



**APPLIED SCIENCE
ASSOCIATES, INC.**

PORT AND HARBOR SERVICES

Applied Science Associates is helping the port industry and those responsible for harbors meet regulatory requirements by providing strong technical solutions to problems involving aquatic impacts. Through the application of computer models we can provide analysis of the transport and fate of dredged material from both dredging and disposal operations. Also we can analyze the transport and fate of conventional and toxic pollutants in the dredged material in addition to outflow from other sources. Plus, models can help in the design of receiving water monitoring in fresh and marine environments. ASA combines robust analysis with visualization tools to effectively communicate results for stakeholder groups, regulatory hearings and expert witness testimony.

CAPABILITIES

How quickly does a particular area flush? What mixing zone size is appropriate for a particular discharge outfall?

Using a judicious mix of field surveys and modeling, ASA can help determine the diluting and flushing capability of a body of water, whether a lake, stream, river, estuary or coastal area. Field studies using dye as a tracer can provide actual distribution of concentrations and thus dilution for an existing facility. Numerical circulation and dye studies can be used to estimate dilution flushing for proposed projects.

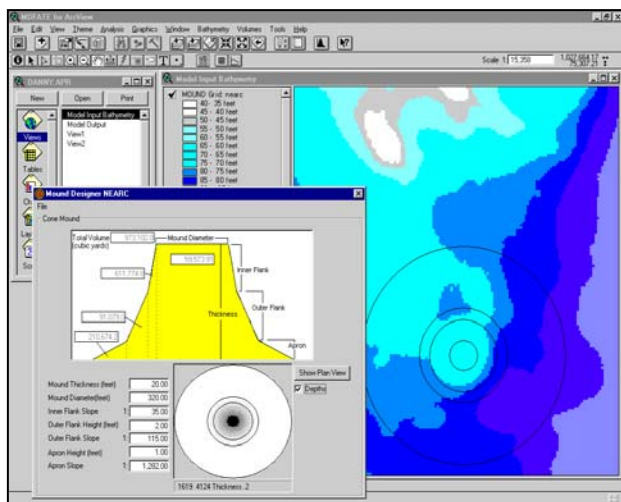
How can the placement of dredged material be optimized to create a containment mound?

The design and location of a disposal operation can be optimized to create a disposal mound to stay within given size constraints. It is also possible to design the disposal operations to create a containment mound consisting of a berm that will eventually be filled with contaminated sediments. ASA, working with the U.S. Army Corps of Engineers has developed a model system that performs these functions.

What is the size of the resulting plume from dredging and disposal operations? Are water quality standards exceeded?

ASA's model systems help private, state and federal agencies determine the impacts that dredging operations have on the environment. This quantitative approach addresses issues like sediment, chemical and other toxic pollutant discharges to answer questions for permitting, such as:

- How large are the plumes from dredging operations and how long do they last?
- Do the sediment and pollutant plume concentrations exceed water quality standards?
- What are the biological impacts from dredging operations?
- What is the effect of the discharge on water quality (i.e. dissolved oxygen)?



SERVICES

The complex regulatory environment for dredging and disposal operations and other environmental issues facing port designers and operators as well as harbor authorities, demand a flexible and responsive consultant. That's what makes ASA the perfect partner.

For twenty years, ASA has combined computer tools with comprehensive field programs to provide customized solutions to aquatic problems for our clients.

ASA's seasoned project managers have extensive experience providing expert witness testimony as well as effectively presenting at regulatory and public hearings.

Our reputation for technical excellence is well respected in both the scientific and regulatory communities.

SOFTWARE

ASA uniquely combines exceptional technical capabilities with visualization tools that present model results in an easily understandable geographic framework.

Advantages to ASA's modeling approach include:

- Models are continuously updated to incorporate the latest scientific advances, keeping them at the forefront of the field.
- Model results can be effectively communicated through animations and three-dimensional displays.
- Each model is seamlessly integrated into a Windows-based system that streamlines the modeling process and reduces set-up time.
- Model systems can be integrated with existing GIS applications, such as ArcView or MapInfo.

PROJECTS

Project: Model Development to Simulate the Fate of Material Lost During Dredging Operations

Client: U.S. Army Corps of Engineers

ASA worked jointly with the U.S. Army Corps of Engineers to develop a model system that simulate the fate of material that is lost during the dredging operation. The model system, known as SSFATE, is designed to handle noncohesive and cohesive sediments using a variety of dredging technologies: cutter head, bucket (open and closed) and hopper. The model predicts the water column sediment concentration and bottom deposition patterns for multiple classes of particles. It is linked to a boundary fitted hydrodynamic model that provides time and space varying currents.

Project: Fate of Sediment and Pollutants from Disposal Operations in Boston Harbor, MA, USA

Client: Massachusetts Port Authority

MASSPORT planned a navigation improvement project, consisting of dredging the 35 ft deep channels and berths in the harbor to a 40 foot dept in the Inner Boston Harbor. Some of the sediments to be dredged in the harbor were contaminated with high levels of toxic pollutants including metals and organics and needed to determine what concentrations of sediments, metals and toxins could be expected. ASA used its calibrated hydrodynamic and pollutant transport models to estimate the water column concentrations in the harbor for various disposal sites. Timing of disposal operations, relative to the tide, was examined to minimize the environmental effects.



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