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March 30, 2012

Mr. Philip Musegaas, Esq.
Hudson River Program Director
Riverkeeper, Inc.
Ossining, NY 10562

Re: Review of Draft Environmental Impact Statement
Tappan Zee Hudson River Crossing Project

CEA No. 21213

Dear Mr. Musegaas:

Carpenter Environmental Associates, Inc. (CEA) has reviewed the Draft Environmental Impact Statement (DEIS) for the Tappan Zee Hudson River Crossing Project prepared by the U.S. Department of Transportation dated January 2012. CEA offers the following comments with respect to impacts to Atlantic (*Acipenser oxyrichus*) and Shortnose Sturgeon (*Acipenser brevirostrum*) populations identified within the project area and more specifically discussed in the Aquatic Sampling Program (Appendix F-1) and Biological Assessment (Appendix F-4).

1. CEA identified a number of instances in the Aquatic Sampling Program (ASP) where more information regarding the Atlantic and Shortnose Sturgeon populations must be provided. The Aquatic Sampling Program states the following:

- *"No discernible trend regarding the presence or absence of shortnose sturgeons can be inferred from the data."*[1]

  The Biological Assessment (BA) continues to base calculations and assumptions on the data described in the above statement. From the data, the BA calculated an encounter rate which was then used to calculate the number of fish to be affected by the project. Considering the above statement, the number of affected fish calculated in the BA is not based on a conclusively defined data set.

[1] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-39.

A more detailed analysis and discussion detailing occurrences of the Shortnose Sturgeon populations within and adjacent to the site is required to fully assess project impacts.

2. CEA identified a number of instances in the Aquatic Sampling Program where survey sampling methodologies for Atlantic Sturgeon populations were insufficient:

- *"Due to concerns of injuring the shortnose sturgeon, the gill net soak times were limited by water temperatures. For temperatures below 59°F (15°C), the maximum soak time was 4 hours; for temperatures between 59 and 68°F (15 and 20°C), the soak times were limited to 2 hours. For temperatures between 68 and 80.6°F (20 and 27°C), the soak times were limited to 1 hour. No netting was permitted when the water temperatures exceeded 80.6°F (27°C)."*[2]

  The ASP soak times ranged from one to four hours depending on the temperature of the water.[3] The 2007 Sweka study of juvenile Atlantic sturgeon completed by the U.S. Fish and Wildlife Service (USFWS) and New York State Department of Environmental Conservation (NYSDEC) stated that nets were soaked for a *minimum* of 2 hours per net.[4] Furthermore, the Sweka study did not require any necessary protections for shortnose sturgeon due to temperature conditions and therefore does not limit the soak time. In fact, the greatest catches in the Sweka (2007) study were observed when recorded water temperatures were greater than 20°C.[5] The statement above from the ASP indicates that when temperatures were between 20°C and 27°C the net was deployed for a *maximum* of 1 hour. A study documented in the National Marine Fisheries Service (NMFS) 2007 Status Review of Atlantic Sturgeon documents reduced soak times for nets when water temperatures exceed 30°C.[6] The ASP study shows a deficiency in understanding the capture of Atlantic sturgeon. The methodology that utilized reduced soak times for the performed sampling is likely a contributing factor as to why no Atlantic sturgeons were collected during the 1 year ASP study and 562 wild juvenile Atlantic sturgeons were collected during the 2½ year Sweka study performed in conjunction with the USFWS and NYSDEC.

- The ASP gill net survey took place between April 2007 and May 2008 on a bi-monthly schedule.[7,8] The sampling performed during the Sweka study occurred

[2] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-33
[3] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-33
[4] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1067. Pg 1060
[5] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1065. Pg 1065
[6] Atlantic Sturgeon Status Review Team for the National Oceanic and Atmospheric Administration. Status Review of Atlantic Sturgeon (Acipenser oxyrinchus oxyrinchus). February 23, 2007. Updated July 27, 2007. Pg 69
[7] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 14

during five time periods: fall 2003, spring 2004, fall 2004, spring 2005 and fall 2005.[9] This covers a 30 month (2½ year) period. By using a longer, seasonally overlapping time frame for sampling, the USFWS and NYSDEC were able to correct circumstantial deficiencies (such as debris in nets) within their sampling.[10] Furthermore, the extended sampling period allowed for a statistical analysis/comparison between sampling periods and locations to occur.[11] These advantages of using a longer, seasonally overlapping time frame were not available to the ASP which was only conducted over the course of one year. Additional studies modeled after the Sweka study needs to be conducted to ensure adequate sampling procedures for capturing and assessing Atlantic Sturgeon populations.

