FRESHWATER SUPPLY POTENTIAL OF THE ATLANTIC INTRACOASTAL WATERWAY NEAR MYRTLE BEACH, SOUTH CAROLINA

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ABSTRACT

The demand for freshwater in Horry and Georgetown Counties in northeastern South Carolina is increasing steadily with population growth and development. In some parts of the Myrtle Beach area, ground-water levels in production wells have been lowered to depths greater than 150 feet below sea level. As part of an investigation to find alternative sources of freshwater, the Atlantic Intracoastal Waterway (AICW) in the vicinity of Myrtle Beach was evaluated as a potential water supply. Freshwater entering the AICW from the major tributaries is adequate for drinking water purposes if treated. The city of Myrtle Beach proposed construction of a surface water treatment plant with its intakes located in the vicinity of 10th Avenue North at AICW mile 363.3.

An unsteady-flow model was used to simulate the daily discharge in the AICW from October 1981 to September 1986 to assess the likelihood of saltwater intrusion into the vicinity of the proposed intakes during periods of low tributary inflow. A MOVE.1 regression equation was developed to relate the average 7-day discharge in the AICW to the 7-day discharge of four major tributary streams. Streamflow records (climatic-years 1954-1986) of the tributary streams and the 7-day discharge regression equation were used to develop a 7-day low-flow frequency curve for the AICW. The estimate of the $7Q_{10}$ (7-day, 10-year low flow) in the AICW is 192 cubic feet per second.

The record of the tributary streams and the relation of 7-day average discharges in the AICW to the 7-day discharges of the tributary streams were also used to simulate 7-day average discharges for the AICW for each day of the 1954-86 period of record. A flow duration hydrograph of these simulated discharges indicated that a lower water supply can be expected during the months of August through October.

A relation was established between the mile position of the saltwater-freshwater interface and specific conductance recorded at Vereen's Marina near S.C. Highway 9. The relation was used with specific conductance data for 1982-85 to synthesize maximum daily inland migrations of the interface for the period. A relation was then established between synthesized 7-day averages of the position of the maximum inland migration of the saltwater-freshwater interface and the 7-day average discharges of the AICW.

On the basis of this relation, the location of the saltwater-freshwater interface for the $7Q_{10}$ discharge is estimated to be at mile 355.5. If a steady-state discharge of 45 cubic feet per second is withdrawn from the