turtles, the observer will monitor for shortnose and Atlantic sturgeon. All such dredging and monitoring will be conducted in a manner consistent with the Incidental Take Statement issued by the NMFS for this District. The incidental take for the shortnose sturgeon is 3 fish per year. In addition, inspectors will periodically monitor placement areas for any sturgeon. The District will continue to coordinate monitoring results with NMFS, and work to develop appropriate measures to minimize impacts.

Q26C. The assessment states "O'Herron believes that the juveniles could range between Artificial Island and Schuylkill with juveniles being closer to the downstream boundary during the winter when river freshwater input is normally greater." What studies exist to

demonstrate, to prove, this belief? Also, there is a large distance between river mile 54 and 92, what efforts are being undertaken to nail down this location?

R26C. See Response to Question26A.

Q26D. The assessment states, "little is known about the specific feeding habits of juvenile shortnose sturgeon in the Delaware River because attempts to locate them in the upper tidal river have been unsuccessful." What studies have been done regarding the location and feeding habitats of shortnose sturgeon near the blasting site?

R26D. The NMFS stated in their Biological Opinion (February 2, 2001) that while shortnose sturgeon forage on a variety of organisms, in the Delaware River, sturgeon primarily feed on the Asiatic river clam (*Corbicula manilensis*). *Corbicula* is widely distributed at all depths in the upper tidal Delaware River, but it is considerably more numerous in the shallows on both sides of the river than in the navigation channel. Foraging is heaviest immediately after spawning in the spring and during the summer and fall, and lighter in the winter. Juvenile sturgeon primarily feed in 33 to 66 feet deep river channels, over sand-mud or gravel-mud bottoms. However, little is known about the specific feeding habits of juvenile shortnose sturgeon in the Delaware River.

Q26E. The assessment states "Although no information is available, the 0.5 ppt isohaline would likely be downstream of the November location during December through March since larger freshwater inflows enter the river during this period." What studies/data is there to support this position?"

R26E. The quote pertains to flow and salinity conditions from December through March for two hydrological scenarios: a recurrence of the drought of record, and long-term average monthly flows. The period from December through March was not explicitly modeled in either scenario. However, within the Delaware Estuary there is a well-established seasonal pattern for inflows to increase, and for the salt line to be displaced in the downstream direction, in the December to March interval. Figure 2 presents a plot of long-term mean daily inflow to the Delaware River at Trenton. The peak inflow typically occurs around 1 April, whereas the minimum inflow typically occurs about 1 September. Tick marks on Figure 2 at day 1 of September through day 1 of April clearly indicate the seasonal trend for inflow to increase in this period. Note that these are long-term averages derived from over 50 years of daily inflow data, and that any particular year or season can have inflows that differ from the long-term average. Nevertheless, it is "normal" for the Delaware River to experience increasing freshwater inflows during the November through March time frame, and to experience a downstream displacement of the salt line, even though we did not explicitly model this interval.

Q26 F. "What information do you have on the month-by-month location of the oligohaline/freshwater interface? What information is available on the maximum and minimum locations of the interface?"

R26. F. "Oligohaline" refers to estuarine water with salinity in the range of 0.5 to 5 ppt (parts per thousand dissolved solids, by weight.) Assuming that the question

("oligohaline/freshwater interface") refers to the position of the 0.5 ppt isohaline, we have data from the 3D-hydrodynamic/salinity model that shows the location of this isohaline during different hydrologic scenarios. Table 5-4 of the Corps' July 1997 Supplemental EIS presents location data for the 0.5 ppt isohaline, as well as others, during a recurrence of the drought of record. Table 5-6 of the SEIS presents data for monthly averaged inflow conditions. The portions of these two tables that pertain to the 0.5 ppt isohaline are presented immediately below. The data indicate that under extreme drought conditions, the maximum upstream penetration of oligohaline conditions extends to approximately DRBC RM (River Mile) 86 to 89 with the 40 foot channel, and to RM 89 to 93 with the 45 foot channel, depending upon the month of the model simulation. Because isochlors penetrate further upstream in the middle of the channel that at the edges, the average location across the oligohaline front ranges from RM 83 to 88 with the 40 foot channel, and from RM 86 to 92 for the 45 foot channel, depending on the month of interest.

During average inflow conditions for the months of August through November, the maximum penetration of the oligohaline/freshwater interface is in the range of RM 73 to 76 for the 40 foot channel, and to RM 74 to 76 for the 45 foot channel. The location of the 0.5 ppt isochlor, averaged across the oligohaline front, ranges from RM 71 to 74 for both the 40 and 45 foot channels.

Model runs simulating the high-discharge period from April and May 1993 indicate that freshwater (salinity equal to zero) extends from the head of tide at Trenton (RM 133) downstream to at least RM 54 for the full two months. This obviously implies that the 0.5 ppt isochlor was located some distance downstream of RM 54 during that period. Thus, depending on the hydrologic scenario considered, the model shows the 0.5 ppt isohaline migrating as far upstream as the vicinity of RM 90 and as far downstream as the vicinity of RM 50, a range of 40 miles.

For comparison with the model results cited above, observed salinity conditions in the Delaware Estuary for the period July 1998 through May 2001 are presented in Figure 3, which displays the location of the "salt line" during this period. It should be noted that the "salt line" as determined by DRBC approximates, but is not exactly equal to, the 0.5 ppt isochlor or the "oligohaline-freshwater interface." DRBC defines the salt line as the 7-day average location of the 250 ppm (parts per million) isochlor. DRBC calculates the location of the salt line on a daily basis, based on conductivity/salinity measurements made at a number of locations within the upper estuary of the Delaware.

Chloride ion represents about 55% by weight of the total dissolved solids in typical seawater. Thus a chloride ion concentration of 250 ppm is approximately equal to a salinity of 450 ppm. For practical purposes, the "salt line" can be considered about the same as the 500 ppm "oligohaline-freshwater" interface. During the July 1998 through May 2001 period, the salt line has extended as far upstream as RM 89 during August 1999, and as far downstream as RM 55 in March 2000 and again in April 2001. In the seven-month period from August 1999 to March 2000, the salt line location fluctuated naturally over a distance of 39 miles.

Q26G. What studies have been done on shortnose sturgeon larger and or smaller than 55 grams and their survivability in proximity to blasting?

