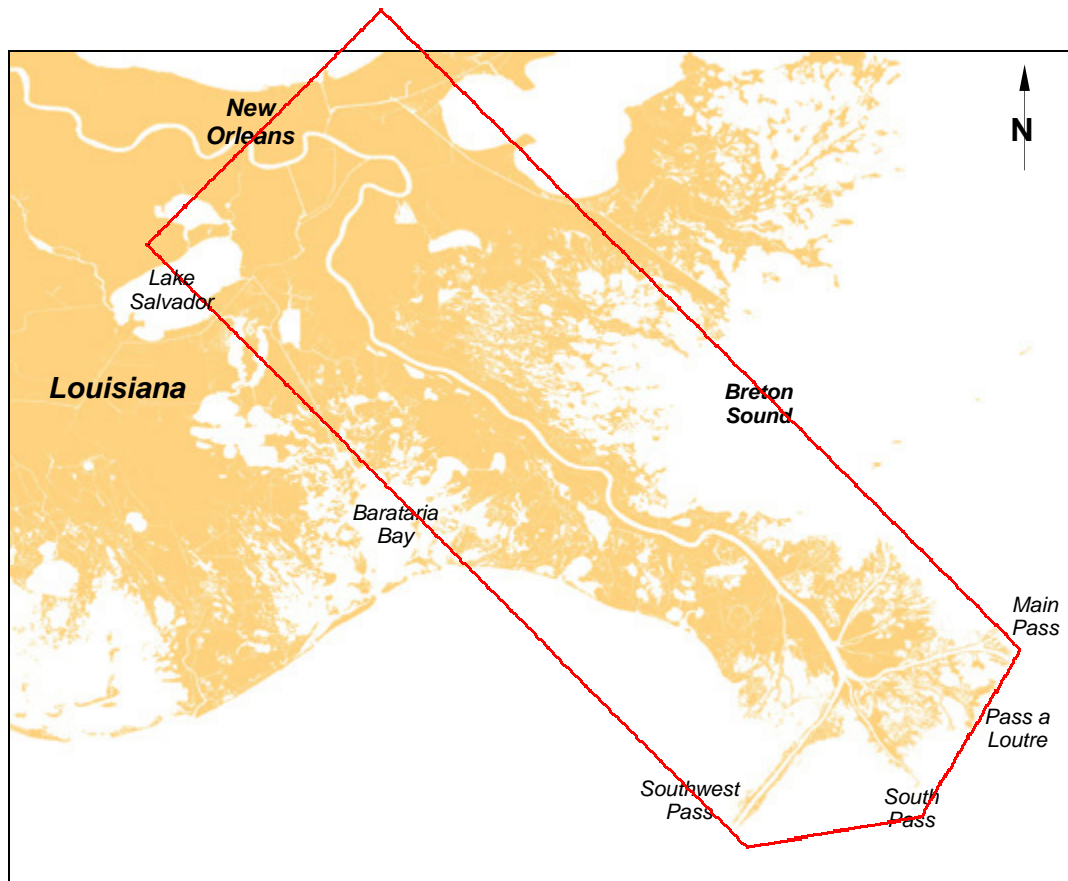


User's Guide

Introduction

Welcome to the Location File for the Lower Mississippi River, Louisiana! The Mississippi River originates as an outlet stream to Lake Itasca in northern Minnesota, then stretches approximately 2,350 miles (3782 km) from Lake Itasca to the Gulf of Mexico. It is the dominant watershed in North America, and drains 41% of the continental United States, including parts of 31 states and 2 Canadian provinces. This Location File covers the Mississippi River from New Orleans to the various river mouths in the bird's-foot delta.



The red polygon represents the region included in the Lower Mississippi River Location File.

