



## *Science and the Public*

### **How Science is Contributing to the Quonset Port Development Stakeholder Process**

Ranging from the self-described eco-sprawl lobby delegate (RI Wise Use) to the Green Party representative and from local neighborhood groups to federal agencies, there is no doubt that the Quonset Point port stakeholders represent a diverse set of interests. This group faces the challenge of achieving consensus on recommendations for the future of a

former Navy port at Quonset Point, Rhode Island while balancing environmental and economic concerns. By working with a wealth of scientific information, these stakeholders may be able to do just that.

The proposed developer, Quonset Point Partners (QPP) has hired ASA to provide the stakeholders with an expert analysis of the marine environment in the Quonset Point vicinity. The study uses information on vegetation and marine sediment types to create maps of marine habitats. By investigating what habitats exist and how they might be impacted by port development, evaluations can be made about how fish, shellfish and wildlife living in those habitats would be affected. Physical and chemical characteristics of the Bay, such as circulation, water quality and sediment quality, are also being evaluated with field studies and computer models to determine how they might change. Hydrodynamic modeling will indicate how development alternatives might change circulation patterns, altering the habitat composition of the Quonset area, and thus affecting the flora and fauna living in those habitats.

Just as important as generating and synthesizing this environmental analysis, is the task of communicating state of the art scientific information to the stakeholders. ASA has taken advantage of a variety of visualization tools such as maps, graphs, and model animation for this purpose. "The common language of maps allows each stakeholder to more effectively understand the complex issues involved, creating more opportunities for creative problem-solving, and enabling each stakeholder to see how their individual concerns fit into the larger context of the project," explains ASA project manager, Craig Swanson.

The hope is that by having the best information available, plans can be carefully made which provide economic benefits yet avoid or minimize damaging impacts to the environment and preserve the quality of life in adjacent communities. Environmental degradation resulting from port development must, by law, be mitigated to provide no net environmental loss. Therefore part of ASA's work will focus in identifying opportunities for mitigation.

Background studies completed by ASA in mid-January 1999 highlight potential marine resources which may be affected by port development and consider mitigation projects. Based on these studies, ASA will estimate potential impacts from port development alternatives generated by the stakeholders during a series of upcoming workshops.



# Not Your Ordinary Road Map

## A Planning Atlas for Florida Power and Light

It's always smart to have a map. That's why Applied Science Associates is finishing work on a color planning atlas for 11 Florida Power and Light (FPL) power generation facilities. The atlas contains maps of natural resources, environmental data, and modeling results for each FPL facility. ASA's three-dimensional modeling analysis includes probability and extent of oiling over time for a variety of oil types and possible volumes that could be spilled. FPL will use the resulting probability maps to plan response strategies.

The probabilities of surface oil, shoreline oil, subsurface oil, and water column aromatics exceeding thresholds of concern were quantified using Applied Science Associates three-dimensional stochastic model in SIMAP. Long-term historical wind and current data were assembled for the area of interest. The model was run many times, randomizing the input parameters. The spill volume was held constant or randomized up to the possible worst-case amount for each run. The mean expected and worst case results provide statistics that may be used in planning response or in risk assessment.