- Atlantic Sturgeon adults and sub adults, that are not spawning, live in coastal and estuarine conditions, generally in shallow water (10-50 m or 33 to 164 ft.) near shores dominated by gravel and sand.[12] The water depth on the eastern side of the existing bridge reaches a low of 50ft.[13] Figure 5 of the BA shows the area corresponding with the 50ft deep water to be comprised of sandy silt clay. Of the area studied by the ASP, the eastern portion of the bridge within the 50ft deep channel would be the most likely location to find Atlantic sturgeon. The ASP does not give the exact depths of the gill nets for each sample location/event, but does state that sampling location F10 was used for deep water sampling at water depths of 25-34 feet.[14] ASP nets were not deployed in water depths greater than 35 feet; therefore they were not deployed within the most likely location for finding Atlantic sturgeon. The gill nets deployed during the ASP were 8 feet high by 125 feet long. The net consisted of 5 gill net panels (each 25 feet long) with mesh sizes ranging between 1 and 5 inches.[15] The gill nets deployed during the Sweka study, in attempt to catch juvenile Atlantic sturgeon, were 8 feet high by 200 feet long. The net consisted of 3 gill net panels, one of each mesh size. The mesh sizes ranged from 3 to 5 inches, which have been shown to effectively capture juvenile-

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[8] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-33

[9] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1067. Pg 1060

[10] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1067. Pg 1060

[11] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1067. Pg 1061

[12] NOAA Fisheries – Office of Protected Resources. Atlantic Sturgeon (Acipenser oxyrinchus oxyrinchus). Updated March 14, 2012. Accessed March 27, 2012. http://www.nmfs.noaa.gov/pr/species/fish/atlantic sturgeon.html

[13] NOAA – Office of Coast Survey. September 2004 nautical chart. http://www.charts .noaa.gov/OnLineViewer/12346.shtml

[14] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-10

[15] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-4

sized Atlantic sturgeon.[16] When compared to one another, the Sweka study used an area of 1600 sq. ft. of net effective at collecting juvenile Atlantic sturgeon. The ASP provided an area of 600 sq. ft. of net effective at capturing juvenile Atlantic sturgeon. When considering the available effective net size, it would be expected that the Sweka study would capture more Atlantic sturgeon.

3. CEA identified a number of instances in the BA where mitigation for disturbances to Atlantic and Shortnose Sturgeon populations was not addressed or insufficient:

- *"The dredging depth required assumes that two feet of sand and gravel armor is placed on the bottom. In total, the channel would be dredged to a depth corresponding to 4.9 m (16 feet) below MLLW)."*[17]

  "However, dredging of the access channel will result in a temporary modification of benthic habitat. Over time deposition processes would allow much of the benthic habitat to return to its pre-construction state. The rate of this transformation would begin at approximately 1 foot per year, likely decreasing as the bed nears it natural pre-dredged elevation."[18]

  The BA states that the river channel substrate will recover on its own and therefore no mitigation plans for the dredged channels have been developed. The channel may recover naturally in time; however, it will take several years after the completion of the project (4½ to 5½ years) for full recovery to pre-disturbance levels. The sturgeon will be losing part of their foraging habitat for a minimum of four to five years. The BA report does not discuss the implications of large scale disturbance to the benthic environment within the Atlantic Sturgeons overwintering habitat (located under and adjacent to the existing bridge). Many factors combine to provide adequate benthic habitat for foraging sturgeon species. The study does not sufficiently identify comparable areas that would support overwintering sturgeon populations that would be displaced due to the long-term disturbances expected in the proposed project area.

  In summary, with the exception of oyster beds that may be permanently lost, where access channels are dredged, there would be a temporary loss of habitat that could affect sturgeon that use the dredged area for foraging. These effects would occur as a result of a localized reduction in benthic fauna. However, the dredging footprint represents a very small percentage of the Hudson River Estuary and its soft bottom habitat. Thus, the temporary reduction of benthic fauna within the dredged area would not substantially reduce foraging opportunities for the river's sturgeon populations, because sturgeon are highly mobile and anadromous, moving up and down the estuary.[19]

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[16] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1067. Pg 1060

[17] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 29

[18] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 75

[19] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 62

The Hudson River Estuary extends from the Battery in southern Manhattan to the Troy Dam, north of Albany, for a distance of 153 miles. Along the length of the 153 miles of the estuary are different sturgeon habitats that provide for spawning, foraging, migrating and overwintering habitats.[20] The Haverstraw-Tappan Zee region of the river is an area identified by NMFS, USFWS and NYSDEC as overwintering habitat.[21] Comparing the habitat provided within the area of the river proposed for dredging to the entirety of the Hudson River Estuary is not an acceptable means for providing conclusive assessments as not all the river has a soft bottom habitat that is used by sturgeons for foraging.

