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June 15, 2010

Lt. Colonel Tickner
US Army Corps of Engineers
Philadelphia District
The Wanamaker Building
100 Penn Square East
Philadelphia, PA 19107-3390

Dear Lt. Colonel Tickner:

We have reviewed the U.S. Army Corps of Engineers' May 21, 2010 response to our April 22 application review letter. Many of the issues we raised were addressed with information sufficient to allow the Department to move forward with the public hearings, which have now been scheduled for July 13 and 14, 2010.

This letter is intended to identify the remaining issues of concern, most of which have been communicated verbally in recent telephone conversations, and which have also been discussed in more detail in the June 14, 2010 meeting of Corps and DNREC technical staff. It will also serve as a status report of the Department's ongoing review.

Issues which should be provided and/or addressed in further detail prior to the public hearings are identified below:

1. Water Quality

(Section 4.7.1.1 of the Regulations Governing the Use of Subaqueous Lands and Section 401 of the Clean Water Act)

The Corps should provide its preliminary analysis of the monitoring data being collected during the Reach C dredging, including data collected for the Killcohook CDF, data collected behind the cutterhead, plus background water and sediment quality data.

We also understand that the Corps is completing an analysis of potential toxics impacts associated with deepening the Sunoco Marcus Hook and Conoco Phillips berthing areas in response to the Department's concerns over secondary impacts from the main channel deepening. That analysis should be submitted prior to the public hearing.

2. Secondary and Cumulative Impacts

(Sections 4.7.3 and 4.7.5.4 of the Regulations Governing the Use of Subaqueous Lands)

Updated Salinity Model

(Sections 4.7.1.3 and 4.7.1.4 of the Regulations Governing the Use of Subaqueous Lands)

Significant questions still remain regarding the validity of the input data used for the salinity model. DNREC and Corps technical staff have discussed remaining issues at their June 14, 2010 meeting based upon detailed DNREC comments already transmitted to the Corps via e:mail on June 7, 2010. Those comments are attached.

Sediment Budget Impacts

(Section 4.7.1.6 of the Regulations Governing the Use of Subaqueous Lands)

See the attached detailed concerns already transmitted to the Corps via e:mail on June 7, 2010. These issues have been further discussed at the June 14, 2010 meeting of technical staff.

3. Operational Concerns

Air Quality Conformity

(Section 4.7.1.5 of the Regulations Governing the Use of Subaqueous Lands)

There is one remaining issue with regard to Air Quality Conformity. The Corps must still provide certification/documentation that the NJ credits are surplus to the states ozone and fine particulate matter SIPs, and eligible for use as general conformity offsets. This is necessary, as Delaware is part of multi-state ozone and fine particulate matter nonattainment areas.

The Corps' May 21 response that "*All of the credits purchased for the Delaware River Main Channel Deepening Project NOx ERCs were identified on their respective state's registry systems or confirmed by the Philadelphia Regional Port Authority's (PRPA) broker as being valid and available for sale or trade, and thus not bound by state SIPs*" is inconsistent with 7 DE Admin Code 1135, and the corresponding federal conformity regulations. The treatment of the ERCs in the state SIPs is paramount to the demonstration that the ERCs may be used as general conformity offsets.

Specifically, 7 DE Admin Code 1135 defines emission offsets as, "*emissions reductions which are quantifiable, consistent with the applicable implementation plan attainment and reasonable further progress demonstrations, surplus to reductions required by, and credited to, other applicable implementation plan provisions, enforceable under both State of Delaware and Federal law, and permanent within the time frame specified by the program. Emissions reductions intended to be achieved as emissions offsets under this regulation must be monitored and enforced in a manner equivalent to that under EPA's New Source Review (NSR) rules.*"

4. Updated Dredge Material Disposal Plan

(Section 4.6.7 of the Regulations Governing the Use of Subaqueous Lands and Section 12.0 of the Wetlands Regulations)

The Department still has significant remaining concerns regarding the Kelly Island and Broadkill projects which were discussed at the June 14, 2010 meeting of technical staff. DNREC's detailed comments were transmitted to the Corps via e:mail on June 7, 2010 and are attached here. Some additional information to address those concerns was presented to DNREC at the meeting and it is our understanding that further information will be forthcoming later this week.

