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Engineer Research and
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Shrewsbury River Flood Control Modeling Study

- Description** The Shrewsbury River is a tidal estuary (see Figure 1) that runs north/northeastward through northeastern New Jersey connecting with the eastward-flowing Navesink River and ultimately draining into Raritan Bay through Sandy Hook Bay. Frequent flooding occurs at critical locations along the Shrewsbury River due to tidal storm events such as the December 1992 northeaster. Although the study area is very close to the coast, the barrier island protects the area from extreme ocean surges. All of the local flooding problems are associated with storm surge that enters the system indirectly from the surge entering Raritan Bay and flooding back southward through Sandy Hook Bay and down to the Navesink and Shrewsbury River mouths and upland flooding. As a result, many residences, commercial properties, and municipal properties are frequently flooded in towns along the Shrewsbury system. The goals of the model study were to determine elevations associated with storm and tidal events and to evaluate the performance of alternative design plans for achieving the desired level of flood protection. Criteria used for the evaluation included the frequency-of-occurrence of certain flood levels and statistical analysis for each design alternative. In addition, the influence that the proposed plans may have on the hydrodynamic circulation within the system was identified.
- Issue** The U.S. Army Engineer District, New York (CENAN) requested that the USACE Engineering Research and Development Center (ERDC) at Waterways Experiment Station (WES) perform a numerical model study for the purpose of analyzing flooding on the Shrewsbury River at Sea Bright, New Jersey.
- Products** The final products included: 1) Report titled: Shrewsbury River Flood Control Modeling (Martin, et al., 2005; 2) Flood level data and statistics for use in the project economic analysis and 3) a working numerical model of the system for future work.
- Supporting Technology** The nonlinear response of the hydrodynamics to the design features could only be estimated by the use of numerical models. The techniques used to develop storm surge hydrographs for the South River Flood Control Project (Letter, et al., 2001) were applied to the study. Those storm surge analyses utilized the ADCIRC (ADvanced CIRCulation) long-wave hydrodynamic code to develop an Eastern Seaboard Ocean Model (ESOM) to calculate the needed storm surges for the surge analysis. The TABS-MD long-wave hydrodynamic code RMA2 was used to develop the Shrewsbury/Navesink River detailed model. Freshwater inflows were developed by CENAN.
- Benefits** Knowledge of the elevations associated with storm and tidal events is now available to effectively analyze flooding on the Shrewsbury River at Sea Bright, New Jersey.
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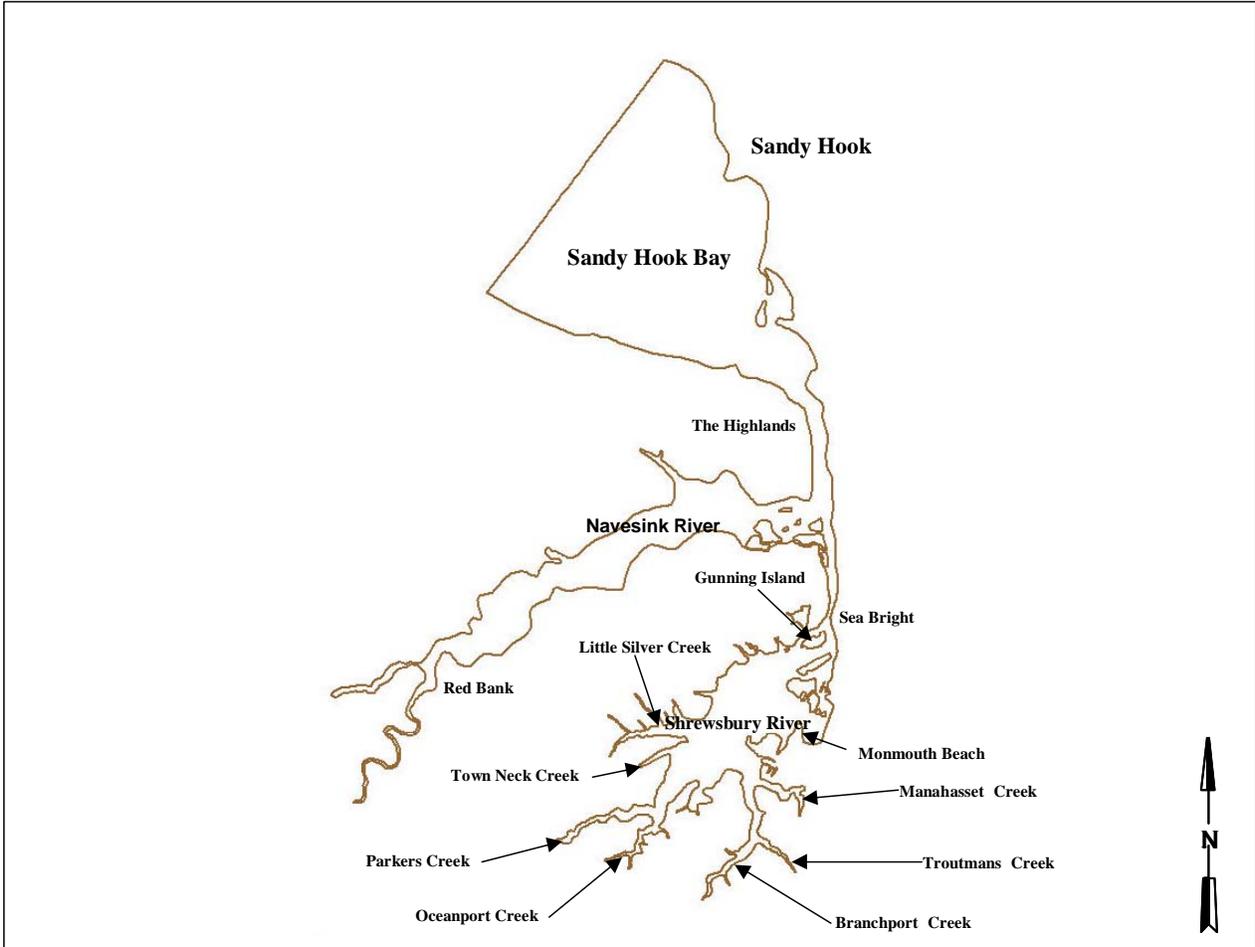


Figure 1. Location Map