IPRenewal NPEmails

From: Stuyvenberg, Andrew
Sent: Friday, July 08, 2011 8:51 AM
To: Logan, Dennis; Balsam, Briana
Cc: IPRenewal NPEmails
Subject: FW: Responses to your Questions about Indian Point Thermal Plume from 30 June 2011

FYI. . .

From: Mark Mattson [mailto:mmattson@normandeau.com]
Sent: Friday, July 08, 2011 6:49 AM
To: Julie.Crocker@Noaa.Gov
Cc: Gray, Dara F; Stuyvenberg, Andrew
Subject: Responses to your Questions about Indian Point Thermal Plume from 30 June 2011

Julie – thank you for your email on 30 June 2011 expressing NMFS questions regarding the thermal plume monitoring performed in the Hudson River near Indian Point (located on the east shore within River Mile segment 42 north of the Battery in lower Manhattan, NY) during the summer of 2010 and presented in the Swanson et al. (2011) report. Dr. Craig Swanson of ASA and principal author of the 2011 tri-axial thermal plume modeling study report examined the water temperature data collected continuously during the ten week period (5 July through 10 September 2010) from thermistor loggers in three to six depth layers for 66 fixed monitoring stations in the Hudson River within approximately 30 km (20 mi) of Indian Point (i.e., the "Thermistor field program"). One thermistor was set 0.3 m (1 ft) below the surface at each monitoring station, another thermistor was set 0.3 m (1 ft) above the river bottom at each monitoring station, and the remaining one to four thermistors were set at equal spacing between the surface and the bottom relative to the depth at each monitoring station. The July and August period of 2010 was the second hottest (after 2005) in the recent 20-year period of record (1991 through 2010) at the USGS West Point Station (River Mile segment 52), reflecting extreme water temperatures during the Thermistor field program.

The Thermistor field program data and the modeling results presented in Swanson et al. (2011) reveal the Indian Point thermal discharge is a surface plume. No water at or above 90°F (32.2°C) was observed at depths below 5 m (16 ft) in a water column depth that is typically 18 m (60 ft) near Indian Point. Since shortnose sturgeon are considered to inhabit primarily demersal areas of the Hudson River, particularly the deep channel area from Kingston to Albany, which is located 50 miles or more upstream from the Indian Point region (Dovel et al. 1988), the presence of a thermal plume at the surface near Indian Point is not a concern.

Dr. Swanson also evaluated the observed near bottom water temperatures from our extensive Hudson River water quality monitoring data base to help place the Indian Point region (River Mile segments 39 through 46) in perspective with the known spawning and nursery habitat for shortnose sturgeon upstream in the tidal freshwater portion of the estuary from Kingston to Albany (River Mile segments 86 through 152). Dr. Swanson reviewed the water temperature data from several monitoring programs conducted in the Hudson River, including the high resolution Thermistor field program described above, and two multi-year (1997 through 2010) Hudson River monitoring programs known as the Ichthyoplankton and the Fall Shoals Surveys (i.e., the "I/FS surveys"). The I/FS surveys were conducted annually during mid-March through November on alternate weeks to provide typically 33 weeks of water quality measurements (including temperature, salinity, and dissolved oxygen concentrations) in each year taken at surface, mid depth, and bottom at 65 fixed monitoring stations located approximately 3 to 5 km (2 to 3 mi) apart from the Battery in lower Manhattan (River Mile segment 0) to the Troy Dam above Albany (River Mile segment 152). Dr. Swanson analyzed these data sets to determine representative near bottom water temperatures in the Indian Point (4 monitoring stations) and Kingston to Albany (17 monitoring stations) reaches of the Hudson River.

Based on the water temperature data from the three monitoring programs, there were no exceedances -- observed or predicted -- at any time or location in the water column below 5 m (16 ft) of depth of the critical thermal maximum temperature of 33.7°C (92.7°F) or the lethal temperature of 34.8°C (94.64°F) for shortnose sturgeon during both the 2010 Thermistor field program and the 1997-2010 I/FS surveys. Furthermore, the thermal plume from Indian Point (River Mile segment 42, east) does not interact with other thermal discharges on the Hudson River, including Bowline Generating Station (River Mile segment 37, west) , or the Charles Point Resource Recovery Facility (RESCO, at River Mile segment 43, east) as noted in Swanson et al. (2011, page 78). Lovett Station was located close to Indian Point on the west bank of the Hudson River within River Mile segment 41, but is no longer in operation and has been razed. With respect to 28.0°C as identified in your email, we note that this value may be an unreasonably low temperature since shortnose sturgeon in the Connecticut River were routinely observed at water temperatures of 27°C to 30°C (Dadswell et al. 1984). Moreover, temperatures at Kingston to Albany, where sturgeon are routinely present and resident, have been observed to exceed 28°C on multiple occasions during four years (1999, 2002, 2005, and 2010) of the 14-year record analyzed.

Nonetheless, as noted below, based upon examination of the 1997 through 2010 I/FS survey water temperature data from the near-bottom stations near Indian Point, 28°C was exceeded for just 56 observations or 2.98% during this 14-year period consisting of 1,877 readings measured weekly from March through November. These already low incidences of observed near-bottom water temperatures above 28°C would be even lower when viewed in the context of an entire year instead of the nine months sampled due to the cold water period not sampled from December through February (i.e., 2.24% for the Indian Point region). Therefore, the contribution of Indian Point's thermal discharge to the Hudson River bottom water temperature is minimal. Shortnose sturgeon are unlikely to encounter 28°C in the Hudson River during most years, and in extreme years like 2010, bottom waters at or above this temperature may be encountered in the Indian Point region, but only in discrete locations and during brief intervals that could be avoided by seeking cooler water nearby.

Finally, Dr. Swanson also examined dissolved oxygen concentrations observed among 14 recent years (1997 through 2010) of water quality samples taken 0.3 m (1 ft) above the river bottom weekly during the I/FS surveys in the Indian Point region of the Hudson River from March through November of each year. Only 17 (0.91%) dissolved oxygen concentrations below 5 mg/l were observed in the Indian Point region during this 14-year period consisting of 1,877 readings, and the lowest dissolved oxygen concentration of 3.4 mg/l occurred just once, while the remaining 16 values were between 4.4 mg/l and 4.9 mg/l. Although I/FS survey water quality sampling did not occur in the Indian Point region during the winter period from December through February of each year due to river ice conditions, it is unlikely that dissolved oxygen concentrations below 5 mg/l would be observed then due to the high oxygen saturation of the cold water in the winter. Therefore, the already low incidence of dissolved oxygen concentrations below 5 mg/l of just 0.91% would be reduced further to 0.68% when viewed in the context of an entire year instead of the nine months sampled, which should alleviate any concern about oxygen stress due to elevated temperatures if shortnose sturgeon were to be found in the Indian Point region of the Hudson River. It should be noted that Hudson River region south of the Indian Point region had 501 dissolved oxygen concentrations below 5 mg/l (6.33% of 7,918 total observations) in the near bottom waters, seven times more frequently than the Indian Point region.

Based on this water temperature and dissolved oxygen information, we believe we have resolved all of your 30 June questions, establishing no credible basis for thermal or dissolved oxygen impacts to shortnose sturgeon from Indian Point's past, present or future operations after license renewal. Please let us know if the information provided has sufficiently answered your questions, or if you have any remaining questions that we may help answer by examining our extensive data base. Since we are practically "neighbors", Dr. Swanson and I would also be happy to participate in any additional telephone calls, or meet with you at your office in Gloucester, if a call or meeting would help facilitate your use of these data to prepare the biological opinion.

Take care and have a great weekend. Mark

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