4. Disturbances to Atlantic and Shortnose Sturgeon populations within the project area due to the proposed installation of permanent platforms were not adequately assessed.

- Figures in the BA depict both temporary and permanent platforms. However, within the text only temporary platforms are clearly discussed. The permanent platform is being shown to be located at the Rockland Landing.[22,23] The BA briefly touches on the additional shading impact of the approx. 99,153 sq-ft permanent platform. The BA also states that the additional shading would not result in direct effects to the sturgeon.[24] There is a lack of defined population and habitat usage data in the vicinity of the proposed project area and more specifically the proposed location of the permanent platforms. The proposed permanent platforms would effectively eliminate over 2 acres of potential overwintering and foraging habitat for Atlantic and Shortnose Sturgeon populations. This portion of the project area requires additional studies and a thorough examination of potential mitigation for loss of essential sturgeon habitat.

5. Disturbances to Atlantic and Shortnose Sturgeon populations within the project area due to the proposed dredging were not adequately assessed.

- Dredging the access channel for the project would be the largest dredging operation (1.68-1.74 million CY) in the Hudson Valley. The extent and magnitude of the dredging impacts on sturgeon population must be better assessed and understood. The NMFS identifies dredging operations as a source of sturgeon mortality in a number of similar estuaries. Significant studies are warranted here.

6. Disturbances to Atlantic and Shortnose Sturgeon populations within the project area due to the effects of the sound from pile driving were not adequately assessed.

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[20] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012.
[21] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1067. Pg. 1064.
[22] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Figure 9.
[23] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 28
[24] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 63

- *"There are limited data from other projects to demonstrate the circumstances under which immediate mortality occurs as a result of pile driving: mortality appears to occur when fish are close [(within a meter to 9 m (a few ft to 30 ft)] to driving of relatively large diameter piles. Studies conducted by California Department of Transportation (Caltrans, 2001) showed some mortality for several different species of wild fish exposed to driving of steel pipe piles 2.4 m (8 ft) in diameter, where as Ruggerone et al. (2008) found no mortality to caged yearling coho salmon (Oncorhynchus kisutch) placed as close as 0.6 m (2 ft) from a 0.45 m (1.5 ft) diameter pile and exposed to over 1,600 strikes. Thus, in the overall range of effects on fish in ecosystems such as the Tappan Zee, only a very small fraction of a fish population likely will be close enough to a pile to be subject to immediate mortality."*[25]

  The two cited studies do not accurately represent the proposed project. The short span option utilizes 1,326 piles with diameters ranging between 4 and 10 feet. The long span option utilizes 836 piles with diameters ranging between 4 and 10 feet. The BA cites no studies concerning fish mortality related to the driving of piles larger than 8 ft in diameter. The BA does not state the distance the fish were from the pile driving activities or what species were mortally affected in the Caltrans 2001 study. Assuming that different species of fish react the same to pile driving, or any other environmental disruption, is an unacceptable practice. Again, in referencing the Ruggerone study, the coho salmon are not sturgeon and are therefore going to be impacted differently. The conclusion that a small fraction of a fish will be within a close enough vicinity to experience immediate mortality is not supported by the referenced material.

  Sampling locations of the gill net survey (ASP) were chosen in order to determine the habitat conditions around the existing bridge. This included six sampling sites directly adjacent to and/or underneath the bridge and three reference sites within 500 and 600 feet north of the bridge.[26,27] The BA states:

  "The limits of the study area considered in this BA have been determined by the potential project effects for dredging and re-deposition of suspended sediment, acoustic impacts from pile driving, and loss of habitat. The potential geographic boundaries extend across the entire width of the Tappan Zee Reach, and based on modeled sound isopleths extend a maximum of 2,210 m (7,250 feet) or less in both up and downriver directions."[28]

  The sampling locations in the ASP do not adequately represent the limits of the study area reported in the BA. The limits of the study area reported in the BA are 20 times larger than the area studied by the ASP. The gill net fish survey does not cover the entire area affected by this project and therefore cannot be considered as a reputable source for information on the study area.

[25] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 44
[26] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-9
[27] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-3
[28] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 55

Sincerely,

Carpenter Environmental
Associates, Inc.

Ralph E. Huddleston, Jr
Senior Vice President