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# BULLETIN

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## Effects of Power Plants on Hudson River Fish

Mr. James Colquhoun, Chief of the Bureau of Habitat for DEC's Division of Fish, Wildlife, and Marine Resources, made a presentation to the Council on the impact of power plants on fish populations inhabiting the Hudson River. These plants draw very large volumes of water from the river for cooling purposes. Fish eggs, larvae, and juveniles are sucked into the plants and can suffer mortality from being caught on the screens at the water intake structure ("impingement mortality") or from turbulence, rapid temperature change, etc. if they are small enough to pass through the screens and through the plant itself ("entrainment mortality"). The extent of these mortalities and how they affect the abundance of fishes in the Hudson River are timely; DEC is presently reviewing permit applications for the construction of new power plants and for updating existing plants. The following is a brief synopsis of Mr. Colquhoun's remarks.

In 1975, the US Environmental Protection Agency issued State Pollution Discharge Elimination System (SPDES) permits for four power plants in the southern portion of the Hudson River--Bowline Point Units 1 and 2; Roseton; and Indian Point--that required these plants to be retrofitted with cooling towers. All these plants used the "once-through" system of drawing a continuous volume of water through the plants for cooling purposes and discharging the heated water back into the river. Cooling towers use a closed cooling system wherein water is pumped through the plant and then allowed to cascade down within a tall tower, losing its heat load, whereupon it is cycled through the plant again. The power companies appealed this expensive requirement and negotiations between EPA the power companies dragged on for 5 years. In 1981, the Hudson River Settlement Agreement (HRSA) was signed. It allowed the power companies to continue operating these plants without cooling towers but imposed upon them extensive operating restrictions or modifications (e.g., scheduled plant outages, fine-tuning of water withdrawals, protective hardware on intake screens) as well as mandating that the companies institute hatchery-based stocking of striped bass, the funding (\$12 million) of a long-term research program on the Hudson River (i.e., the Hudson River Foundation for Science and Research), and the establishment of a biological monitoring program to evaluate the impacts of power plants on the ecosystem of the Hudson River, especially fish populations. Over the ensuing decade, this agreement and its provisions were implemented.

In 1991, the HRSA expired and was renewed for one year, but environmental groups party to the original agreement immediately sued. This litigation was suspended in 1992 by a consent order which was extended each year through 1998. During this entire period, the monitoring programs established under the original HRSA continued. In 1992, the DEC declared that the applications of the power companies for renewal of their SPDES permits were incomplete and that the companies must prepare a full Environmental Impact Statement (EIS) for permit renewal as part of the State Environmental Quality Review (SEQR) process. Eventually, in 1999, the power companies submitted an EIS which the DEC considered complete enough to submit to the public for review and comment. The official public comment period for this EIS ends on 24 June 2000.

All the research information developed by the power companies clearly indicated that with the existing

plants, using once-through cooling systems, the more power produced, the more water is used, and the greater the impact on fish stocks from impingement and entrainment mortalities. However new, more efficient (closed-cycle) technologies that will be required in proposed new plants have significantly less impact because these technologies draw very little water from the river. The conditional entrainment mortality rate (CEMR), the percent reduction in year class strength of Hudson River fish as a result of power plants-related entrainment mortality, is estimated at 20-30% for most species examined based on short-term survival rate (30-55% if 100% mortality is assumed from latent injuries.) For example, the population of American shad in the river might as much as double if the entrainment mortalities caused by the operation of a single plant in the Albany area could be eliminated. Data presented by Mr. Colquhoun on New York Harbor area power plants show entrainment in large numbers for many finfish species.

The federal Clean Water Act requires that "the location, design, construction, and capacity of cooling water intake structures, in connection with point source thermal discharges, shall reflect the best technology available for minimizing adverse environmental impact." New York law is similar. The utility choice option recognizes that relicensing existing plants is the equivalent of building new plants; the utilities don't have to construct expensive cooling towers for an existing plant if the plant is to be taken off line in the next few years. However if they don't intend to rehabilitate an old plant, it must be shut down and its power production replaced by a new plant with cooling tower technology.

Mr. Colquhoun stated that all the new power plants would have either cooling towers or some other means to greatly reduce impingement and entrainment mortality of fish. Councilor Schwab recalled an estimate by Dr. Philip Goodyear of Oak Ridge National Laboratory that the Indian Point 2 plant would kill 50% of each year class of striped bass spawned in the Hudson River; Mr. Colquhoun agreed that subsequent data confirmed this.

Mr. Colquhoun concluded that the excellent utility monitoring data collected over the past 25 years had created a unique ability to extrapolate and apply conclusions elsewhere. Mr. Colvin of DEC stated that the agency was interested in expanding and applying this information on estimated Hudson River impingement and entrainment mortalities of fish to other states and areas in the Mid-Atlantic region beyond New York. For example, American shad are in trouble not just in the Hudson River but along the entire East Coast. ASMFC is very interested in considering power plants as a source of fish mortality. The DEC made a presentation to the Commission, which subsequently created a working group to generate a set of scientific approaches to be used on a coast-wide basis for shad and similar estuarine spawners when considering utility applications in coastal states.