5. Cost Benefit Ratio

(Section 4.6.8 of the Regulations Governing the Use of Subaqueous Lands)

The Corps has agreed to perform an updated quantitative assessment of the impact of relevant market and industry trends on the previously projects project benefits to augment the qualitative port assessment. The Department requests the following during the interim:

1. A copy of the qualitative port assessment for reference;
2. A timeline regarding the updated quantitative assessment; and
3. An outline of what will be covered in the quantitative assessment (i.e. for which benefit categories are relevant market and industry trends being considered?)

6. Coastal Zone Management Act Federal Consistency

(P.L.92-583) Section 307(c); 15 CFR Part 930)

The application did not include a Consistency Determination in accordance with the Federal Coastal Zone Management Act. In order to process this application in the most expeditious and proper manner, please submit a Consistency Determination to the Delaware Coastal Management Program so the 20 day public notice period and 60 day review timeframe may be met.

To the extent that it is feasible, the Corps should provide information to address these remaining concerns prior to the public hearings scheduled for July 13th and 14th. Additionally, the record cannot be closed and a decision cannot be rendered until such time as the necessary supplemental information provided by the Corps has been subject to adequate public review.

If you should have any questions, please feel free to contact me.

Sincerely,



Collin P. O'Mara,
Secretary

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Attachment I: Comments Re: Kelly Island

We have reviewed the COE's 5/21/2010 response letter to DNREC Comments Provided April 22, 2010 and have some critical comments.

In short, we do not concur with the Corps' statement that concerns raised over the Use of Kelly Island as a beneficial use site have been addressed since the publication of 1997 SEIS.

The main purposes of Kelly island project as described in the SEIS are to restore intertidal wetland using dredged sediment from the deepening of the Delaware River navigation channel, stem erosion of Kelly island shoreline, provide extensive sandy beach for spawning horseshoe crabs, and provide continued protection to the entrance of the Mahon River. Insufficient data has been submitted to document that these purposes can be met, and at least one has been completely abandoned by the USACE.

It is our finding that the Corps has made some substantial changes and proposed a new design; but has not adequately addressed the concerns, has created some additional concerns with the proposed changes that need to be evaluated and addressed, and does not have adequate sediment geophysical data to support that the proposed project and changes are feasible.

These are thematically grouped as 1) No Final Plan to enable a review, 2) berm/beach design problems, 3) wetland design concerns, 4) long term maintenance responsibility and cost, 5) incomplete and inadequate sediment data, 6) sea level rise concerns, and 7) reduction in benefits due to abandonment of protection for Port Mahon boat ramp.

Lack of Final Design Plan

The Kelly Island Project does not have a final design plan that allows for an adequate review and evaluation of the project. The conceptual plans may provide some reasonable ideas for consideration of a construction project; however, they do not provide necessary information for a competent review of the project. It is not the policy of the State of Delaware to review and make a decision on hypothetical concepts.

Beach/Berm Design Problems

On Page 10, the Corps describes very significant design changes to the 1997 original design for the Kelly Island project. These changes included abandoning a 20 foot-width footprint stacked geotube design, to a 200 foot-width beach structure with a buried geotube. The revised footprint averages 600 feet wide at its base. It also adds 12 – 600 ft. timber groins. The extensive footprint will significantly impact subaqueous bottom and living resources and we have not been provided with any quantitative data that indicates that the benefits will outweigh the environmental cost.

It has been well documented in recent decades in Delaware Bay that horseshoe crab site selection, density of eggs in the sand, and rates of egg development are dependent upon sediment characteristics, foreshore slope and width, and wave activity. The proposed design does not meet the requirements that must be met to create the type of habitat needed. The proposed beach will be of poor quality for horseshoe crabs and shorebirds due to the fine to medium grain

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sediment to be used and the low foreshore slope. These conditions should be expected to limit habitat use.

Smith et al, 2002 recommend that to create horseshoe crab spawning habitat, sand for replenishment projects should be selected to have a mean sediment size of 0.35 to 0.50 mm for the sand fraction. The sediment should also contain a gravel sub fraction. On page 11 of the Corps responses, it is stated that “The typical sediment size (D50) for the sand to be used in the construction of Kelly Island is between 0.3 and 0.4 mm”. This sediment size will not “provide both a stable beach and suitable horseshoe crab habitat” (page 11) as opined by the Corps in their response to DNREC. Minimal if any habitat benefits for horseshoe crabs, and key species of shorebirds, can be expected to be realized from the project.

