

Determining the hydraulic residence time of Penobscot Bay, Maine, by implementing a box model

The hydraulic residence time of Penobscot Bay, Maine was determined for the month of May in 2004 and 2005 by implementing a box model. Empirical data obtained from Penobscot Bay was inputted into the model to produce advection rates for each box. A simulation was run using the calculated advection rates to determine the residence time of each surface box. The residence times calculated for Penobscot Bay was highest at the head of the estuary and decreased towards the estuary's mouth. Residence times were found to change with varying freshwater inputs and salinity distribution throughout the estuary. Determining the residence time revealed insight on the circulation and dynamics of Penobscot Bay, which ultimately can be used to aid in the conservation of endangered species, such as Atlantic salmon.

Advisors: Lauren Sahl and David Avery