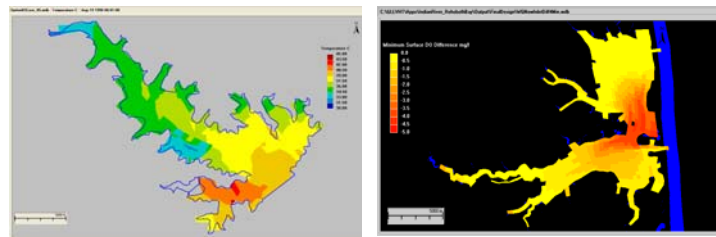


316(b) Entrainment and Impingement Studies Indian River Power Plant

Conectiv, Inc., Indian River Estuary, Delaware



Situation

As part of the NPDES permitting process for Conectiv's Indian River Power Plant (IRPP), ENTRIX performed a 316(b) demonstration to assess the potential for adverse environmental impacts from the cooling intake structures to the indigenous population that may be withdrawn into the plant. A plan of study was developed and implemented cooperatively with the state regulators to examine the numbers, lifestages, and types of fish and shellfish in the far-field and near-field (trawl and Ichthyoplankton studies), and those impacted by the plant's Cooling Water Intake Structure (CWIS) (impingement and entrainment monitoring). The demonstration required a quantitative and qualitative assessment of these measurements to understand the relative effect of the CWIS upon the indigenous populations of aquatic organisms.

Approach

To provide a quantitative assessment of the impacts of the CWIS, ERM used GEMSS® (Generalized Environmental Modeling System for Surfacewaters) to compute entrainment parameters for the ETM and the EAM, programmed in EXCEL and provided to the client.

The model used bathymetric data to set up the 3-D model grid to represent the study area. The study area included Indian River, Indian River Bay, and Rehoboth Bay which was divided into regions corresponding to the biological far-field and near-field sampling regions

To evaluate the percentage of standing crop that could be entrained from a specified region, a numerical dye study was performed. Each region was dyed separately, with dye

a surrogate for the entrainable organisms, to estimate the likelihood of withdrawal into the plant. The model-predicted entrainment parameters were compared with field data. A similar approach was used for obtaining the entrainment parameters of different life stages by species. The natural mortality for each life stage and species was included in the model as a loss rate, as was interdependency between each life.

ENTRIX used a risk-based approach to evaluate impacts to the fish and blue crab populations from the CWIS. Entrainment and impingement samples were collected at the IRPP in order to determine the species and abundance of fish and blue crab affected by the CWIS. Ichthyoplankton and trawl sampling provided data regarding the variety, occurrence, abundance, and distribution of fish and blue crab. The data was applied to ERM's EAM and ETM models to assess the potential risk of an adverse environmental impact associated with the operation of the CWIS. The supplemental population trend data were used to place the estimated risk in an ecological perspective relative to the Indian River Estuary and Rehoboth Bay ecosystem with an emphasis on the fish and blue crab populations.

Results

With ERM's entrainment assessment software, ENTRIX was able to provide a quantification of the relative effects of the CWIS upon the local aquatic populations, and submit the 316(b) demonstration. The demonstration has been reviewed, and ENTRIX is currently working with the plant's current owners, NRG Energy, Inc., to develop a strategy to attain compliance with the final Phase II Rule at this facility.