



MARINE ENVIRONMENTAL NEWSLETTER

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ASA & Miacomet Pond, Nantucket Island, Massachusetts



Located 30 miles off the coast of Cape Cod, Massachusetts and containing over 82 miles of white sand beaches, Nantucket Island is a popular summer getaway for vacationers seeking peace, quiet and lots of fun in the sun.

Miacomet Pond, a freshwater pond adjacent to the southern shore of Nantucket, is separated from the Atlantic Ocean by a relatively low beach that is periodically breached as the water level in the pond rises. As the pond fills or a storm erodes the beach, a breach occurs that drains or lowers the water level of the pond. The primary source of water to the pond is via groundwater that carries nutrients and other pollutants from various land uses in its watershed. When no outlet exists to relieve the groundwater inflow, the water level increases to cause local flooding of roadways and basements. When a major breach occurs, the pond substantially drains and the bottom can be exposed as mud flats for extended periods. Both situations result in negative impacts to surrounding landowners.

The problems of Miacomet Pond have been increasing for a number of years as development continues in its watershed. To address these problems, the Massachusetts Department of Environmental Protection, as part of its Massachusetts Watershed Initiative program, selected ASA to develop the Miacomet Pond Modeling System. ASA assembled a team of experts that included Hydraulic and

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The Inside Story

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Congressman Kennedy Meets with ASA To Discuss Narragansett Bay

Craig Swanson and Matt Ward participated in a briefing on 5 June 2001 for Rhode Island Congressman Patrick Kennedy about the work ASA did with Brown University on a NASA funded project. The project, Narragansett Bay from Space: A Perspective for the 21st Century, investigated the use of remotely sensed thermal data of the bay integrated with ASA's hydrothermal model and in situ sensors. One of the project goals was to develop prototype products and services for evaluating the thermal structure of any water body using this technology.



From left to right: Matt Ward, Craig Swanson, Congressman Patrick Kennedy and Brown Professor Jack Mustard.

ECDIS SUPPORT

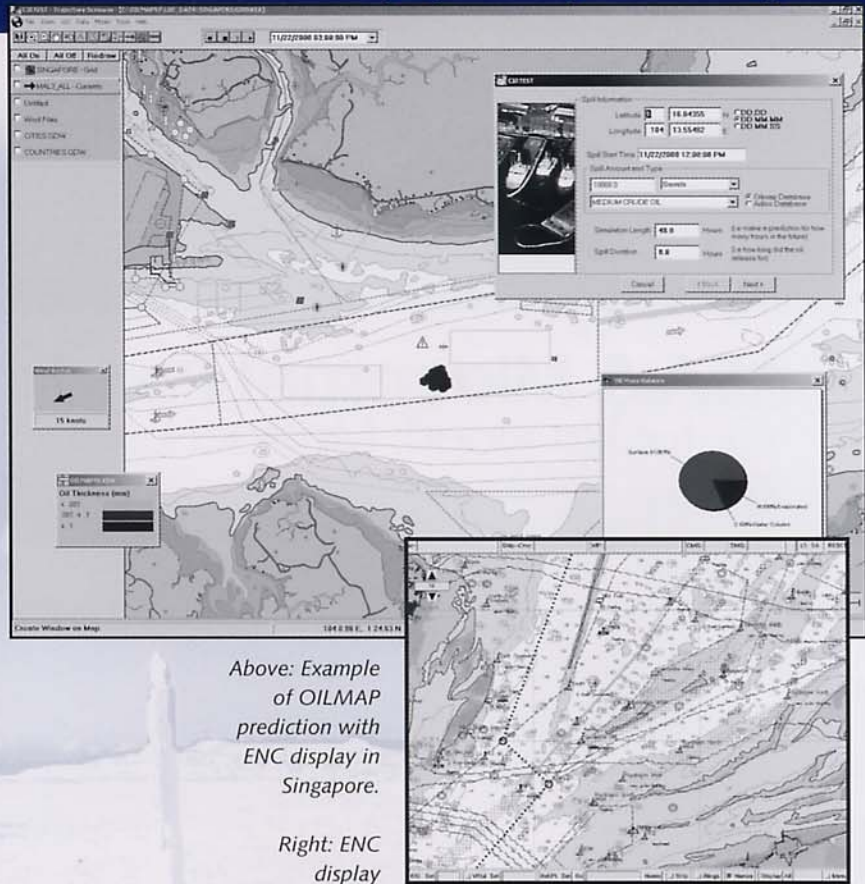
ASA software tools have incorporated support for many map and GIS formats for over a decade. In recent years, our products have included support for British Admiralty Charts (ARCS), ESRI data, and Mapinfo data. As part of a collaboration with a German company, SevenCs in Hamburg, ASA's products can now support Electronic Navigation Charts (ENCs) in S-57 format.

