



Fact Sheet

US Army Corps of Engineers
U.S. Army Engineer Research and Development Center

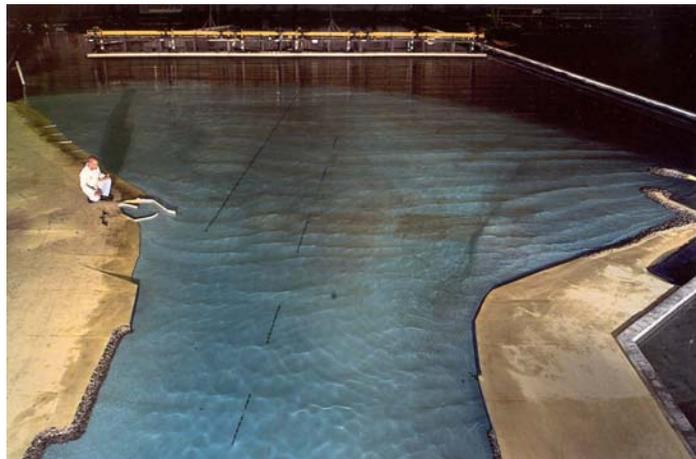
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Sedimentation and Hydrodynamic Study of U.S. Coast Guard Station Boat Basin, Port Huron, Michigan

Purpose: To qualitatively study sediment movement pathways and deposition at the harbor entrance and quantify wave conditions inside the boat basin and to develop remedial plans to alleviate undesirable wave and shoaling conditions at the entrance to and inside the harbor.

Background: The U.S. Coast Guard Station, Port Huron, includes a small boat basin at the extreme southern portion of Lake Huron where the lake empties into the St. Clair River. This location is ideal for rescue operations for heavy summer recreational boat traffic on lower Lake Huron and the upper St. Clair River. However, because the basin is located in the dynamic lake-to-river transition region, sedimentation at the harbor entrance is so severe that rescue operations are limited and frequent dredging is required. In addition, vertical sheet pile walls contribute to undesirable reflective wave energy inside the basin from wind waves and vessel-generated waves from ship traffic. Strong currents in combination with waves also cause problems for navigating into the basin. At times shoaling is so severe the rescue operation has to be moved to a marina located on the St Clair River. This results in extended response times and other safety issues that are not desirable to the Coast Guard.



Facts: At the request of the U.S. Army Engineer District, Detroit, and the U.S. Coast Guard Civil Engineering Unit, Cleveland, a 1:60-scale physical hydraulic model was designed and constructed at the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory to study shoaling, current, and wave conditions at the site. The model reproduced the extreme southern portion of Lake Huron and the entrance to the St. Clair River. About 0.7 miles of the United States shoreline was reproduced on the west, which included Port Huron Harbor, as well as 0.8 miles of the Canadian shoreline on the east. A 60-ft-long unidirectional, spectral wave generator, an automated data acquisition and control system, capacitance-type wave gauges, a model circulation system, remote-controlled navigation vessels, and coal tracer materials were used in model operation. Multiple modifications were made to the basin configuration to determine an optimum alternative for alleviation of undesirable conditions. The existing north breakwater was reoriented and terminated 40 ft lakeward of its original termination point and, in addition, a 40-ft-long lakeward extension of the structure was included. The final plan minimized shoaling at the harbor entrance, reduced wave heights in the basin for both wind waves and vessel-generated wakes, improved navigation conditions, and should not cause any adverse impacts downstream of the harbor in the river.

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