



**US Army Corps  
of Engineers®**  
Engineer Research and  
Development Center

**Facility**

## **ESTEX Research Facility**

### **Purpose**

ESTEX is a large research and development experimental facility constructed and operated by ERDC's [Coastal and Hydraulics Laboratory](#). The facility, which began operation in December 2002, is designed for research in unsteady, nonuniform flow and transport research in all hydrographical zones for advancing the understanding of hydrodynamic processes that are important to water resources conservation and management.



**ESTEX facility filling**

### **Specifications**

ESTEX has three main components: a 60-ft by 60-ft by 10-ft-deep water research facility (DWRF) directly connected to a 420-ft by 60-ft by 4-ft-deep research basin (REBA), and a parallel 10-ft wide, 480-ft-long flume with depths of 4 ft and 10 ft. A removable partition wall permits formation of an inset flume of any width up to 60 ft and a variable cross section.

### **Benefits**

ESTEX is capable of time-varying unidirectional or reversing flows. Tides and/or currents can be generated separately in the flume as well as in the basin. Pumps installed on two large, fully covered sumps with recirculating arrangement generate flow and tides.

ESTEX provides:

- A test basin and flume combination that can be essentially free of sidewall, endwall, and entrance effects over large distances, a characteristic available nowhere else.
- High Reynolds number flows that escape the usual limits of scale effects in many other flumes presently available.
- A wide and deep facility with significant through-flow needed for vessel effects studies and dredged material placement studies.
- A sufficient length of flume to rigorously define sediment transport processes so that sediment models can be substantially improved and proved to work better.

### **Application Possibilities**

ESTEX can be used successfully in a wide variety of research including:

- Dredging studies for large-scale controlled tests on the performance of dredge heads for design improvements aimed at minimizing resuspension.
- Sediment deposition studies in which varying flow velocity and water depth are simulated.
- Flocculation under turbulent flow for different levels of turbulence.
- Fluid mud studies for development of special devices and their accurate calculation for measurement.
- Mud flow studies to provide better estimates on siltation.
- Aid to numerical studies through making the models more reliable.
- Selective withdrawal through cooling water intakes of thermal and nuclear power stations and dispersion of buoyant jets in depth-limited environment.
- Sediment gage calibration for reliable measurement devices.
- Current gage calibration for large field velocity instruments to the required accuracy.
- Wetland modeling which can be evaluated experimentally by reproducing vegetation and benthic characteristics of site on a large scale.
- Large-scale physical model navigation studies such as vessel behavior and vessel effects on the waterway that can be conducted to the desired scale.
- Scale effects. A larger size facility such as ESTEX can reproduce conditions closer to the prototype.

### **Current Project**

Currently, a portion of the facility holds two models of Cooke Inlet, AK: the Large Area Model of the entire inlet and the Small Area Model focusing on Anchorage Harbor. The purpose of the modeling is to investigate changes in the flow regime and sedimentation in the Harbor as a result of planned improvements.

### **Point of Contact**

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