ENC support allows model results such as oil spill predictions, chemical plume predictions, and search & rescue regions to be displayed on nautical charts. Responders can plan emergency response and vessel movements on top of the standard navigational aids in the integrated display.

ECDIS represents a complete system consisting of hardware, software and data. Although it is not fully correct, the term ECDIS is often used interchangeably with the term NAUTICAL CHART. In fact, all kinds of nautical chart presentations on computers are often called ECDIS.

ECDIS is designed to replace the conventional chart table and is intended to permit all types of work traditionally connected with the paper nautical chart and to make these activities easier, more precise and faster. These include route planning, entry of observations, instructions and notes, position determination, and updating charts with the aid of the Notices to Mariners (NTM).

The official original data (S57 data) of the electronic nautical chart is usually supplied on CD-ROM or, in case of updates, via digital telephone or satellite communication system. This original data is also called electronic nautical chart (ENC).



Above: Example of OILMAP prediction with ENC display in Singapore.

Right: ENC display

TMDL—A Clean Water Strategy

Summer vacation nightmare: There's not a cloud in the sky and weather forecasters predict that temperatures will reach 90 degrees. You pack the car full with toys, towels, and sunscreen and make a beeline for the nearest lake. Unfortunately, upon getting there you discover that the lake is closed to swimmers. The state environmental agency has posted a notice that due to frequent exceedances of the state fecal coliform standard, the lake must remain closed until the results of an ongoing Total Maximum Daily Load (TMDL) assessment are available.

So, what is TMDL?

A TMDL is an integrated water quality assessment of a water body that considers both point and non-point sources of pollutants and establishes quantitative linkages between these sources and their effects on receiving waters. The process is designed to evaluate and determine what source reductions may be necessary to achieve water quality standards. The TMDL program is part of an overall strategy by the Environmental Protection Agency (EPA) to identify all polluted surface waters, determine

the causes of the pollution, and to restore those waters to appropriate water quality standards. Section 303(d) of the Clean Water Act requires all states to perform TMDL assessments on all water quality impaired water bodies and submit those assessments to the EPA for approval.

The TMDL will identify the sources of the pollutant and determine the causal links between the source loads and receiving water concentrations. Accordingly, the process allows regulators, dischargers, and other interested stakeholders to quantitatively assess and revise permitted effluent limits in order to meet the standards for a water body.

Dan Mendelsohn, Bill Saunders, and Eduardo Yassuda (ASATM-Brazil) recently attended the first Total Maximum Daily Load (TMDL) Science Issues Conference, co-sponsored by the Water Environment Federation and the Association of State and Interstate Water Pollution Control Administrators. The conference, held in St. Louis, MO, provided the first significant forum for TMDL modelers, regulators, scientists, and researchers to convene and exchange ideas regarding technical TMDL issues such as modeling approaches, monitoring technologies, and load allocation methodologies.

The TMDL program represents a relatively new arena for water quality modelers and for the application of ASA-developed models, and ASA is actively involved in a number of TMDL projects with partner firm ATM. An example project involves a nutrient TMDL study for the Rhode Island Department of Environmental Management (RIDEM), where ASA's WQMAP model system is being applied to the Providence and Seekonk River system, which experiences periodic hypoxic and anoxic events. In addition to the prediction of hydrodynamic circulation, pollutant transport, and water quality, the WQMAP WASP eutrophication model implementation is being updated to more accurately predict dissolved oxygen concentrations in the Providence/Seekonk River system. The TMDL modeling effort will aid in the development of a nutrient load allocation and will ultimately lead to improved water quality in the system.



ASA accountant **Linda Nolan-Gagne** and her daughter **Alexis** recently completed their second Avon Breast Cancer 3-Day Walk. The participants covered 65 miles, from Fitchburg, MA to Boston, during May 18-20. Linda and Alexis, along with 3,000 other walkers, raised 4.9 million dollars for breast cancer research and support. For Linda, a two-time breast cancer survivor, the support of all those who donated to the cause and cheered along the route was greatly appreciated. The proceeds from the walk are awarded to non-profit and research organizations to educate and provide support for underprivileged women and to fund continued research.



Linda and Alexis smile at the Finish Line.

Roddy Thomas and **Eric Anderson** presented ASA's CHEMMAP application for interested parties from MEMAC, a Middle East spill response cooperative organization in Bahrain in the end of April and beginning of May. Many of the Gulf countries were represented, and there was good interest in the capabilities to model and predict the movement and concentration of potential released chemicals in the environment.

Craig Swanson presented updates on two Nantucket Island projects ASA is conducting to the Nantucket Watershed Team Meeting on 12 June 2001. The first described our work developing a hydrologic and water quality model system for Miacomet Pond and the second outlined our plans for a recently-begun modeling and characterization study for Madaket Harbor and Long Pond at the west end of the island.

