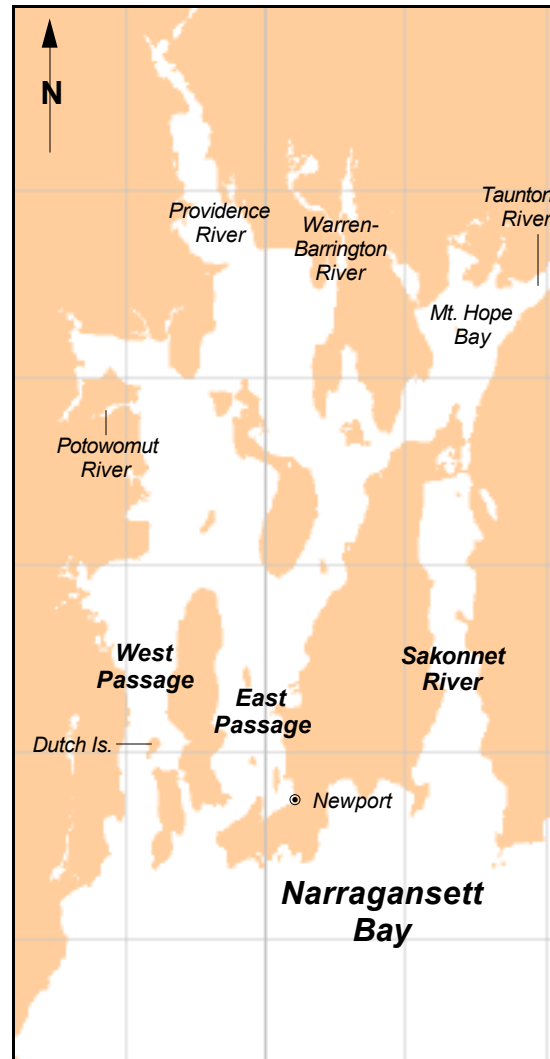


User's Guide

Welcome to the Location File for Narragansett Bay! This bay reaches two-thirds of the way into the state of Rhode Island in the northeastern U.S. Narragansett Bay is a designated estuary of national significance and a habitat for hundreds of species, including winter flounder, lobster, hard shell clams, eel grass, and seals, throughout their life cycles. (Save the Bay®: People for Narragansett Bay, http://www.savebay.org/about_bay.htm).



NOAA has created Location Files for different U.S. coastal regions to help you use the General NOAA Oil Modeling Environment, GNOME. In addition, on a case-by-case basis, NOAA develops international Location Files when working with specific partners. Each Location File contains information about local oceanographic conditions that GNOME uses to model oil spills in the area covered by that Location File. Each Location File also contains references (both

print publications and Internet sites) to help you learn more about the location you are simulating.

As you work with the Location File for Narragansett Bay, GNOME will prompt you to:

1. Choose the model settings (start date and time, and run duration).
2. Input the wind conditions.

GNOME will guide you through choosing the model settings and entering the wind conditions. Click the Help button anytime you need help setting up the model. Check the “Finding Wind Data” Help topic to see a list of web sites that publish wind data for this region.

More information about GNOME and Location Files is available at <http://response.restoration.noaa.gov/software/gnome/gnome.html> .

Technical Documentation

Background

Narragansett Bay is composed of three north/south-oriented, interconnected passages: West Passage, East Passage (Providence River), and Sakonnet River (Mt. Hope Bay). Narragansett Bay is primarily fed by four rivers: Providence River, Taunton River, Potowomut River, and Warren-Barrington River (Hicks 1959).