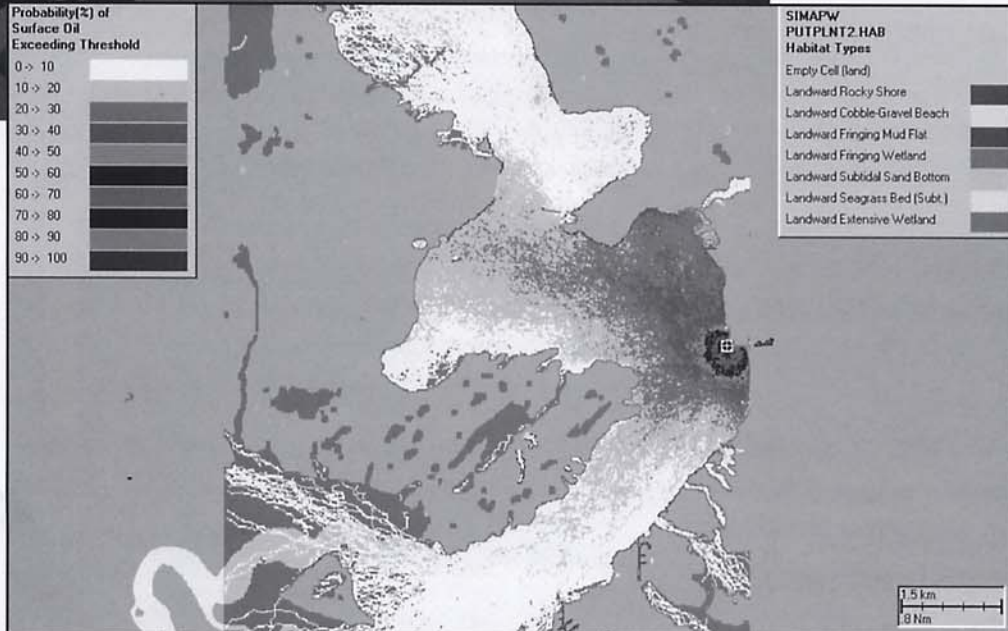
Modeling results may be studied not only through the atlas, but also electronically through SIMAP's user interface. The user may select from the library of simulations to determine the conditions under which worst-case oiling occurs.

This analysis allows oil spill responders, as well as those assessing potential impacts to answer important questions, such as:

- (1) *What is the probability of oiling, above a threshold of concern, for each location near a potential spill site?*
- (2) *How soon will oil reach each site of concern?*
- (3) *How much oil contamination is expected?*
- (4) *Is there a potential for impacting biological resources with this oil?*



Sample stochastic probabilities for a hypothetical spill in the St. Johns river as part of FPL's oil spill preparedness program.



## The Caspian Region Prevention, Preparedness Response Workshop

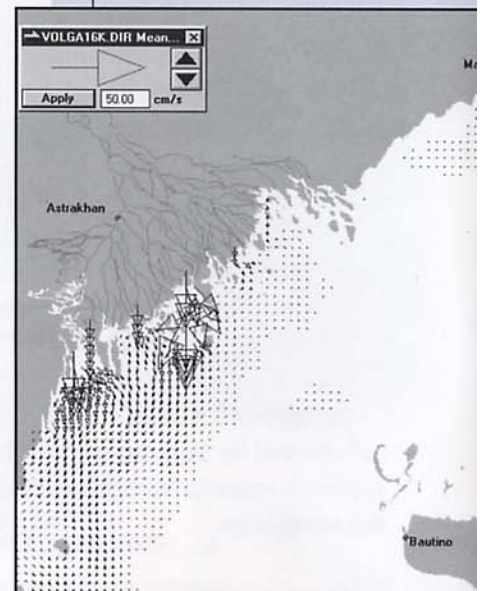
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Eric Anderson and Roddy Thomas paper: *Oil Spill & Circulation Model, Applications to the Caspian Sea*, at the Caspian Prevention, Preparedness, and Response Workshop, Almaty, Kazakhstan. The paper gives recent wind-forced hydrodynamic simulation contingency analysis in the North Caspian Sea. The workshop was part of the Caspian Sea International Operational Interagency Cooperation (OKIOC). The workshop was part of the Environmental Protection Program (CEP) initiative funded by the World Bank, US AID and the EEC. Through the workshop, the oil industry partners, the CEP seeks to reduce the risk of oil spills in the Caspian Sea through clearly defined prevention and response programs.

The several governments bordering the Caspian Sea are cooperating with the oil industries to develop contingency plans for response to emergencies. The Workshop proved a useful forum for the states and industry to jointly discuss the risks and set priorities for the next phase of the program.

ASA presented the application of the SIMAP model and GIS system, and how such a system can foster cooperation in the region and provide a comprehensive review of the ecology of the Caspian Sea.

- Setting up geographic databases in the region for a comprehensive review of the ecology of the Caspian Sea.
- The development of suitable water quality monitoring programs for the Caspian Sea.
- The implementation of a regional oil spill response program
- The introduction of a GIS/model system transfer and training program to help the oil industry and government agencies in the region.



