GNOME

NOAA's spill response trajectory model, GNOME (General NOAA Oil Modeling Environment), is a free computer program available for download from the Web site of NOAA's Office of Response and Restoration (OR&R), Emergency Response Division (ERD) (formerly Hazardous Materials Response Division [HAZMAT]). You can use GNOME to investigate the effects of different pollutants and environmental conditions on trajectory results. You can examine both the forecast trajectory ("best guess") and the uncertainty estimate ("minimum regret") at the same time.

GNOME supports different user experience levels through user modes. In **Standard mode**, regionally-specific location files use questions to guide users in setting up their scenarios. In **Diagnostic mode**, advanced users can set up a custom region (as ERD does during a spill response), and can incorporate a number of outside atmospheric and oceanic circulation models, such as the NOAA or other nowcast/forecast models. In addition, using GNOME's **GIS Output mode**, users can obtain GIS-compatible output.
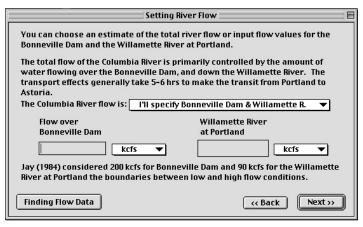
Design a Realistic Scenario

Location files are required to run GNOME in its standard configuration. NOAA develops location files that include a base map, current patterns, and relevant climatology and tidal information. GNOME location files have been developed for:

- Apra Harbor, Guam
- Boston and vicinity
- Casco Bay, ME
- Central Long Island Sound
- Columbia River Estuary
- Delaware Bay
- Galveston Bay, TX
- Glacier Bay, AK
- Harrison and Gwydyr Bays, AK
- Kaneohe Bay, HI
- Lower Mississippi River, LA
- Mobile Bay, AL
- Narragansett Bay, RI

- Norfolk, VA
- Port Everglades, FL
- Prince William Sound, AK
- ROPME Sea Area (Arabian Gulf)
- Sabine Lake and Port Arthur
- San Diego Bay, CA
- San Juan, Puerto Rico
- Santa Barbara Channel, CA
- Strait of Juan de Fuca, WA
- St. Johns River, FL
- Stefansson Sound, AK
- Tampa Bay, FL

In GNOME's Standard mode, a Wizard asks questions to help you set up the spill scenario. The complexity of the Wizard's questions depends on the specific region being modeled and detailed help is always provided for each Wizard question.

The Columbia River Estuary location file requests information on relative flow (high, medium, or low) or the flow over Bonneville Dam and through the Willamette River.
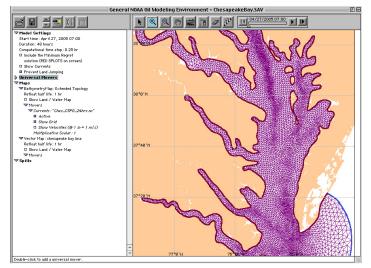

The Santa Barbara Channel location file asks the user to select among statistically significant circulation patterns.

Output may be printed as trajectory forecasts at specific times, or viewed on a monitor as a "movie." In addition to graphical output, GNOME estimates the amount of oil beached, still floating, or evaporated at specific times.

GIS users can obtain GIS-compatible output. GNOME's GIS Output mode lets you save geo-referenced files of oil location at specific times. This information can then be used by various Geographical Information Systems. NOAA provides extensions for ArcView 3.x and ArcMap 9.x at http://response.restoration.noaa.gov/gnometoolkit.

Know Your Limits

Uncertainty estimates are provided as additional trajectory analysis information. By investigating the uncertainty associated with wind, diffusion, and current estimates, you can identify potential threats that might be missed by only looking at the "best guess" trajectory. In the Standard and GIS modes, default values are used for the uncertainty parameters.

GNOME can use models on a variety of grids, including rectangular, curvilinear, and triangular grids. Here, the NOAA Chesapeake nowcast/ forecast model (based on the QUODDY finite element model) has been loaded into GNOME.

GNOME Can Use Your Atmospheric or Oceanic Circulation Model

GNOME has been developed as a grid-independent trajectory model. This means that the currents can be imported from any model that uses a rectangular, curvilinear, or triangular grid. GNOME can use wind information from a time series at a point, or a circulation model on a rectangular grid. Documentation is available on proper formatting for currents and winds at http://response.restoration. noaa.gov/gnomediagnostic/locationfiles.

GNOME accepts both netCDF- and ASCII-formatted circulation fields. If your particular model is not currently supported, send an email to the GNOME Wizard. Our goal is to make GNOME compliant with a subset of the netCDF COARDS CF 2.0 standards when they are published.

GNOME and the IOOS Regional Associations

OR&R is interested in working cooperatively with the emerging IOOS Regional Associations. We already have projects with a few of the Regional Associations to make their forecast models compatible with GNOME. Proper formatting allows these models to be leveraged for educational purposes and spill response using GNOME. Please contact the GNOME Wizard if you are interested in this capability.

Getting GNOME

The GNOME model is constantly undergoing development to incorporate emergency needs. Location files are developed for U.S. coastal areas as resources become available. For the most recent GNOME and the latest list of location files, check the Web site.

GNOME runs on Macintosh or Microsoft Windows operating systems. The model, location files, example format files, and associated documentation can be downloaded directly from the OR&R Web site. A User's Guide, including technical documentation, and example problems are available for each location file. For Diagnostic mode users, documentation for all GNOME's input and output formats is available for download.

For additional information:
http://response.restoration.noaa.gov/gnome
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(206) 526-6317

NOAA's Office of Response & Restoration—Protecting our Coastal Environment

For further information about NOAA's Office of Response and Restoration, please visit our Web site at

http://response.restoration.noaa.gov or call (301) 713-2989.