



Integrated Oil Spill Impact Model System

SIMAP provides detailed predictions of the three-dimensional trajectory, fate, biological effects, and other impacts of spilled oil and fuels.



Applications for SIMAP

- Impact Assessment
- Hindcast/forecast of spill response
- Natural resource damage assessment
- Contingency planning - including worst-case scenario
- Ecological Risk Assessment
- Cost-benefit analysis
- Drills and education

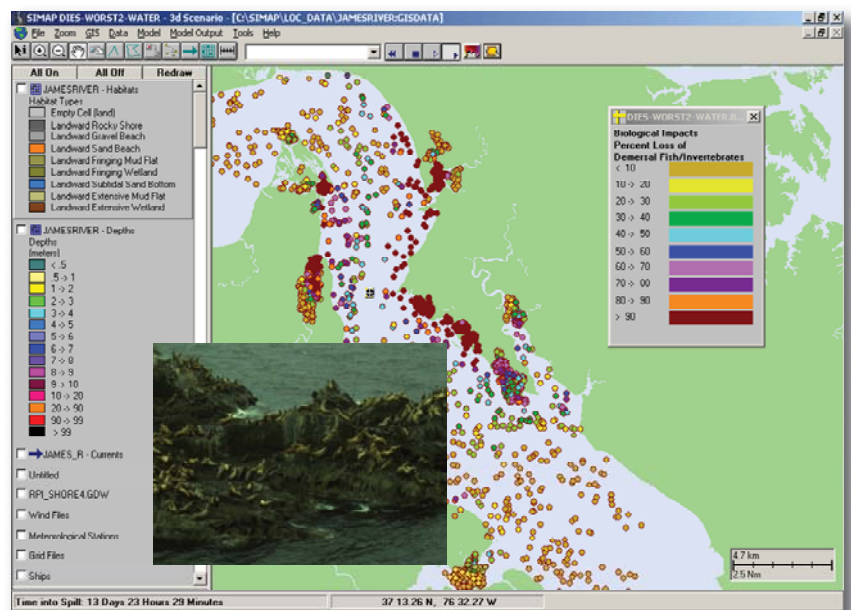
SIMAP Highlights

- Physical Fates Model
- Biological Exposure and Effects Model
- Stochastic Model
- Interactive GIS
- Environmental, Oil & Biological Databases

Features

- Contains ASA's own GIS or can be used in other GIS software such as ArcView®
- Easily interpreted visual displays of surface distribution and subsurface concentrations of spilled oil and its components over time
- Impacts on fish, shellfish, wildlife, and for series of habitats (environments) affected by the spill.
- Location-specific environmental/ biological data applied to any fresh or salt aquatic environment in the world

- 3D Viewer capabilities
- Can utilize a variety of hydrodynamic file formats



Model Modules

Physical Fates Model

SIMAP simulates the following processes:

- Initial plume dynamics
- Slick spreading, transport, and entrainment of floating oil
- Evaporation and volatilization (to atmosphere)
- Transport and dispersion of entrained oil and dissolved aromatics in the water column
- Dissolution and adsorption of entrained oil and dissolved aromatics to suspended sediments
- Sedimentation and resuspension
- Natural degradation
- Shoreline entrainment
- Boom and dispersant effectiveness

Biological Exposure and Effects Model

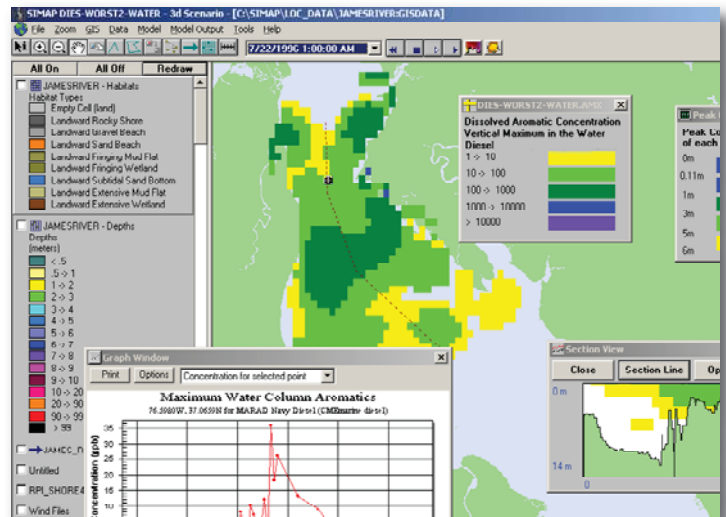
The biological exposure model evaluates:

- Area or water volume exposed above a selected threshold (i.e. a toxicological endpoint in US EPA ecological risk assessment terminology)
- Dose (sum of concentration times time of exposure) aquatic biota are exposed to and the expected percent mortality from acute toxic effects
- Direct-contact impacts to birds, mammals, and other wildlife

Stochastic Model

The stochastic model predicts:

- Range of expected contamination and the probability of exceeding thresholds of concern from an oil discharge
- Frequency distribution of model results, for which statistics are calculated and plotted



Environmental, Chemical and Biological Databases

- **Environmental database** - includes coastline, bathymetry, shoreline type, ecological habitat type, and temporally varying ice coverage, temperature, and salinity
- **Oil database** - includes physical-chemical properties; allows the user to add new oils, duplicate oils already in the database and make changes to oil data while preserving the original values
- **Biological databases** - can be set up for any area of the world. For the US, ASA has developed a biological database containing seasonal or monthly mean abundance by species and habitat type for each biogeographic region of the US

ASA has built a wide range of computer modeling applications to solve various environmental problems. ASAMAP™, ASA's suite of environmental modeling tools, are available for licensed use and customization and include: AIRMAP, CHEMMAP, COASTMAP, HYDROMAP, OILMAP, SARMAP, SIMAP, MUDMAP and WQMAP. For more information visit our website at www.asascience.com.



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