September 1998

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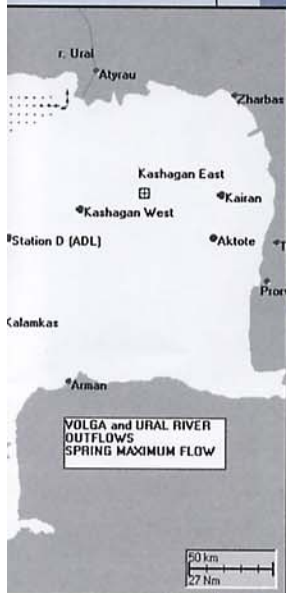
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**Daniel Mendelsohn** co-authored a paper with Eduardo Yassuda, Steven Davie and Steven Peene of Applied Technology and Management entitled Hydrodynamic Characterization of the Lower Savannah River Estuary. The paper was presented as a poster session by Eduardo and Steve at the AGU 1998 Fall Meeting in San Francisco, California. The paper describes a field program and modeling study of the Lower Savannah River to further our understanding of the estuary as an integrated system and to provide a tool for the evaluation of the potential environmental impacts of a proposed deepening of the shipping channel.

**Eoin Howlett** delivered the final version of the Alaska Graphical Resource Database (GRD), a CD-ROM based GIS application that contains a wealth of environmental data as part of the Prince William Sound Nearshore Response Plan. The GRD was developed jointly with ASA, the Alyeska Pipeline Service Company and Emcon Alaska and is publicly available in Alaska. Eoin also trained Alyeska personnel, January 20/21, on the use of the latest version of the Alyeska Tactical Oil Spill Model (ATOM) which accesses the GRD data and real-time tanker and response vessel locations from a VTS.

**Daniel Mendelsohn** and **Tatsu Isaji** along with Kenneth Hunkins of the Lamont-Doherty Earth Observatory of Columbia University authored Numerical Hydrodynamic Models of Lake Champlain. The paper was presented at the AGU Special Session, Lake Champlain: Research and Progress Towards Management Conference held at Middlebury College, Middlebury, Vermont. The paper discusses the important physical processes in the lake and focuses on the internal seiche which has been observed to dominate circulation, mixing and transport in the main body of the lake. One-dimensional and two-dimensional, one-layer and two-layer numerical models and their application to modeling the seiche are discussed.

**Matthew Ward** joined ASA this October. He holds a Bachelor and Master of Science degree in Mechanical Engineering from the University of Rhode Island. He has an extensive background in environmental science, numerical coastal model development and engineering design. Matt will be responsible for developing and analyzing hydrodynamic and water quality model scenarios.



**Roddy Thomas** and **Eoin Howlett** participated in Mobil Europe's annual Regional Response Team (RRT) Exercise 'HERMES', 9/10 November 1998, held this year in Southampton, England. ASA initially provided planning staff with modelling support to help set up the exercise scenario, a presentation on oil spill modelling to exercise participants and modelling support during the exercise event.

**Eoin Howlett** delivered the latest version of SARMAP with the Rapid Response Module (RRM) to the Irish Government's Irish Marine Emergency Services (IMES) in December. The RRM allows users to rapidly evaluate available search units, their distance from an incident, and their effectiveness if deployed to the search area.

**Craig Swanson** participated in the inaugural Coastal Institute seminar at the Graduate School of Oceanography at the University of Rhode Island on 17 December 1998. This first seminar was a presentation and discussion of the economic and environmental effects of a proposed container port at Quonset Point on Narragansett Bay.

**Eoin Howlett** presented Cozoil, The Coastal Zone Oil Spill Model, during the MMS Information Transfer Meeting (ITM) in Anchorage, Alaska, January 19, 1999.

**Henry Rines** and **Eric Anderson**, along with Michael Palet and Ana Maria Mora Alcaraz of GDS de Mexico, spent 18-23 October in the Dos Bocas, Mexico area collecting oceanographic data for inputs to hydrodynamic model simulations. In the lagoon behind the PEMEX Dos Bocas terminal they collected surface and bottom current meter observations through two complete tidal cycles, surveyed the vertical structure of the lagoon and entrance, and collected observations of local shoreline vegetation (predominantly mangrove species), fishing effort, and wildlife.



Fishermen tending gill net, Dos Bocas, Mexico.