Additionally, 4-5 degrees is the slope that is characteristic of mid-Delaware Bay beaches that receive the heaviest spawning levels (Smith et al, 2002a). The proposed project and fine to medium grain size sand will create a low angle beach or berm for the proposed confined disposal facility. We have observed on Delaware Bay beaches that the chances of stranding that lead to individual horseshoe crab death are increased on a wide beach with a slope of 0-2 degrees. Horseshoe crabs use slope to guide their return to water after a spawning event; low foreshore slope may result in horseshoe crabs becoming disoriented and permanently stranded (Dr. Richard Weber personal observation). The inclusion of timber groins in a low slope beach area may further impede the crabs’ ability to return to the Bay.

Horseshoe crabs prefer to spawn on narrow beaches. Density of spawning females is indirectly related to foreshore width (Smith, 2002b). Consequently, density of live horseshoe crab eggs in surface sediment is inversely associated to foreshore width. Smith et al, 2002b found that density of live eggs was $2.36 \times 10^5 \text{ m}^{-2}$ where foreshore width was less than 16.5 m, and was $2.28 \times 10^4 \text{ m}^{-2}$ in beaches wider than 16.5 m.

Finally, for this berm/beach to be stable we must have a better idea of the geophysical characteristic of the differentiated volumes being placed. Due to the high current, wind, and wave energy, we believe that we must have a courser grain size. While timber groins have been proposed to stop littoral drift, we are concerned that the likely scenario is for a large volume to be exported off the beach along the groins affecting even greater amounts of subaqueous habitat. The norm for a beach fill project is to have a 1/4 to 1/3 to be eroded off the beach before it stabilizes. We are concerned that with the high concentration of fine to medium grained sand and this being an area that experiences extensive wave driven erosion, much more sand will be lost.

The USACE is not clear on the wave data used in the sediment transport model, only stating “boundary conditions were developed from a larger-scale finite difference grid covering the Egg Island Point area, the Kelly Island area, and the stockpile site area”. The “wave” parameter would be a highly sensitive input in any sediment transport model. Without a better description of how the wave data was developed, calibrated, and verified; the integrity of the results of the sediment transport model is in questions. The Delaware Coastal program from 1998 to present has had two wave buoys deployed in the middle and lower reaches of the Delaware Bay on an intermittent basis. The equivalent of more than two year’s data and several coastal storm events has been captured by each buoy. This data is available to the USACE.

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Wetland Design Concerns

In order to create the wetland area, fine silts and sands will be disposed of in a confined disposal site, for which future management is unclear. It may be an open tidal area or it may be proposed as an impounded area. There are serious logistical constraints to access this site that will present serious operational challenges for management. In addition, the requirement for a large permanent beach with hard structures will limit any bay front tidal exchange. It is also undetermined if and when sediments would consolidate to a point of a stable wetland area, and any efforts to manage the wetland as an open tidal area prior to this condition would come with a high risk of excessive erosion and sediment loss in close proximity to Delaware's prime oyster seed bed areas. This is a crucial concern as these ecological resources are highly susceptible to damage from increased sedimentation.

Even if the significantly changed project reduces the likelihood of a catastrophic beach breach for a period of time, it will require continuous maintenance to ensure this protection for the long term. Simply conducting a onetime beach construction project in this well documented area of high erosion would likely only delay a catastrophic breach in this ecologically sensitive area. If the US Army Corps of Engineers constructs this project, it must accept the responsibility to manage and maintain it in perpetuity. Maintenance of this disposal area will require substantial fiscal and operational resources in the long term, which should not be relegated as a responsibility and unfunded mandate to the State. A detailed assessment of the long term operational responsibilities and costs must be conducted; and a detailed description of how the USACE will maintain this site long term at no fiscal cost to the State of Delaware must be provided.