Eric Anderson presented a paper on the new HYDROMAP globally relocatable hydrodynamics model developed by **Tatsu Isaji**, **Eoin Howlett**, and **Colleen Dalton** at the 2001 Arctic and Marine Oilspill Program in Edmonton, Alberta on 14 June. The model demonstration was well received.

Sasha Zigic spent five weeks in Japan during April and the start of May. Sasha worked on various projects, including setting up a hydrodynamic model of Tokyo Bay in collaboration with the staff from Science and Technology (SAT) and Marine

Biological Research Institute of Japan (MBRIJ). During this time, Sasha also spent a weekend away with his colleagues from SAT and MBRIJ as part of their staff trip. On this trip, he experienced many interesting and enjoyable facets of Japanese food and culture including a trip to an Onsen (Japanese hot baths) and karaoke.

Eoin Howlett and **Roddy Thomas** recently visited the offices of Rijkswaterstaat North Sea Directorate and delivered the latest version of OILMAP and CHEMMAP Arcview in support of their operational needs.

On 12-14 June **Deborah French McCay** presented papers at the 24th annual Arctic and Marine Oilspill Program (AMOP) Technical Seminar and 18th Technical Seminar on Chemical Spills (TSOCS) in Edmonton, Alberta. Debbie presented a modeling evaluation of potential concentrations of dissolved aromatics that would be expected with and without the application of dispersants on oil spills. She also presented an example application of ASA's chemical spill model CHEMMAP to an ecological risk assessment for MMS of chemicals used in oil and gas operations in the Gulf of Mexico.

Eoin Howlett and **Eric Anderson** spent a week, June 4 -8, in Singapore to participate in a kick-off meeting for an Integrated Simulation System that ASA and KONGSBERG Norcontrol are developing for MPA Singapore. ASA are developing a Crisis Management Simulator to manage a variety of marine accidents.

Eoin Howlett provided training to a number of personnel at Aramco Services Company in Houston, April 18/19. The training focused on the use of OILMAP for spill trajectory modeling, and the use of GIS for managing response equipment in a spill exercise environment.



PROTECTING HOKKAIDO'S WATERS

Hokkaido is the most northern and the second largest island of Japan. It remains mostly untouched with picturesque countrysides and pristine unspoiled waters, which supply 20% of Japan's seafood demand and play an integral part to Hokkaido's economy.

Maintaining the natural beauty and economic resource has become a growing concern for the people of Hokkaido. This is due to the increased threat of oil spills caused by the exploration near Sakhalin Island, north of Hokkaido.

With so much at risk, the North Japan Port Consultants (NJPC) recently purchased ASA's oil spill model, OILMAP, to improve Hokkaido's oil spill response preparation.

Between the 24-25th April three members of the NJPC staff underwent an intensive training course carried out by a member of the Asia-Pacific office, Mr Sasha Zigic. The two-day training course provided the three trainees experience in using OILMAP as a response tool in the event of a spill.



North Japan Port Consultants OILMAP training course. From left to right: Mr Natsuhiko Otsuka, Sasha Zigic, Mifume-san and Sato-san.



New ASA Office in Perth, Australia

As part of ASA's global expansion, Asia-Pacific Applied Science Associates is pleased to announce a new office on Australia's west coast. The new office is located in the heart of Perth (capital of Western Australia) and was created to serve our present and potential clients. It is operated by Scott Langtry, Director of Operations, and Kathy Sheridan and will be supported by Brian King, Sasha Zigic and Marc Zapata from the east coast.

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ASA & Miacomet Pond continued

Water Resources (HWRE) and The Boston University Marine Program (BUMP) at Woods Hole. The team was assigned to identify available historical information, to implement a field program to collect pond level data, ground water level data and nutrient input rates, to calibrate ASA's hydrodynamic and nutrient transport models and to apply the WQMAP modeling system to the pond to simulate pond levels, total nitrogen concentrations and total phosphate concentrations within the pond.

As a public outreach component of the project, ASA created a website that contains information about the Miacomet Pond project including: why the pond is being studied, a bibliography of resources, links to other related sites and a tool to run ASA's WQMAP model and view the model output. The online model outputs the water level of the pond and the concentration of nitrogen and phosphorus in easy-to-read graphs. This model is available for use by anyone with web access. The only required input data are the start and end times for the

model simulation and the amount of precipitation that occurs during the specified time frame. Default values for the mass of nitrogen and phosphorus in each of the watershed areas are provided to help users; this value can be modified by more advanced users. Along with modeling capabilities, the Miacomet Pond website offers an array of pictures that show examples of the pond's problems and the landscape of the surrounding area. To learn more about Miacomet Pond, check out the website at: <http://www.appsci.com/miacomet>.

"Take out your map and look at it. See what a real corner of the world it occupies; how it stands there away off shore.... Look at it — a mere hillock, an elbow of sand; all beach, without a background."

—Herman Melville, *Moby Dick*

ASA homepage visit us at <http://www.appsci.com>



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