

Applied Science Associates is helping wastewater treatment facility operators 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 pathogens, conventional and toxic pollutants; conceptual designs of outfall discharges and design of receiving waters 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

### FLUSHING AND DILUTION STUDIES

*How quickly does a particular area flush? What mixing zone size is appropriate for a particular 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 dye studies can be used to estimate dilution flushing for proposed projects.

### CONCEPTUAL DESIGN OF OUTFALLS

*Where is the best place to locate an outfall? What is the optimal design?*

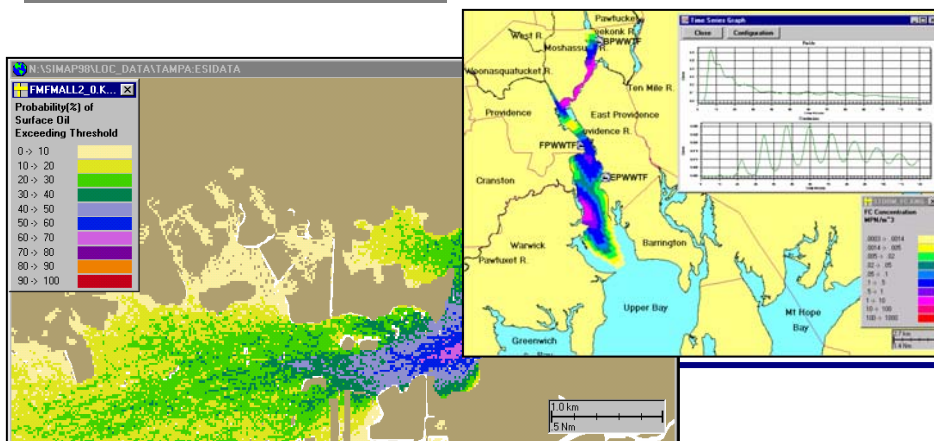
In the design and location of a wastewater treatment facility, discharge outfall is important in maximizing the dilution and minimizing the resulting impact. ASA uses a variety of near field plume models linked to far field pollutant transport models to estimate effects and optimize designs. These models have been used in many locations where the environmental processes uniquely affect plume.

### COMBINED SEWER OVERFLOWS

*How long do shell fishing areas and beaches need to be closed to protect public health from CSO events?*

ASA's models help wastewater treatment facility operators determine the impacts they have on the environment. This quantitative approach addresses issues like pathogen, chemical and other toxic pollutant discharges to answer questions for benefit analysis and permitting, such as:

- How long and to what extent must the receiving body of water be closed around outfalls to ensure public health?
- What is the effect of the discharge on water quality (i.e. dissolved oxygen)?
- Are water quality standards being violated by the discharges?
- What are the impacts of various CSO design alternatives on water quality?



## SERVICES

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The complex regulatory environment of wastewater treatment facilities demands 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

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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.
- Model grids are highly adaptable to complex shorelines and depths and allow increased resolution in areas of greatest interest.
- Each model is seamlessly integrated into a Windows-based system that streamlines the modeling process and reduces set-up time.

## PROJECTS

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### **Project: Impact Assessment of Design Alternatives for the greater Providence, RI Combined Sewer Overflows**

*Client: Narragansett Bay Commission*

ASA assessed the effects of the combined sewer overflow (CSO) events on water quality in the Providence River and Upper Narragansett Bay. The study used ASA's WQMAP hydrodynamic and water quality modeling system to estimate the extent of pollutant plumes from a total of 85 CSOs under different design alternatives. The alternatives consisted of near surface and deep tunnel storage as well as satellite treatment facilities. Different design storms were studied to assist in determining how many days per year that elevated levels of fecal coliforms would impact shellfishing areas and beaches. The FC transport model was used to forecast future conditions under various CSO mitigation alternatives.

### **Project: Flushing and Outfall Study in Cohasset Harbor, MA, USA**

*Client: Town of Cohasset*

The Town of Cohasset was in the process of upgrading its wastewater treatment plant and needed to determine if Cohasset Harbor had sufficient assimilative capacity to receive an increased volume of treated effluent. ASA performed a dye study with associated hydrodynamic measurements to determine present dilution and flushing characteristics. Using the calibrated hydrodynamic and pollutant transport models in WQMAP, ASA then estimated the concentrations of pathogens and metals in the harbor based on increased loads from the plant. As part of the project, a conceptual design for the discharge outfall was developed using EPA's CORMIX model. The design was optimized to provide maximum dilution while minimizing the impacts to boats in the adjacent mooring field.



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