In a related concern, highly disturbed sediments have a tendency to be colonized and dominated by invasive species such as phragmites, leading to an extremely low quality and low benefit wetland system. In addition, providing this type of habitat directly adjacent to the high quality habitat found on the Bombay Hook National Wildlife Refuge could provide additional seed stock that may spread and cause ecological degradation of the adjacent marsh area. Avoidance and control of this invasive species requires significant management of water levels, and may require routine spraying with herbicides over the long term. Addressing these issues in perpetuity should also be included in a long term maintenance agreement for the site.

Long Term Maintenance Responsibility and Cost

Due to the concerns associated with the long term problems this site may create, a signed maintenance agreement clarifying the long term responsibilities of the USACE and the estimated costs per decade must be provided. If it is the intent of the USACE to relegate this responsibility to the State of Delaware or any other agency for long term maintenance, please provide a copy of that agreement.

Incomplete and Inadequate Sediment Data

The Corps has stated that "twenty-nine channel vibracores were collected in the Delaware River and gaps in channel sedimentation quality were covered by a geoacoustic survey of the channel". No core info (locations and detailed grain sizes analysis data) was provided, for Reach E, to DNREC for review. It is impossible for us to assess whether these cores adequately characterize

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the sediment in this reach without the data being provided for our review. It is unclear if the core locations were based upon the seismic data collected during the geoaoustic study completed by McGee. DNREC is also concerned that the geoaoustic data is not of high enough vertical resolution nullifying its ability for use to pick out areas of transition or shallow reflectors identification and characterization. We need to understand whether the overall distribution of the cores is in clusters or randomly distributed, and whether or not it was conducted in a way that provides adequate resolution for statistically defensive mapping and characterizations of the sediment in this reach.

DNREC recently conducted our own independent geoaoustic study, and have indications that significantly finer grained areas (mixed silt/sand deposits) that are rich in organic material dominate large stretches of Reach E. We question whether these areas were adequately sampled. We have inadequate data to assess whether the additional cores collected by the USACE are a true representation of the reach. We must have the full core data, locations, core logs, and the criteria used to collect them, and the quality assurance/quality control used.

Understanding this is critical, as our independent geoaoustic data indicates that there are several rapid transitions in the sub-bottom that could result in huge disparities in the estimated volumes of certain grain sizes. We question whether the existing sediment conditions will be conducive to the proposed sediment allocations for the conceptual plans of the USACE.

Future Sea Level Rise

The Corps has stated that “the impact of continued sea level rise on the proposed sand dike containment structure at Kelly Island is not deemed sufficient to compromise the intended function and durability of this feature of the project”, yet this finding appears to be an unsubstantiated opinion. More importantly, it may be in direct conflict with the latest Army Corps of Engineers guidance that stipulates that sea level rise must be considered in all phases of Civil Works programs (Department of Army Circular No. 1165-2-211; July 1, 2009). What is the basis for this opinion? What scenario did the Philadelphia District of the USACE use as a future sea level rise and why was it chosen? The Corps must provide a detailed vulnerability assessment for the long term impact on this disposal site, and incorporate these findings into the long term maintenance plan for the site.

Reduction in benefits due to abandonment of protection for Mahon Boat Ramp

We are concerned that one of the major “benefits”, that of protecting the entrance to the Mahon River and the Boat Ramp, has been disregarded. While the Corps contends “that the loss of the spit and its impact on protection of the Mahon River boat ramp is not relevant to the intended ecosystem restoration purpose of the Kelly Island site”, this benefit was a major factor in the assessment of project benefits during the early planning of the project. The complete abandonment of this is a significant change in the scope and benefit of the project. It also highlights the shifting public policy in Delaware to begin to consider the strategic retreat from the area rather than development of hard structure and other facilities in this area. Like the boat ramp and Mahon Road, the Kelly Island area will likely be cost prohibitive to maintain in the long term. The prudent public policy decision in this area, after considering the erosion rate, potential sea level rise scenarios, and logistical challenges to site maintenance and management,

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is to abandon the consideration of this site and pursue wiser public policy and a common sense approach to management of the coast.

Works Cited:

McGee, R.G. (1996). "Geoacoustic study of Delaware main channel," Technical Report HL-96-9, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Smith, David, Nancy Jackson, Susan Love, Karl Nordstrom, Richard Weber and David Carter. Beach Nourishment on Delaware Bay Beaches to Restore Habitat for Horseshoe Crab Spawning and Shorebird Foraging. December, 2002a. Report prepared for the Nature Conservancy.