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## ASA Develops Interface for Corps of Engineers Dredging Model

ASA has completed development of an ArcView GIS interface for a US Army Corps of Engineers model that is used to simulate the short-term movement of contaminants introduced into the water column during ocean disposal of dredged sediment. This dredged material disposal model, called the Short Term FATE of dredged material (STFATE) model, was developed by the US Army Corps of Engineers (USACE), at the Waterways Experiment Station (WES). The model integrates detailed bathymetry, dredged material chemical and physical characteristics, water column data, and information on the disposal to predict contaminant concentrations in the water column for periods up to a few hours.

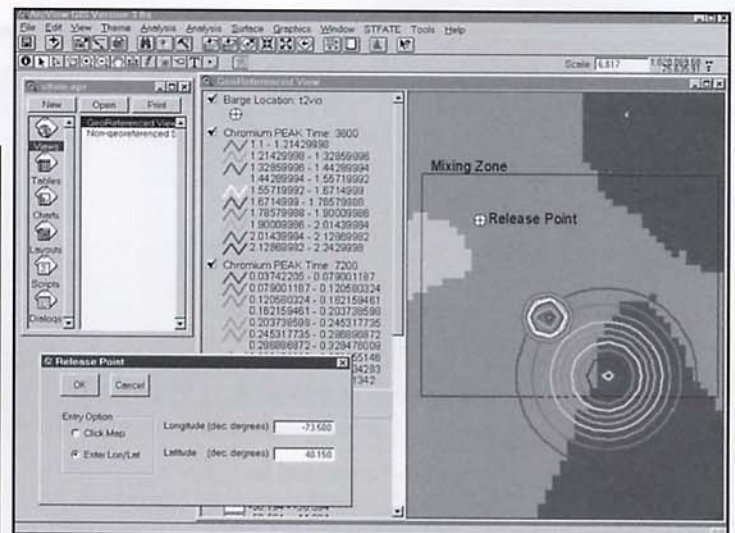
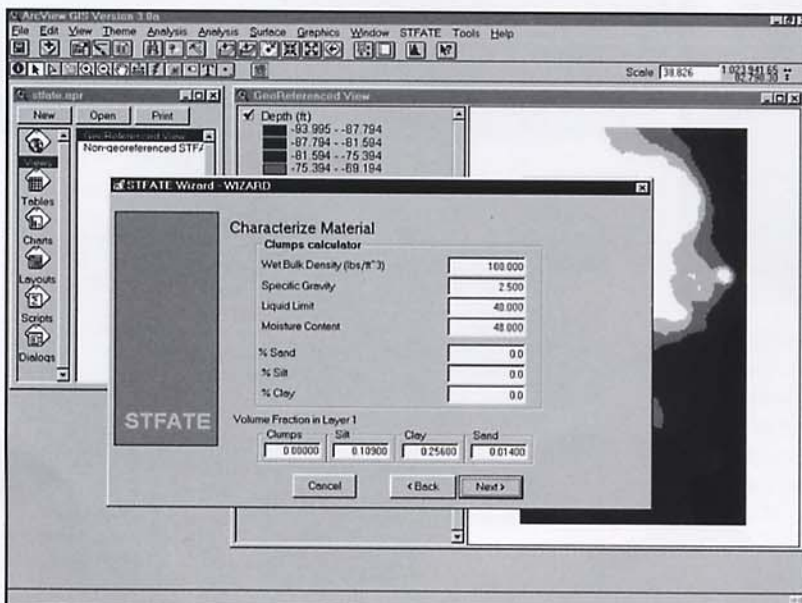
The US Environmental Protection Agency (EPA) requires that the STFATE model is run prior to disposal of dredged material to determine if contaminants in the sediment will reach levels exceeding water quality criteria.

The New York District of the Corps of Engineers funded the interface development, and ASA and SAIC are supporting their application of STFATE in their operations and planning for placement of dredged material in the Historical Area Remediation site located seaward of New York Harbor.


ASA has completed similar interfaces for a suite of Corps of Engineers models within the ArcView framework. The interface simplifies the setup and operation of the models and greatly facilitates interpretation of model results for district engineers.

Chris Galagan, ASA's GIS manager who has been responsible for much of the GIS design says, "The use of open GIS, such as Arcview, allows us to manage global databases and apply these models anywhere in the world. The setup time to get data ready for the models has been significantly reduced.

*Simplified model interfaces are used to meet dredge disposal regulations*



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