

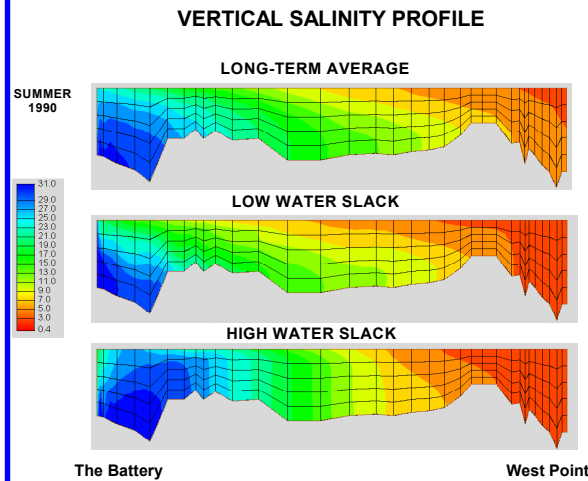
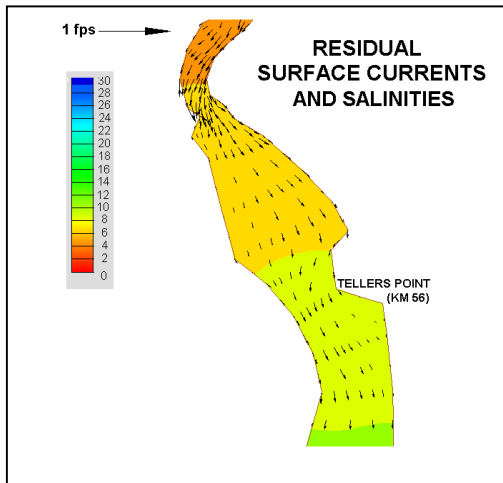
PROJECT TITLE: HYDROLOGIC AND ANTHROPOGENIC CONTROLS ON THE SALINITY DISTRIBUTION OF THE HUDSON RIVER ESTUARY (HYDRODYNAMIC MODELING)

Contractor: [Najarian Associates](#)
 Client: Hudson River Foundation for Science and Environmental Research

Amount: \$45,000 Research Grant

Completion Date: 6/21/00

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The upper Hudson River Estuary (HRE) provides an abundant potable water supply. Nevertheless, managers are concerned that excessive water withdrawals from the upper HRE may increase salinity intrusion and, thereby, endanger both upstream water supplies and sensitive aquatic communities. To address such concerns, Najarian Associates was awarded a research grant to assess the extent of brackish intrusions in the upper HRE under various water withdrawal schemes and hydrologic conditions. To this end, a three-dimensional, hydrodynamic and salt

transport model was adapted to the HRE. The model was calibrated with available hydrodynamic and salinity data. The model reproduced salient hydrodynamic features, including observed intratidal and intertidal variations in the vertical salinity structure. Also, the model identified dominant hydrodynamic transport mechanisms.

Project Highlights:

The model was used to simulate planned water withdrawals of 300 million gallons per day, approximately 3% of the average freshwater inflow to the HRE. Results suggest that these withdrawals will minimally impact the HRE salinity regime under average freshwater inflow conditions.

The study revealed a pattern of relatively large seasonal migrations of the HRE salt front, and an interesting long-term trend. During a severe drought period in 1995, available U.S. Geological Survey field data indicated that the HRE salt front migrated approximated 25 km further upstream than during the hydrologically comparable (though arguably more severe) 1964-65 drought. These data suggest that there are not only seasonal, but also long-term trends in salt front migration.