Smith, D.R., Pooler P.S., Loveland, R.E., Botton M.L., Michels, S.F., Weber, R.G., Carter, D.B. Horseshoe Crab Reproductive Activity on Delaware Beaches: Interactions with Beach Characteristics. 2002b. Journal of Coastal Research. 18:4. 730-740.

USACE, 2009. Incorporating Sea-Level Change Considerations in Civil Programs. Circular No. 1165-2-211. Dept of the Army, U.S. Army Corps of Engineers, Washington, DC.

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Attachment II: Additional Comments Re: Kelly Island

The Corps reports that Kelly Island has been eroding at an estimated rate of 20 feet per year. I did not see an analysis of the eroding forces that result in this unusually high rate. The proposed wetland restoration project includes the placement of 1.7 million cubic yards of sand to form a containment dike for the wetland. Groins are proposed to reduce longshore sediment losses. If the material placed; sand, silt and clay, at this very erodible site is released through future erosion into the water column, it will result in subaqueous deposition that may not be compatible with current underwater habitat and navigation values. Therefore, I ask the following questions.

1. Are the forces that result in the historic erosion of Kelly Island been identified and quantified? If the answer to #1 is yes, can we see that analysis?

If the answer to #1 is no, what is the annual erosion rate of the beneficial use project expected to be?

2. Where has the substantial amount of sediment that has eroded from Kelly Island over the past several decades ended up?
3. What is the projected longshore transport rate at the new beach? This is pertinent in considering the expected performance of the groins.
4. Where will eroded sediment be deposited?
5. Do the design elevations of the dike and wetlands account for post construction settlement? Typically, newly placed sediment has a higher void than native, in situ, material. There will likely be settlement that will lower the actual elevation of the features to be built. Is this accounted for in an 'overage' allowance? This is important for both level of protection provided by the dike as well as the ability of the unplanted wetland surface to succeed as intertidal wetland.
6. What is the maintenance plan for this new beach system? Typically, beach creation projects go through a period of equilibration, followed by annual erosion that continues to move sediment from within the project area. We need to know the full geomorphic cycle that is expected for this new land accompanied by a plan to sustain it through future placement of material.
7. What is the funding source for beach maintenance?
8. Is there an annual monitoring plan to measure the performance of this site? If so, is the funding for this stable?

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Attachment III: Comments Re: Kelly Island Horseshoe Crab Issues

Most of the remaining concerns, outside of time-of-year restrictions, involve uncertainty about sediment characterization.

Should the Kelly Island restoration component of the project ultimately be deemed appropriate, we would like to revisit the landside construction schedule to minimize adverse impacts to spawning horseshoe crabs and their eggs/larvae. It may be reasonable to adjust the work schedule to more closely reflect the construction schedule proposed for the Broadkill replenishment at the May 13, 2010 project coordination meeting. It is recognized that this may be difficult given the competing closures and anticipated six month construction requirement. However, given that the justification for disposing of the sediment is focused on providing spawning habitat for horseshoe crabs, it seems reasonable to avoid detrimental impacts to the target restoration species, particularly during the peak spawning season in May and June. The Atlantic States Marine Fisheries Commission's (ASMFC) recommended seasonal restriction for construction activities is from April 15 to August 30. Can the Corps accommodate this seasonal restriction?

The characterization of the grain-size of the material proposed for placement at both the Kelly Island and Broadkill sites remains in question. Based on the comments of others and a limited examination of Roxann and CHIRP data, my concern is that there has been insufficient core sampling to adequately characterize the proposed placement material. I think additional sediment cores (located based on recently conducted CHIRP sampling) and subsequent modeling, could significantly reduce the uncertainty to a reasonable level. Without an adequate characterization of the sediments to be placed, however, it seems difficult if not impossible to have effectively modeled the dynamics of the sediment proposed for placement. For this reason, I am not confident that the Kelly Island material will remain in place and that it will not impact the oyster grounds immediately offshore. There is little question that a catastrophic failure of the proposed structure will have devastating consequences on the nearby oyster resources.

