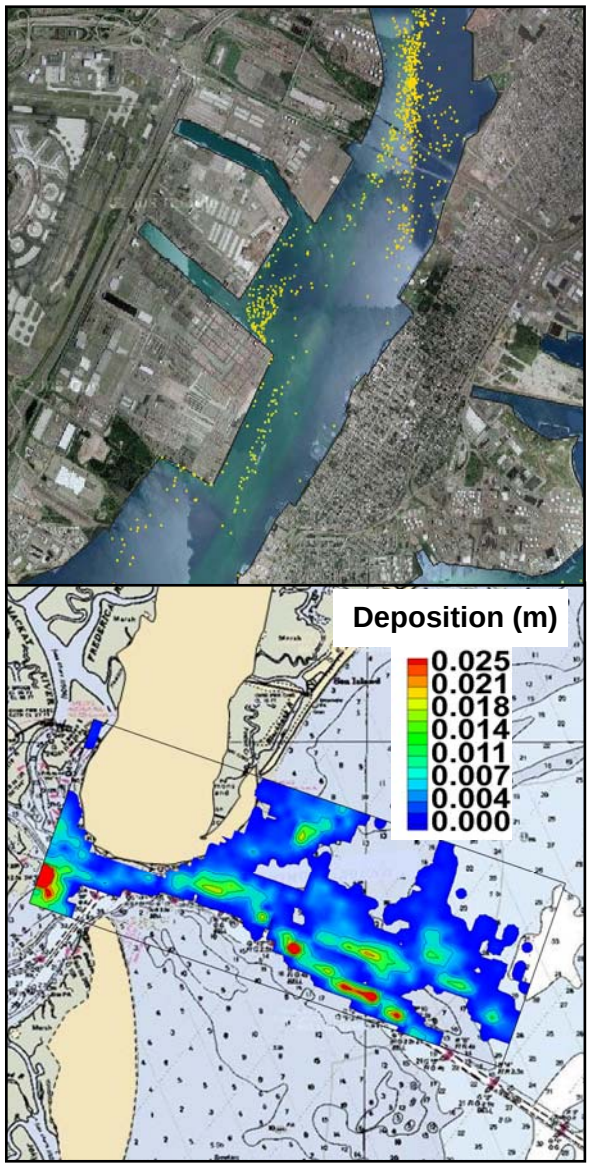
The Particle Tracking Model

U.S. ARMY CORPS OF ENGINEERS **BUILDING STRONG®**

Description

The Particle Tracking Model (PTM) is a Lagrangian particle tracker designed to determine the fate of multiple constituents (sediment, chemicals, debris, biota, etc) released from local sources (dredges, placement sites, outfalls, propeller wash, etc) in complex hydrodynamic and wave environments. Each local source is defined independently and may have several constituents. Model results include the fate of each constituent from each local source. PTM simulates particle transport using pre-calculated, periodically saved hydrodynamic (and wave) model output from state of the art models. The hydrodynamic model is not coupled to the sediment transport model and can be run once for multiple PTM simulations. PTM uses processes vital to constituent transport including but not limited to advection, diffusion, settling, deposition, and resuspension. The PTM interface is in the Surface-water Modeling System, which provides a user-friendly environment for input development, model execution, data analysis, and visualization.



Purpose

Accurate prediction of the fate of water-borne constituents is a key element in coastal engineering, navigation, environmental resources, and dredged material management. PTM provides rapid analysis of multiple scenarios to optimize management of aquatic habitat, construction projects, water quality, etc. The model was originally developed to address regulatory issues related to sediment fate in Corps projects. PTM uses have expanded to include optimization of transport for biological and sediment resources.

Users

Corps Districts, EPA, NOAA, wildlife and fishery agencies, state/local water and environmental resource agencies, industry, academia, and consulting firms. Corps research programs involved in development include: CIRP, DOTS, and DOER.

Benefits

PTM supports environmental risk assessment, beneficial sediment use and habitat protection. The computational efficiency of PTM permits simulation of multiple predictive scenarios to determine transport pathways and exposure in environmentally sensitive areas, thereby identifying options which can ultimately reduce anticipated expenditures, risk, and consequences in coastal, estuaries, and inland waterways. In addition, PTM is independent of any one specific hydrodynamic model, allowing the user flexibility with regard to hydrodynamic input.

Point of Contact

Dr. Tahirih Lackey, CEERD-HF-CT, e-mail: tahirih.c.lackey@usace.army.mil, 3909 Halls Ferry Road, Vicksburg, MS 39180-6199.