The bay is 25 miles (40 kilometers) long and 10 miles (16 kilometers) wide, covering 125 square miles (324.1 square kilometers) at mean low water. The total volume below mean low water is 10^{10} cubic feet (2.8×10^8 cubic meters). The mean depth of the entire bay is 29 feet (8.8 meters) and the maximum is 188 feet (57.3 meters). The lower East Passage has a mean depth of 58 feet (17.7 meters) and is approximately twice as deep as both West Passage and the Sakonnet River. Both West Passage and the Sakonnet River have a mean depth of 24.5 feet (7.5 meters). (Hicks 1959)

Circulation in the region is driven primarily by tides. Secondary circulation patterns result from winds (Weisberg 1976; Weisberg and Sturges 1976; Gordon and Spaulding 1987). Variability in river flow does not have a significant impact on surface current variability in the Providence River section of Narragansett Bay (Weisberg 1976), and is unlikely to significantly impact other regions of the bay.

There is some evidence of flow resulting from the sudden arrest of a strong southward wind. Strong southward winds blowing over a period of time would tend to push water out of the Bay. Upon removal of the wind stress, water will flow back into the Bay to compensate. This aspect of the circulation in Narragansett Bay is not represented in the Location File currents.

Current Patterns

The Narragansett Bay Location File uses four current patterns to simulate tidal and subtidal circulation. The tidal current pattern is scaled to tides west of Dutch Island in the West Passage (41° 30.3' N, 71° 24.6' W; NOS tidal prediction station #2326).

Two wind-driven circulation patterns are used to simulate wind-driven flow: one pattern from northerly winds and another from easterly winds. These two patterns are combined linearly to produce a current pattern appropriate for the user-defined wind field.

A steady Providence River outflow circulation pattern is used to simulate a net surface outflow from Narragansett Bay.

All current patterns were created with the NOAA Current Analysis for Trajectory Simulation (CATS) hydrodynamic application.

References

You can get more information about Narragansett Bay from these publications and web sites.

Oceanographic

Gordon, R. B., and M. L. Spaulding, 1987: Numerical simulations of the tidal- and wind-driven circulation in Narragansett Bay. *Estuarine, Coastal and Shelf Sci.*, **24**, 611-636.

Hicks, S.D., 1959: The physical oceanography of Narragansett Bay. *Limnol. Oceanogr.*, **11**, 316-327.

NOAA National Weather Service (NWS) Rhode Island tides
<http://www.nws.noaa.gov/er/box/ritides.html>
Tide data for Rhode Island.

Weisberg, R. H., 1976: The nontidal flow in the Providence River of Narragansett Bay: A stochastic approach to estuarine circulation. *J. Phys. Oceanogr.*, **6**, 721-734.

Weisberg, R. H., and W. Sturges, 1976: Velocity observations in the West Passage of Narragansett Bay: A partially mixed estuary. *J. Phys. Oceanogr.*, **6**, 345-354.

Weather and Online Information

NOAA Marine Forecast for Narragansett Bay
National Centers for Environmental Prediction (NCEP) Marine Prediction
Center

<ftp://www.mpc.ncep.noaa.gov/pub/docs/mpc/coastal/BOSCWFBOS>
Marine forecast for Narragansett Bay.

NOAA/NOS Center for Operational Oceanographic Products and Services (CO-
OPS)

<http://co-ops.nos.noaa.gov/nbports/nbAIIIMET.html>
Current wind observations for Narragansett Bay.

NOAA National Weather Service (NWS)

<http://www.nws.noaa.gov>
Current weather observations, forecasts, and warnings for the entire U.S.

Interactive Weather Information Network--National Weather Service (NWS)

<http://iwin.nws.noaa.gov/iwin/iwdspg1.html>
Click RI on the map for Rhode Island weather reports and forecasts.

General Information

U.S. Environmental Protection Agency (EPA) Watershed Profile: Narragansett
Bay

<http://www.epa.gov/surf3/hucs/01090004/>
Environmental profile and watershed information focused on rivers, streams,
lakes, and land characteristics.

Oil Spill Response

NOAA Hazardous Materials Response Division (HAZMAT)

<http://response.restoration.noaa.gov>
Tools and information for emergency responders and planners, and others
concerned about the effects of oil and hazardous chemicals in our waters and
along our coasts.