The ASMFC recommends that the grain-size of renourishment material be similar in size to the grain size that currently exists. Smith et al. (2002) reported that data from unnourished beaches located in the Delaware Bay indicated that sediments finer than 0.063 mm were uncommon on the foreshore. The USACE states that, "The typical sediment size (D50) for the sand to be used in the construction of Kelly Island is between 0.2 and 0.4 mm (medium to medium-fine sand), which will provide both a stable beach and suitable horseshoe crab habitat." It is my understanding that the "D50" indicates that 50% of the material would, in fact, be expected to be less than the reported range. That would result in a significant portion of fine to very fine sand and possibly large quantities of silt or clay. If a significant proportion of fined-grained material exists in the placed material, it may settle in layers creating a substrate more resistant to waves and burrowing organisms because a sediment bed with low porosity and high density will behave as a solid (Smith et al 2002). Further, I am concerned that the fine sand may inhibit horseshoe crab egg development due to low interstitial oxygen. Once again, if my interpretation of "D50" is correct, it seems implausible that the placement of this material would have a negligible impact on the nearby oyster resources, but I must defer to others on this.

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The limited published data available suggests that the size of the proposed placement material is toward the lower (smaller grain-size) end or even outside of the bounds of suitability for horseshoe crab spawning. Smith et al. (2002) reported from their work conducted in the Delaware Bay that, "The source of sediment for nourishment should be chosen to reflect a coarse estuarine beach. The nourished sediment should have a gravel sand subfraction and have a mean sediment size of 0.35 to 0.50 mm in the sand fraction." Brady and Schrading (1996) prepared a draft Delaware Bay habitat suitability index (HSI) model for the Corps. This draft model suggests that optimal sediment size (HSI=1.0) is 0.6 to 0.8 mm; whereas, the material proposed for placement would score about 0.33 to 0.68 (HSI). The grain-size of DE Bay (NJ) beaches with the highest concentrations of horseshoe crabs ranged from 0.5 to 2.0 mm, with a medium [median] grain of 0.7 mm. It is further my understanding that finer grained sediments will result in a flatter beach once "settled". Horseshoe crabs adults and juveniles require an appropriate slope to orient themselves. A beach slope of 7% is believed to be optimal according to Brady and Schrading (1996) and some assurance that this slope would be likely is desirable. Once again, it would seem that such an assurance should be predicated on adequate sediment characterization and subsequent modeling.

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Attachment IV: Comments Re: the Sediment Budget and Salinity Model

Sediment Budget Questions:

There is much remaining uncertainty surrounding the effect of channel deepening on the sediment budget.

In their response, the Corps states: “Based on our numerical hydrodynamic modeling the deepened 45 ft channel will not contribute to increased tidal amplitudes.” This is a point that has been a non-argued point until now. Everyone seemed to agree on this effect of deepening (since it is clearly documented from the past deepening), but now that it is placed in the context of wetland loss, the Corp seems to doubt that it would occur. The Corps application should clearly show this asserted non effect by showing a time-series of tide level with sea-level removed. This would show the increase in tide-level that resulted from the deepening in the 1940’s and 60’s.

In conversations I have had directly with Dr. Chris Sommerfield, University of Delaware, there is no question that further deepening will result in further changes in the sediment budget. More sediment will be deposited in the deeper channel and less will be re-distributed into the shallow flanks and shoals of the river and bay. How will the Corps monitor, assess and address these changes to the estuary should the project be approved?

Data requests:

The core locations, core logs, and grain size analysis data for all the cores located in Reach E. There are 27 cores that are in the reach that would have sediments used in the construction of Kelly Island and another 8 in the lower reach for the area that will be used to construct Broadkill Beach. We have not had access to any of that data, and that data is vital in our review of the feasibility of the Kelly Island and Broadkill projects.

Salinity Model:

Our understanding is that the Corp does not intend to do any adjustments or re-runs of the salinity model. We still contend that the most up to date and reliable data has not been utilized in the model, and that calls the modeling results into question. Jeff Gebert has stated that any new data collection would be unrealistic due to monetary and time constraints. However, at the very least, we request that the Corps change the bathymetry grid to incorporate realistic depths that would represent actual post-construction conditions (for example, in Reach C many of the areas will have a depth of 47 ft not 45 ft). If this cannot be accomplished, the Department cannot be confident that the other input data, or the model output, is the best available representation of the Delaware Estuary conditions and predicted changes.