R26G. In Wilmington Harbor, Wilmington, North Carolina, studies were done to determine the impacts of blasting on shortnose sturgeon (Wilmington District, 2000). To determine the impacts of blasting on shortnose sturgeon and size of the LD1area (the lethal distance from the blast where 1 % of the fish died), test blasting was performed in Wilmington Harbor in the fall/winter of 1998/99. During test blasting, 50 hatchery reared shortnose sturgeon were placed in cages (2 feet diameter by 3 feet long plastic cylinders) 3 feet from the bottom (worst case survival scenario for blast pressure as confirmed by test blast pressure results) at 35, 70, 140, 280 and 560 feet up and downstream of the blast. Also, 200 caged sturgeon were held at a control location about ½ mile from the blast location. Based on random weighing of 70 of the caged sturgeon, the caged fish had a mean weight of 55 grams and were young of the year fish. The range of fish used was from 15 to 139 grams. Young fish were used because smaller fish have been shown to be more susceptible to pressure (O'Keeffe 1984 a&b, Keevin and Hempen 1997, Young 1991).

References:

Keevin, Thomas M. and Gregory L. Hempen. 1997. *The Environmental Effects of Underwater Explosions with Methods to Mitigate Impacts*. U.S. Army Corps of Engineers, St. Louis District, St. Louis, Missouri.

O'Keeffe, John David. 1994a. *Guidelines for Predicting the Effects of Underwater Explosions on Swimbladder Fish*. Research and Technology Department. Navel Surface Weapons Center NSWC TR 82-328. Silver Spring, MD.

O'Keeffe, John David and George A. Young. 1994b. *Handbook on the Environmental Effects of Underwater Explosions*. Research and Technology Department. Navel Surface Weapons Center NSWC TR 83-240. Silver Spring, MD.

Young, George A. 1991. *Concise Methods for Predicting the Effects of Underwater Explosions on Marine Life*. Research and Technology Department. Naval Surface Warfare Center. NAVSWC MP 91-220. Silver Spring, MD.

Wilmington District. 2000. *Environmental Assessment Preconstruction Modifications of Authorized Improvements, Wilmington Harbor, North Carolina. U.S. Army Corps of Engineers*. Wilmington, North Carolina, February 2000.

Q26H. The assessment discusses the Corps' belief that juvenile shortnose sturgeon overwinter on the fresh side of the oligohaline/fresh water interface. What studies exist to support this conclusion? Are they always on the freshwater side?

R26 H. See Response to Question26A.

Q26I. The assessment asserts that the blasting is unlikely to have a significant impact on the food source of shortnose sturgeon because their "favorite food source" *Corbicula* is wide spread in the Delaware Estuary. What studies does the Corps have to support the assertion that *Corbicula* is the primary food source in the estuary portion of the River, particularly the area where the blasting is to take place? What studies do you have that *Corbicula* occur at the same level in the blasting portion of the river as upriver? If *Corbicula* is not found to be in the blasting portion of the river, what studies demonstrate what food source is there and its role as a possible food source for shortnose sturgeon? What do you know about invertebrate fauna in the blasting range and are they suitable for shortnose sturgeon?

R26I. In the biological assessment, the statement that the Delaware River, Asiatic river clam (*Corbicula manilensis)* is considered to be the primary food source for shortnose sturgeon cites the following study:

O'Herron, J.C. II, Able, K.W., and Hastings, R.W. 1985, *A Study of the Shortnose Sturgeon (Acipenser brevirostrum) population in the upper tidal Delaware River: Assessment of impacts of maintenance dredging (Post- dredging study of Duck Island and Perriwig ranges)*, Draft final report. Prepared for the U.S. Army Corps of Engineers, Philadelphia District by the Center for Coastal and Environmental Studies, Rutgers, the State University of New Jersey, New Brunswick, NJ

A survey of benthic organisms from the C&D Canal to Trenton, New Jersey, which includes the blasting area, found that the benthic macroinvertebrate community was dominated by sludge worms, fly larvae, scuds, aquatic pill bugs, bristle worms and *Corbicula* (Environmental Consulting Services, Inc. 1993). Also, **see Response26 D.**

Environmental Consulting Services, Inc. 1993. *Survey of benthos: Delaware estuary: from the area of the C&D Canal through Philadelphia to Trenton.* Delaware Estuary Program.

Q26J. One of the alternatives for minimizing impacts relies on the use of gill nets to keep sturgeon out of the blasting area. What studies have you done on the force and speed of the current in this reach of the river? What studies do you have to demonstrate that the gill nets could actually withstand this force?

R26J. The purpose of the gill nets is not to keep sturgeon out of the blasting area, but to capture the fish prior to blasting and remove them so that they are not injured. This conservation measure is in the Biological Opinion issued by the National Marine Fisheries Service on February 2, 2001 and reads as follows:

"Before each blast, four sinking gillnets (5.5 inch stretched mesh, 328 feet [100 meters] long, 9.8-13.1 feet [3-4 meters] high) will be set to surround each blast area as near as feasible. These nets shall be in place for at least 3 hours and none of the nets will be removed any sooner than 1 hour before the blast. This may require overnight sets. The

nets shall be manned continuously to prevent obstructing the channel to ship traffic. Any sturgeon removed (shortnose or Atlantic) shall be tagged and released at a location approved by the NMFS."

Sinking gill nets have been used successfully in the Delaware River to capture shortnose sturgeon. They would be placed parallel to the river current at a navigation channel depth (Environmental Research and Consulting, Inc. 1999).

Environmental Research and Consulting, Inc. 1999. *Interim Report of Shortnose Sturgeon Population Studies in the Delaware River, January through April 1999.* Prepared for National Marine Fisheries Service, Gloucester, MA.

Q26K. You cite studies which say that smaller fish are generally more vulnerable to injury than larger fish, are these studies based on fish in general or on shortnose sturgeon specifically?

R26K. The studies cited in **R26G** that smaller fish are generally more vulnerable to injury than larger fish were based on fish with swim bladders, but not specifically shortnose sturgeon (which have swim bladders). The study cited by the Wilmington District in the Biological Assessment to evaluate blasting impacts was done specifically on shortnose sturgeon. The conservation measures in the Biological Assessment prepared by the Philadelphia District and the Biological Opinion issued by the National Marine Fisheries Service, are based on these studies.

Q26L. What studies do you have that sonar fish finders can accurately locate shortnose sturgeon?

R26 L. The use of sonar is intended to detect schools of any fish that may be in the blasting area prior to blasting. The measure is described in the Biological Opinion from the NMFS (February 2, 2001):

"Surveillance for schools of fish will be conducted by vessels with sonar fish finders (with a LCD display screen) for a period of 20 minutes before each blast. The surveillance zone will be approximately circular with a radius of about 500 feet extending outward from each blast set. If fish schools are detected, blasting will be delayed until they leave."

