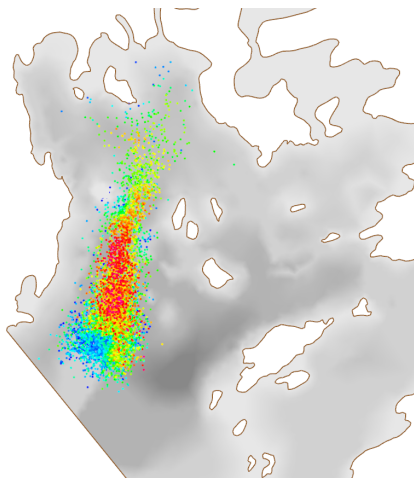
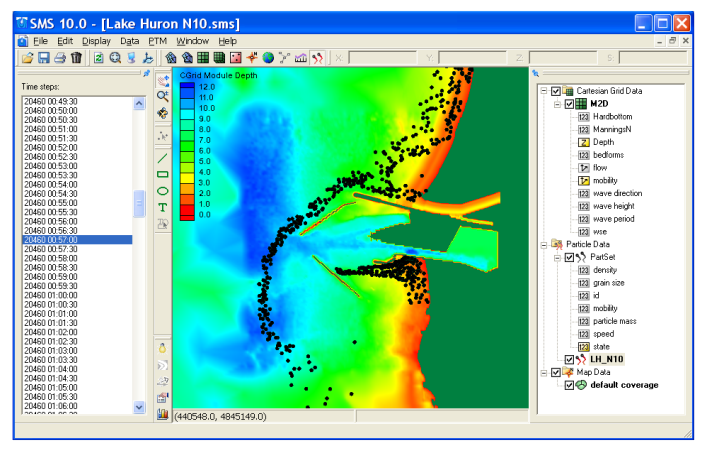
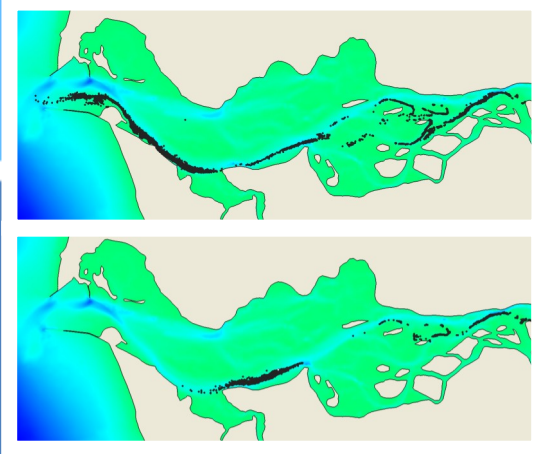
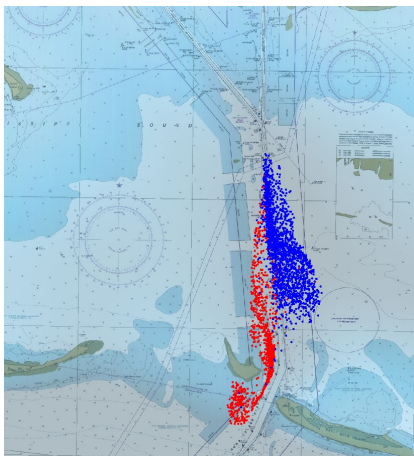




Plume modelling with a 3D wind field



Winnowing of coarse and fine sediment during a dredging operation

PARTICLE TRANSPORT MODEL (PTM)

Coldwater Consulting Ltd. has been contracted by the US Army Corps of Engineers to develop a Lagrangian-based sediment transport model. The Particle Tracking Model (PTM) has been designed to meet the needs of two USACE research programs, the Coastal Inlets Research Program (CIRP) and the Dredging Operations and Environmental Research Program (DOER).

PTM represents the sediment field by a number of discrete particles. Each particle represents a given mass of sediment and has its own unique set of characteristics. Advantages are:

- Graded sediments are easily modeled.
- Sediment pathways can be readily identified.
- Conditions with sharp gradients in suspended solids (plumes, for example), can be modeled without numerical diffusion
- Lagrangian models can be run with a fraction of the computer execution time required by Eulerian models.

PTM requires a domain with bathymetric and sediment data, flow and (if applicable) wave data. Particles are released into the flow and the following computations proceed through time:

- Eulerian calculations interpolate hydrodynamics and compute shears, bed-forms, mobility, transport rates
- Lagrangian calculations compute sediment advection, diffusion, settling, deposition, re-entrainment

PTM is operated using its own interface within the SMS modeling environment. 2D and 3D hydrodynamic and wave models are supported including CMS-Flow (2D and 3D), ADCIRC (2D and 3D), CH3D, CMS-Wave and STWAVE.

Additional tools (sediment traps, transport and mobility mapping, residence time calculator, etc.) are included and can provide useful insights to complicated problems.