There is little precedent for using acoustics to detect the presence of sturgeon. In theory, fisheries hydroacoustics gear could "see" sturgeon unless they were sitting directly on the bottom. The problem would be covering enough area to discern their presence (assuming they are rare), and distinguishing them from other targets of the same size characteristics. Although fisheries hydroacoustics technology is progressing in that direction, we can't at this point confidently distinguish targets at the species-level. The acoustics data have to be "ground-truthed" by conventional net samples (Clarke, Douglas, U.S. Army Engineer Research and Development Center, Vicksburg, MS. Personal Communication, June 18, 2001).

R27. An analysis potential impacts of the project on drinking water aquifers and groundwater is presented in the July 1997 SEIS in Sections 5.10 and 7.0 respectively. At the request of the Corps, the U.S. Geological Survey was tasked to make an assessment or investigate impacts of the dredging project on the drinking water aquifers. The concerns generally focused on three areas of concern.

- (1) Dredging breaches confining unit
- (2) Saltwater in river encroachment onto well-recharge areas
- (3) Disposal areas effecting nearby wells

To address the above concerns the U.S. Geological Survey (USGS) subsequently performed three separate studies. The USGS issued three separate reports as listed below.

1. Evaluation of Ground-Water Flow from Dredged Material Disposal Sites in Gloucester and Salem Counties, New Jersey (USGS, 1995)

2. Hydrogeologic Conditions Adjacent to the Delaware River, Gloucester, Salem and Cumberland Counties, New Jersey (USGS, 1996)

3. Selected Hydrogeologic and Chloride-Concentration Data for the Northern and Central Coastal Area of New Castle County, Delaware (USGS, 1998)*

Note draft report was prepared in 1996.

A letter dated 23 January1996 was then issued by the USGS, which summarized their findings and referenced these reports. A copy of that letter is enclosed.

USGS investigation or analysis of the above concerns reached the following findings.

In summary, the concerns about increasing the potential for saltwater from the river to infiltrate into the adjacent aquifers, either as a result of dredging through a confining unit or as a result of the upstream movement of saltwater in the deepened channel can be set aside. No significant confining units will be breached and the saltwater will not significantly move upstream to increase the threat of saltwater intrusion.

The concern that fluids leaching from the dredged-material disposal areas could infiltrate to the aquifer with recharge can also be set aside.

Since the completion of that study and in cooperation with NJDEP and DNREC, the Corps has installed monitoring wells at all Federally owned CDFs that are or will be used for placement of dredged material from the maintenance of the existing 40-foot Delaware River Main Channel as well as from the deepening project in the States of New Jersey and Delaware. Also, groundwater-monitoring wells will be installed at the new upland disposal sites that will be developed for the deepening project. Groundwater monitoring plans have been submitted to NJDEP and DNREC for their approval. Upon approval, the Corps will commence the groundwater monitoring.

Q28. What studies have been done on CDFs for this project and what were their findings?

R28. Geotechnical testing has been performed at all existing CDFs and proposed new upland CDFs. In addition, for the proposed CDFs HTRW sampling was performed. In addition, environmental assessments were performed on all proposed CDFs. These reports described vegetation, wildlife resources, and wetlands. The results of these studies are summarized in Sections 3.2, 6.2 and 6.3 of the Corps' July 1997 Supplemental EIS. Plans to manage the new CDFs to provide wetland habitat are described in Sections 6.4 and 6.5. Section 6.6 describes how the quantity and quality of wetlands could be increased over existing conditions. This plan was developed in coordination with the NJDEP and the USFWS. In addition, water quality monitoring was conducted during maintenance dredging operations at the Pedricktown and Killcohook CDFs. No significant impacts were identified.

Q29. What approvals are needed to engage in economic loading and from whom?

R29. The States of Delaware and New Jersey would have to approve economic loading relative to compliance with their Section 401 Water Quality Certification Programs and Coastal Zone Management Programs.

Q30. How have you addressed the studies that find conflicting directions of net flow of water in the C&D Canal?"

R30. The 3D-hydrodynamic/salinity modeling for the Delaware Deepening Study was completed in 1996. A similar study effort during the C&D Canal Deepening Study was completed approximately three years later. In that period, several changes and improvements were made to the 3D model of Delaware Estuary and Upper Chesapeake Bays, including better vertical resolution of depth near the bottom, refined grid cell spacing, improved vertical accuracy on Chesapeake Bay tidal boundary conditions, as well as others. The combined impact of these changes was that the net monthly flows through the C&D Canal during the drought of record simulation changed from westward in the Delaware modeling to eastward in the later C&D modeling.

On a tidal time scale, the results in the canal for the two models are very similar. For example, plots of computed versus observed velocity data in the canal show a high degree of similarity between the C&D Report and the Delaware Report for comparable periods. However, the direction of net flow is reversed. The important question is whether this impacts salinity conditions in the Delaware Bay and River. We made a model run with the Delaware model for 1965 in which net flow through the Canal was forced to the east by adjusting the Annapolis boundary tide signal upwards by 7 cm and the Lewes tide signal downward by 6 cm. The results show that with eastward flow thought the Canal in 1965 the computed salinity at Philadelphia and Marcus Hook is reduced compared to the results from the Delaware Deepening model. Thus, if the Delaware Deepening model was, in fact, in error as regards the net flow direction during the 1965 drought of record, correcting the flow direction would lead to somewhat lower model predictions of salinity at River Mile 98 in Philadelphia. In summary, we recognize

that there are differences between the earlier Delaware Deepening salinity model and the later C&D Deepening model with respect to monthly net flows during the 1965 drought simulations. However, "net flow" in the C&D Canal is always a small difference between the very large eastward and westward flows that result from continually changing instantaneous head difference between the two ends of the Canal.

Figure 1

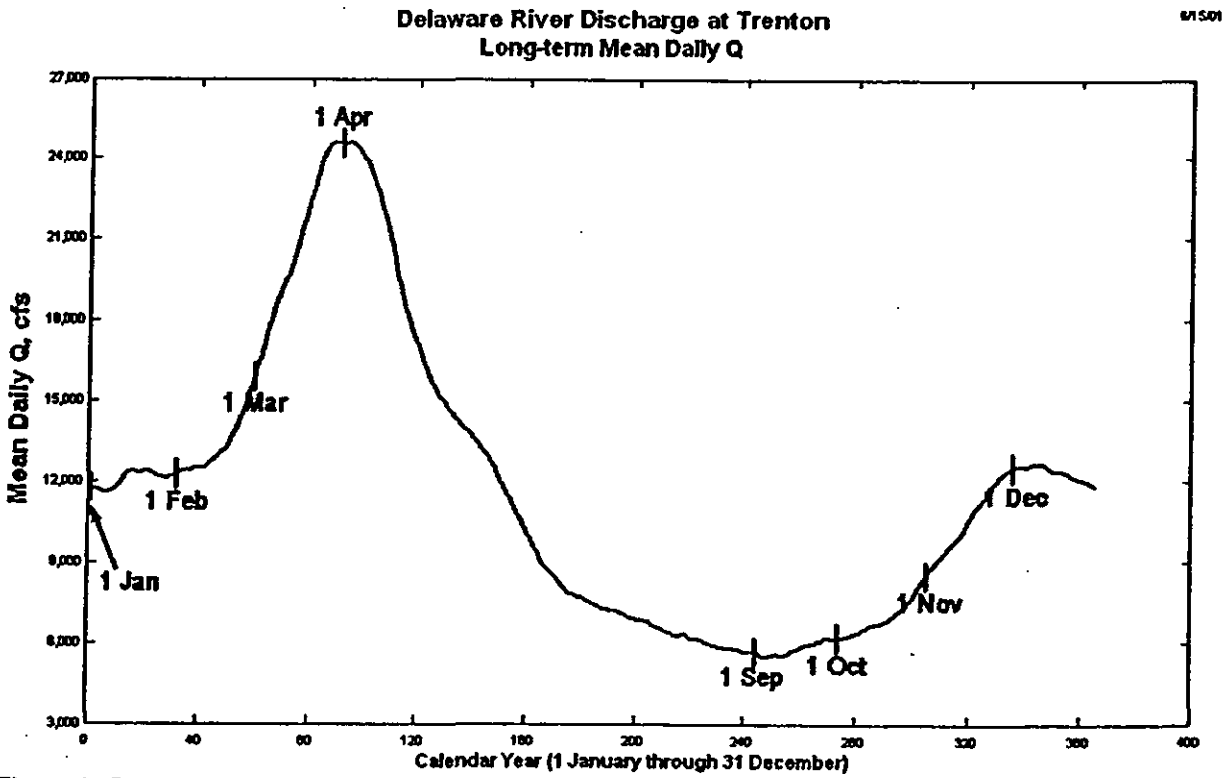

Figure 2. Long-term Mean Daily Flow at Trenton.

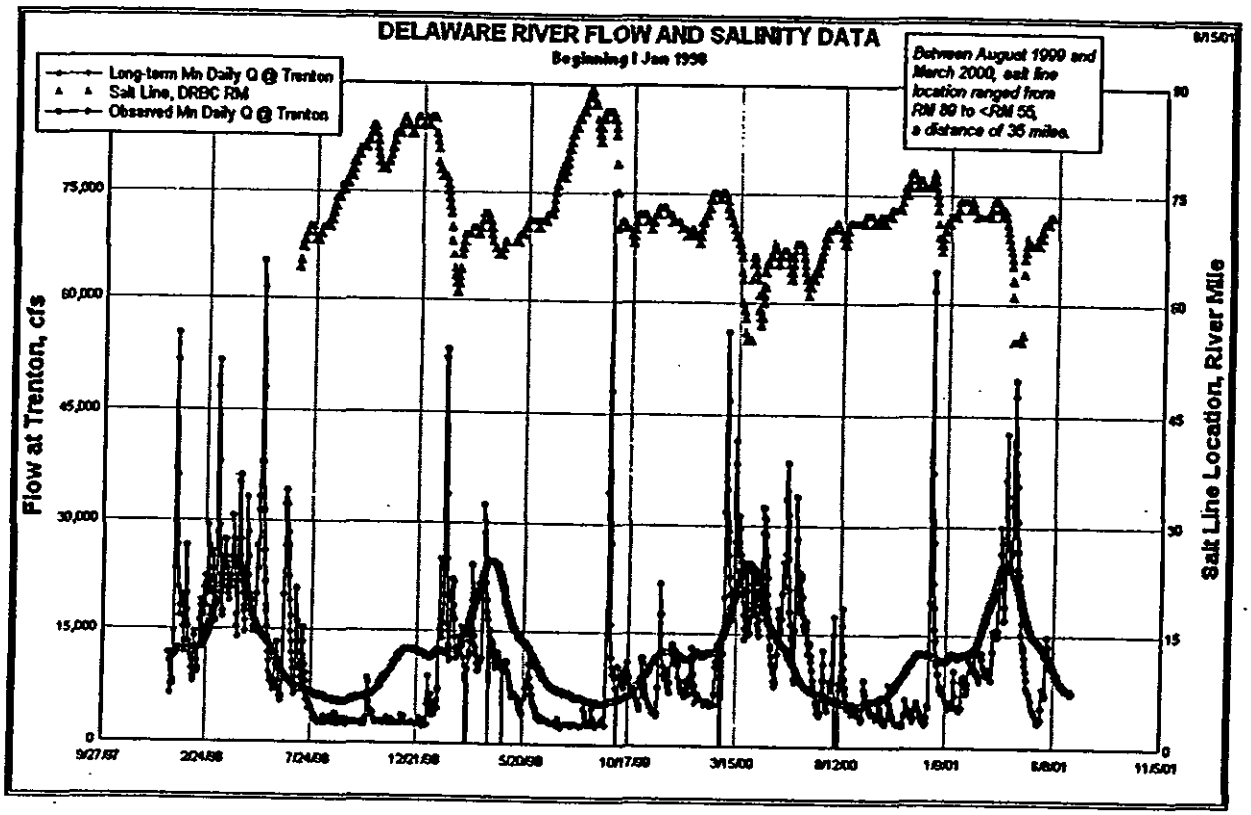

Figure 3. Flow and Salt Line Data

MONTHLY AVG LOCATION OF 0.5 ppt ISOHALINE (RM)						
MONTH	MAX INTRUSION			AVG ACROSS FRONT		
	40 FT	45 FT	DIFF	40 FT	45 FT	DIFF
AUG	85.8	88.9	3.1	83.3	86.2	2.9
SEPT	88.4	88.9	0.5	85.3	88.4	3.1
OCT	86.6	88.9	2.3	85.3	88.4	3.1
NOV	88.9	92.8	3.9	88.4	91.7	3.3

Source: Table 5-4, Supplemental EIS.

MONTHLY AVG LOCATION OF 0. 5 ppt ISOHALINE (RM)						
MONTH	MAX INTRUSION			AVG ACROSS FRONT		
	40 FT	45 FT	DIFF	40 FT	45 FT	DIFF
AUG	73	73.9	0.9	70.6	70.6	0
SEPT	75	76.1	1.1	72.2	73	0.8
OCT	76.1	76.1	0	73.9	73.9	0
NOV	73.9	75	1.1	71.5	72.2	0.7

Source: Table 5-6, Supplemental EIS.

June 5, 2001

US Department of the Army -- Corps of Engineers
Philadelphia District
Wanamaker Bldg
100 Penn Square East
Philadelphia, PA 19107-3396

Hand delivered
June 6, 2001
Dover, DE

In addition to the questions submitted during our presentation, the Delaware Riverkeeper Network would like to request written responses, on the record, to the questions that follow. We have also attached copies of two freedom of information act requests that were mailed to your Philadelphia office on May 1, 2001 and May 8, 2001. We have yet to receive responses to these requests and ask that you provide the requested information immediately.

#1 ✓How much more crude oil have you predicted will come up the River if this project takes place?

#2 ✓Does the cost benefit analysis for this project include the cost to deepen the private channels of the oil facilities which have to be deepened for those facilities to get the benefits attributed to them? If not, why not?

#3 ✓Figure 13 in your permit application shows blasting only to occur in and around the Marcus Hook area, but the text of the application discusses blasting that continues in Reaches C and D. Where exactly will blasting be occurring?

#4 ✓Where do the spoils presently dredged from Reach E of the River/Bay during maintenance dredging presently get disposed of? Could those sediments be used for beach replenishment? If not, why not?

#5 ✓What benefits did you attribute to the containership industry from this project?

#6 ✓ How much oil has been spilled during lightering in Delaware Bay in the last 50 years?

#7 ✓How did you include the benefit of potential reduced oil spillage in your cost/benefit analysis? Did you use this same approach for including things like the cost of potential decimation of oyster populations on the cost side of your calculation?

DELAWARE RIVERKEEPER® NETWORK - *with offices on the main stem Delaware, in the Schuylkill Watershed and in the Delaware Estuary*
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An American Littoral Society Affiliate

#8 ✓How is the company that does the dredging selected? How many companies that operate and employ within this region are capable of participating in that process? Who does the current maintenance dredging? Can you/do you dictate that the project employees be hired from within the region where the project is ongoing?

#9 ✓You did not calculate economic benefits to the Port of Wilmington because existing side channels are less than 40 feet. Why then did you calculate benefits to oil facilities who have private channels that are also less than 40 feet? What is the current depth of the private channels for the 6 oil facilities that will benefit from the project?

#10 ✓Please share the details regarding the model used for the economic calculations with regards to the State of Delaware – the model, assumptions made, data used, and outcomes. Where else has this model been used? Has it been validated? When? By whom?

#11 ✓While you have done analysis of discharges from the Pedricktown and Kilcohook CDFs, what studies have you done on the levels of pollution discharging from the National Park, Oldmans, Artificial Island, Penns Neck, and Reedy Point sites? For the record, please supply copies of any such studies and associated findings.

#12 ✓Are discharges to the Delaware River and tributary streams from the confined disposal facilities currently subject to Clean Water Act permits? If not, why not? Are their discharges regularly monitored? If yes, by whom? Please provide any data for the record.

#13 ✓We have been repeatedly told that the Corps has studied drinking water impacts associated with the confined disposal facilities, but, we have yet to see these studies. Could you please supply a copy as part of the record of this workshop?

#14 ✓In the SEIS and other supporting materials for this project you state that 4 new CDFs are necessary to accommodate the dredge spoils, why now do you only list 3?

#15 ✓Do you plan to use a process known as economic loading whereby sediment laden water is allowed to spill over the side of the dredge barge to the River? When will this decision be made? What studies have been done on the water quality impacts of this action? On the impacts to oyster beds? What approvals would be necessary for this practice to be put into use assuming all other permits and approvals for the project as a whole have already been received?

#16 ✓The Delaware River Basin Compact requires all projects that will affect the River to be incorporated into the Comprehensive Plan. Has this project been incorporated into the Comprehensive Plan? If so, was public input solicited? If not, why not?

#17 ✓Your permit application says the Corp is doing monitoring of oysters pre, during and post construction in order to "attempt to determine if the project significantly impacted the oyster resources". What is the status of your pre-construction monitoring?

#18 ✓What is your definition of a significant impact to the oyster seed beds and populations? At what point will you make a determination about whether or not there is a significant impact to oyster populations from this project? Will there be any effort to identify impacts as the project moves forward so appropriate responsive action (or even a stop in the dredging) could take place if deemed necessary to protect the oysters?

#19 ✓When will you conduct a study and report regarding PCBs, metals and organic contaminants in berthing areas and private channels? We recommend this study and report include the kinds of information Rick Greene has included in his analysis on the main channel in his draft report dated February 1999.

#20 ✓Why have you not used the SSfate model for your water quality standards analysis?

#21 ✓What action will be taken to protect Sea Turtles from the dredging project?

#22 ✓In your sampling protocols for female crabs why are the samples being collected by dragging the sampler for 1 minute at 3 knots? Would it not be more appropriate to sample by dragging the sampler for a certain, uniform, distance? Otherwise, depending on current and winds is it conceivable that the sampling boat could move a very small distance, even no distance, across the bottom of the River and yet still be traveling 3 knots for 1 minute?

#23 ✓Why has Kelly Island been eroding? Is this a natural phenomenon or a manmade one? If manmade, what is the cause and what action will be taken to address that cause?

#24 ✓Is the Kelly Island project only implementable if the deepening project goes forward?

#25 ✓What action will be taken to ensure the restored areas on Kelly Island will not be invaded by Phragmites?

#25A ➳You have said that if phragmites does move in herbicides will be used for control – we are opposed to this method of phragmites control and urge you to create plans which prevent invasion of phragmites in the first place by making the elevations, inundation periods, etc... to be <u>not</u> conducive to phragmites invasion. What steps have you taken in this direction?

#25B ➳To the extent you are thinking of using herbicides, you have talked about "spot" treatment – in New Jersey spot treatments have included aerial spraying of over 2000 acres. What is your definition of "spot treatment"?

#25C ➳Who will be responsible for the decisions regarding phragmites? Who will be responsible for the costs of that decision? Who will be responsible for implementation of that decision?

#26 ✓With regards to the shortnose sturgeon biological assessment:

#26A ➳The assessment states: "South of Wilmington the shortnose sturgeon population is limited to adults due to increased salinity." What studies do you have to support this statement/assertion?

#26B ➳What steps will you take to accurately quantify the number of shortnose sturgeon entrained during hydraulic dredging?

#26C ➳The assessment states "O'Herron believes that the juveniles could range between Artificial Island and the Schuylkill with the juveniles being closer to the downstream boundary during the winter when river freshwater input is normally greater." What studies exist to demonstrate, to prove, this belief? Also, there is a large distance between river mile 54 and 92, what efforts are being undertaken to nail down this location?

#26D ➳The assessment states, "little is known about the specific feeding habits of juvenile shortnose sturgeon in the Delaware River because attempts to locate them in the upper tidal river have been unsuccessful." What studies have been done regarding the location and feeding habits of shortnose sturgeon near the blasting site?

#26E ➳The assessment states: "Although no information is available, the 0.5 ppt isohaline would likely be downstream of the November location during December through March since larger freshwater inflows enter the river during this period." What studies/data is there to support this position?

#26F ➳What information do you have on the month-by-month location of the oligohaline/freshwater interface? What information is available on the maximum and minimum locations of the interface?

#26G ➳What studies have been done on shortnose sturgeon larger and/or smaller than 55 grams and their survivability in proximity to blasting?

#26H ➳The assessment discusses the Corps' belief that juvenile shortnose sturgeon overwinter on the fresh side of the oligohaline/fresh water interface. What studies exist to support this conclusion? Are they always on the freshwater side?

#26I ➳The assessment asserts that the blasting is unlikely to have a significant impact on the food source of shortnose sturgeon because their "favorite food source" *Corbicula* is wide spread in the Delaware Estuary. What studies does the Corps have to support the assertion that *Corbicula* is the primary food source in the estuary portion of the River, particularly the area where the blasting is to take place? What studies do you have that *Corbicula* occur at the same level in the blasting portion of the river as upriver? If *Corbicula* is not found to be in the blasting portion of the river, what studies demonstrate what food source is there and its role as a possible food source for shortnose sturgeon? What do you know about invertebrate fauna in the blasting range and are they suitable for shortnose sturgeon?

#26J ➳One of the alternatives for minimizing impacts relies on the use of gill nets to keep sturgeon out of the blasting area. What studies have you done on the force and

speed of the current in this reach of the river? What studies do you have to demonstrate that the gill nets could actually withstand this force?

#26K ➤➤ You site studies which say that smaller fish are generally more vulnerable to injury than larger fish, are these studies based on fish in general or on shortnose sturgeon specifically?

#26L ➤➤What studies do you have that sonar fish finders can accurately locate shortnose sturgeon?

#27 ✓ can you please provide any studies on the impacts of the dredging project on drinking water aquifers?

#28 ✓ what tests have been done all CDFs for this project and what were their findings?

#29 ✓ what approvals are needed to engage in economic loading and from whom?

[redacted]

#30 ✓ How have you addressed the studies which find conflicting directions of net flow of water in the C&D canal?

DELAWARE RIVER MAIN CHANNEL DEEPENING PRROJCT

RESPONSES TO QUESTIONS IN A LETTER DATED 6 JUNE 2001
FROM June D. MacArtor, Esquire

Question 1. Responsibility Issues. It appears that the sponsor, the Delaware River Port Authority, has no project responsibilities other than providing their portion of the non-Federal part of project funding and sites adequate to accept all project spoils.

- Is this correct? If not, what additional responsibilities does DRPA have?

Response. Besides providing project funding and provision of sites to accept dredged material from initial deepening as well as subsequent maintenance of the 45-foot channel, the sponsor would be responsible for various actions as discussed in responses to question 2 below.

Question 2. Legal Responsibility for Remediation.

- Who decides whether or not remediation is required, and exactly what type and degree of remediation is appropriate?

Response. Any decision as to need, type and degree of hazardous substance remediation covered by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) will be made by the U.S. Environmental Protection Agency in conjunction with the State where the remediation is taking place. Any other environmental remediation will be decided upon by the Corps unless such remediation is a requirement of any valid State permit or water quality certification in which case the State will decide upon the need, type and degree of remediation required.

- Who is legally responsible to perform and/or pay for needed remediation work?

Response. Responsibility for project costs are set forth in the Project Cooperation Agreement (PCA) entered into by the Corps and the Delaware River Port Authority. All CERCLA remediation costs are the responsibility of DRPA. Any other remediation costs would be subject to cost-sharing between the Corps and DRPA.

- What are the limits of responsibility of the Corps, the sponsor (Delaware River Port Authority and the State of Delaware?

Response. The Corps is unaware of any limitations on its responsibilities or the responsibilities of DRPA as set forth in the PCA other than the limitations that may be subsequently placed upon the Corps by the United States Congress. The limitations on the State of Delaware's Department of Natural Resources and Environmental Control as a regulatory agency are those placed upon it by the State Legislature.

-Is there precedent for liability, or non-liability, on the part of the sponsor, in this case the Delaware River Port Authority.

Response. Both the Federal Government and DRPA are included within the definition of the term "person" as set forth in section 101(21) of CERCLA and are therefore subject to any hazardous substance remediation required under CERCLA. Liability for any state permit or water quality certification violation would be placed upon the Corps as the permit holder.

Question 3. Permit Application.

- As a civilian employee, does Delaware agree that Mr. Callegari is authorized to commit the Corps to the agreements specified in the permit application?

Response. State of Delaware is preparing a response.

- ***Is Mr. Callegari- or anyone in the Corps –authorized to commit the Delaware River Port Authority to anything?***

Response. No.

June D. MacArtor, Esquire
93 Caravel Drive
Bear, DE

June 6, 2001

To: U. S. Army Corps of Engineers
Re: Liability for Dredging DE R channel from 40' to 45'

#1 • Responsibility Issues. It appears that the sponsor, the Delaware River Port Authority, has no project responsibilities other than providing their portion of the non-Federal part of project funding and sites adequate to accept all project spoils.

- Is this correct? If not, what additional responsibilities does DRPA have?

#2 • Legal Responsibility for Remediation. It is important that all major groups involved in or affected by the project (the Corps, DRPA and the State of Delaware) know who is responsible for what, in the case of needed environmental remediation required due to project activities or later maintenance dredging.

- Who decides whether or not remediation is required, and exactly what type and degree of remediation is appropriate?

- Who is legally responsible to perform and/or pay for needed remediation work?

- What are the limits of responsibility of the Corps, the sponsor (Delaware River and Port Authority) and the State of Delaware?

- Is there precedent for liability, or non-liability, on the part of the sponsor, in this case the Delaware River Port Authority?

#3 • Permit Application. The Delaware Basic Application Form requires specification of 'Applicant", Authorized Agent" and "Contractor". It would seem that the "Applicant" should be the DRPA, the "Contractor" should be the USACE and the "Authorized Agent" can be a Corps employee or whoever else the DRPA wishes to designate to act on their behalf in the processing of the application. From the perspective of potential liability, it is important that the differing roles of applicant, contractor and agent be understood and in keeping with Delaware law ... and settled before permits are issued.

- As a civilian employee, does Delaware agree that Mr. Calligari is authorized to commit the Corps to the agreements specified in the permit application?

- Is Mr. Calligari – or anyone in the Corps – authorized to commit the Delaware River Port Authority to anything?

June D. MacArtor, Esquire

4. Additional Supporting Documents

The following is a list of supporting documents. Actual documents are included in two separates binders (Volumes 1 and 2).

VOLUME 1

SHORTNOSE STURGEON

- Telephone conversations with John O'Herron on 28 March 2000 and 20 June 2001.
- Telephone conversation with Carrie Mc Daniel on 17 June 2001.
- National Marine Fisheries Service Biological Opinion dated January 31, 2001.
- Biological Assessment: Prepared by Corps of Engineers, Philadelphia District, entitled: "Effects of Rock Blasting on the Shortnose Sturgeon" – May 2000.
- O'Herron, J.C. II, Able, K.W., and Hastings, R.W., 1993, *Movements of the Shortnose Sturgeon (Acipenser brevirostrum) in the Delaware River,* Estuaries 16 (2): 235 – 240.
- Dadswell, M.J., B.D. Taubert, T.S. Squiers, D. Marchette, and J. Buckley. 1984. *Synopsis of biological data on the shortnose sturgeon (Acipenser brevirostrum) (LeSueur, 1818).* NOAA Technical Report, NMFS 14, National Marine Fisheries Service. October 1984. 45 pp.

GROUND WATER

- Evaluation of Ground-Water Flow from Dredged Material Disposal Sites in Gloucester and Salem Counties, New Jersey (USGS, 1995).
- Hydrogeologic Conditions Adjacent to the Delaware River, Gloucester, Salem and Cumberland Counties, New Jersey (USGS, 1996).
- USGS letter prepared by Anthony S. Navoy dated January 23, 1996 to Mr. Stan Lulewicz, Corps of Engineers.
- Selected Hydrogeologic and Chloride-Concentration Data for the Northern and Central Coastal Area of New Castle County, Delaware (USGS, 1998)

WATER QUALITY MONITORING

- Water Quality Monitoring For Salem River Dredging, Prepared for U.S. Army Corps of Engineers by Versar, Inc. February 1996.

VOLUME 2

WATER QUALITY MONITORING

- Pedricktown Confined Disposal Facility Contaiment Loading and Water Quality Analysis, Prepared for U.S. Army Corps of Engineers by Versar, Inc. October 2000.
- Killcohook Confined Disposal Facility Water Quality Analysis, Prepared for U.S. Army Corps of Engineers byVersar, Inc. February 2001

5. Public Workshop Attendees

US Corps of Engineers
June 6, 2001 Workshop

First Name	Last Name	Street	City	State	Zip	Organization/Affiliation
						Delaware for Safe Waters
C.M. Ross	Abson	607 South Street	New Castle	DE	19720	Green Delaware
Hilda	Amacker	4455 Ct. Ave., NW, Suite A300	Washington	DC	20008	Clean Water Action
Jim	Bailey	401 N. Bayshore Drive	Milton	DE	19968	Broadkill Beach Preservation Assoc.
Mike	Borovicka		Dover AFB	DE		
Carol	Braverman	3 West Virginia Ave.	Broadkill Beach	DE	19968	Broadkill Beach Preservation Assoc.
Jed	Brown	2610 Whitehall Neck Road	Smyrna	DE	19977	US Fish & Wildlfie Service
Jim	Bryant	104 Savannah Dr.	Bear	DE	19701	Green Peace
Ray	Burton	312 Walnut Street	Milton	DE	19968	Broadkill Beach Preservation Assoc.
Jerry	Butkus	1002 N. Bay Shore Dr., Broadkil	Milton	DE	19968	
David	Carter	89 Kings Hwy.	Dover	DE	19901	DNREC/DSWC
						Motiva Enterprises
Thomas W.	Carter	2000 Wrangle Hill Road	Delaware City	DE	19706	Delaware City Refinery
Don	Casbaugh	49 Marsh Woods Lane	Wilmington	DE	19810	Delaware Bicycle Council
Carrie	Casey	844 King Street	Wilmington	DE	19801	Office of Senator Corper
Chris	Castagno	19 East Fifth St.	New Castle	DE	19720	
Chester	Clark	2611 Tyrnsfone Dr.	Wilmington	DE	19808-1638	
Dori	Connor	18 Crippen Drive	New Castle	DE	19720	Delaware State Senator
Sarah	Cooky	89 Kings Hwy.	Dover	DE	19901	DNREC
Richard	DeWan	401 E. State Street	Trenton	NJ	08620	NJ DEP
Kevin	Donnelly	89 Kings Hwy.	Dover	DE	19901	DNREC/DWR
Eileen	Elmer	2506 S. Bay Shore	Milton	DE	19968	
John	Flaherty	506 W. 30th St.	Wilmington	DE	19802	Delaware Greenwatch
Lorraine	Fleming	PO Box 700	Hockessin	DE	19707	Delaware Nature Society
Dick	Fleming	19 Quail Crossing	Wilmington	DE	19807	Delaware Nature Society
George	Freebery	813 W. 13th Street	New Castle	DE	19720	City of New Castle
W.	Gahagan	601 Smiths Bridge Road	Wilmington	DE	19807	
Shawn M.	Garvin	1650 Arch Street	Philadelphia	PA	19103	EPA, Region III
Glenn	Gauvry	2012 S. Baysore Dr.	Milton	DE	19968	Ecocogical Research & Development Group (ERDG)
James P.	Gorman	309 Carolyn St.	Georgetown	DE	19947	Bud Gorman Inc.
Rick	Greene	89 Kings Hwy.	Dover	DE	19901	DNREC
Robert	Henry	89 Kings Hwy.	Dover	DE	19901	DNREC/DSWC
Laura	Herr	89 Kings Hwy.	Dover	DE	19901	DNREC/Wetlands
James R.	Hodges	1304 Radford Road	Wilmington	DE	19803	Independent small boater
Joanne	Hughey	89 Kings Hwy.	Dover	DE	19901	DNREC

Sara E.F.	Hutchinson	14 W. 4th	New Castle	DE		
Antonio R.	Janairo	644 Venue Dr.	Dover	DE	19901-4305	
Kate	Johnson	300 S. New Street	Dover	DE	19904	Congressman Mike Castle
Forsyth P.	Kinean	25 State Police Drive	West Trenton	NJ	08626	Delaware Estuary Program
Kevin W.	Krick	240 Cherry Street	Philadelphia	PA	19106	Maritime Exchange
Joyce W.	Lindsay	106 Virginia Ave., Broadkill	Milton	DE	19968	Broadkill Beach Preservation Assoc.
Susan	Love	89 Kings Hwy.	Dover	DE	19901	DNREC/DCMP
June	MacArtor	93 Caravel Dr.	Bear	DE	19701	
Spiros	Manteavinos	2000 Wrangle Hill Road	Delaware City	DE	19706	Motiva Enterprises
Andrew T.	Manus	30 Rodney Road	Dover	DE	19901	
Bob	Martin	220 Delaware Street	New Castle	DE	19720	City of New Castle
Maryanne	McGonegal	506 W. 30th St.	Wilmington	DE	19802	Delaware Greenwatch
Tom	McGonigle	402 Iking Drive	Wilmington	DE	19802	
Tom	McKenna	University of Delaware	Newark	DE	19716	Delaware Geological Survey
Dorothy P.	Miller	430 Orchard Road	Newark	DE	19711-5137	Coalition for Natural Stream Valleys, Inc.
Roy	Miller	89 Kings Hwy.	Dover	DE	19901	DNREC/Div. Fish & Wildlife
Bill	Moyer	89 Kings Hwy.	Dover	DE	19901	DNREC
Laurie	Moyer	89 Kings Hwy.	Dover	DE	19901	DNREC/AWR
Alan	Muller	Box 69	Port Penn	DE	19731	Green Delaware
Jane	Nogaki	223 Park Ave.	Marlton	NJ	08053	NJ Enviornmental Federation
Denise	Obert	PO Box 61	Palonianian Springs	VA	20129	National Wildlife Federation
Jeff	Otto	411 S. Ivy Lane	Glen Mills	PA	19342	Harbor Rock
W. H.	Palmer	PO Box 867	Valley Forge	PA	19482	Water Resources Assoc.
Jim	Parrs	2411 Berwyn Rd.	Wilmington	DE	19810	delaforum.com
Bruce	Patrick	Federal & Water Street	Dover	DE	19903	Div. Of Public Health
Chip	Patterson	216 Chestnut Street	New Castle	DE	19707	Municipal Services Commission
Gary	Patterson	PO Box 1429	Dover	DE	19903	
Susan L.	Peterson	176 Little Elk Creek Road	Elkton	MD	21921	Delaware Ornithological Society
Tim	Plemmons	156 E 4th St.	New Castle	DE	19720	
Anne	Porter	10 N. Caroline Avenue	Milton	DE	19968	Broadkill Beach Preservation Assoc.
Coralie	Pryde	1902 Beechwood Dr.	Wilmington	DE	19810	Delaware Nature Society
	Ricos	89 Kings Hwy.	Dover	DE	19901	DNREC/DCMP
Dennis	Rockford	240 Cherry Street	Philadelphia	PA	19106	Maritime Exchange
Leah	Roedel	1212 Foulk Road	Wilmington	DE	19803	Delaware River & Bay Shoreline Council
Ann	Rydgen	726 Loveville Road, Cty. 61	Hockessin	DE	19707-1523	Delaware Audubon Society
Leslie	Sairye	909 Highland Ave.	Wilmington	DE	19809	Delaware Audubon Society

Robert J.	Shantz	2000 Wrangle Hill Road	Delaware City	DE	19706	Delaware City Refinery
David	Small	89 Kings Hwy.	Dover	DE	19901	DNREC
Kevin	Smith	24 N.W. Front St.	Milford	DE	19963	Office of Senator Biden
		200 S. Claymont St.				International Longshoremane's Assoc.
Wayne	Spencer	PO Box 267	Wilmington	DE	19899	Local #1694
Rick	Spencer	1400 16th St., NW	Washington	DC	20036	National Wildlife Federation
Michael D.	Sprague	1 Hausel Road	Wilmington	DE	19801	
Peter R.	Steele	5803 Kennett Pike, Suite D	Wilmington	DE	19807	Gahagan & Bryant Associates, Inc.
Jim	Steffins	402 Coldspring Run	Newark	DE	19711	Delaware Sierra Club
Marion C.	Stewart	1912 Marsh Road, #3S1	Wilmington	DE	19810-3963	Civic League of New Castle County
Jim	Stuhltrager	4601 Concord Pike	Wilmington	DE	19803	Mid-Atlantic Environmental Law Center
Hema	Subramanian	1400 16th St., NW	Washington	DC	20036	National Wildlife Federation
Kurt	Sundelin	25 Longspur Drive	Wilmington	DE	19808	
Robert R.	Thompson	89 Kings Hwy.	Dover	DE	19901	DNREC
Jeff C.	Tinsman	RD #3 Box 25-I	Georgetown	DE	19947	Delaware Fish & Wildlife
Pat	Todd	1221 Evergreen Rd.	Wilmington	DE	19803	League of Women Voters
Andy	Urquhart	48 Bridgeshire Rd.	Newark	DE	19711	Delaware Audubon Society
						Delaware Recycle Network
Maya	van Rossum	PO Box 326	Washington Crossing	PA	18977	(Delaware River Keeper)
Lisa	Vest	89 Kings Hwy.	Dover	DE	19901	DNREC/Dover
Willia	Ward	1201 Orange St., #1010	Wilmington	DE	19801	Wad Syd - Associates
Rick	Westerguard	1200 North Delsea Drive	Calyton	NJ	08312	Gloucester County Planning Div.
Joan & David	Whalen	2506 S. Bay Shore	Milton	DE	19968	
Teresa	Whitaker	2326 Lockwood Chapel Rd.	Dover	PA	19904	L.W.V.G.D.

Illegible or Incomplete:

Rser	Agr	2101 N. Grant Ave.	Wilmington	DE	19806	Wood Barn
Eileen	Butler					Audubon Society ?
Lori	Denno					Delaware Nature Society