The Mississippi River supports a diverse array of wetland, open-water, and floodplain habitats; however, human activities have greatly altered this river ecosystem. Most of the river and its floodplain have been extensively modified for commercial navigation and other human developments. Much of the watershed is intensively cultivated, and many tributaries deliver substantial amounts of sediment, nutrients, and pesticides into the river. Pollutants also enter the river from metropolitan and industrial areas. The resulting loss of natural wetlands has caused a loss of habitat for native plants and animals and has reduced the biological productivity of the entire river basin. As an

example, during the summer months an area of hypoxia (low dissolved oxygen levels) forms, covering 6,000 to 7,000 square miles (9656 to 11265 square km) of bottom waters on the Gulf of Mexico's Texas-Louisiana continental shelf. This condition is believed to be caused by an interaction of excessive nutrients and contaminants carried into the Gulf from the Mississippi, physical changes to the river, such as channelization and the loss of natural wetlands and vegetation along the banks, and the interaction of freshwater from the river with the saltwater of the Gulf.

Coastal traffic in this region is heavy, particularly at New Orleans, which is located at the junction of the Intracoastal Waterway with the Mississippi River. The Port of New Orleans is, by volume, the largest port on the Gulf of Mexico and is one of the nation's leading general cargo ports. Primarily an import port, it holds the top market share for import steel, natural rubber, plywood, and coffee, and also leads the nation in exporting pulp and paper products, chemicals, and frozen poultry and food products. In addition, New Orleans is a major port of call for Caribbean cruises.

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 the Lower Mississippi, GNOME will prompt you to:

1. Choose the model settings (start date and time, and run duration).
2. Set the flow rate for the Mississippi River.
3. Input the wind conditions.

GNOME will guide you through each of these choices. Each window has a button that leads you to helpful information and the general Help topic list. Click the Help button anytime you need help setting up the model. For example, in the Setting River Flow window, you need to provide the river current speed at New Orleans so that GNOME can calculate the currents downstream. You can do this by entering either a stage height at New Orleans, or a specific speed of the river at New Orleans. To learn how to obtain the current speed, click the button, "Finding Flow Data", or check the "Finding River Flow Data" Help topic. Similarly, when you need to input the wind conditions in GNOME, you can click the "Finding Wind Data" button 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

This Location File is designed to simulate the river flow of the Mississippi River from New Orleans to the various river mouths in the bird's-foot delta. Because of the shifting shoreline in the area, there may be areas that do not look like the current river. Storms open new passes and close other flow-through areas on an annual basis; however, the overall structure of the main passes has not changed.

Current Patterns

As water flows down river, it spreads out through the channels and passes along the river. At the larger Head of Passes, the water divides among the four larger passes. Predicting the relative amounts of water flowing out through each of the passes is difficult because it is a function of the amount of water flowing down the river and any sea level setup at the end of the passes. In this simple Location File, we consider only the river flow effects without the sea level setup. We believe this simplistic approach still provides a useful tool for drills and planning.

The currents were created in the NOAA Current Analysis for Trajectory Simulations (CATS) model using the shallow water wave constraints. Current speed scaling is from a rating curve for the Mississippi River from the NOAA National Weather Service.

References

You can get more information about the lower Mississippi River from these publications and web sites.

General Information

Mississippi River Basin

<http://www.epa.gov/msbasin/>

An EPA Office of Water website that describes the Mississippi River's complex ecosystem, its six major subbasins, and the Gulf of Mexico. It also examines the environmental challenges that affect the river's subbasins and the Gulf.

Mississippi River

<http://biology.usgs.gov/s+t/SNT/noframe/ms137.htm>

An article from the U.S. Geological Survey Biological Resources Division report, "The Status and Trends of the Nation's Biological Resources." Authors: J.G. Wiener, C.R. Fremling, C.E. Korschgen, K.P. Kenow, E.M. Kirsch, S.J. Rogers, Y. Yin, and J.S. Sauer.

Mississippi National River & Recreation Area

<http://www.nps.gov/miss/features/factoids/index.html>

A National Park Service website providing general information and facts about the Mississippi River.

US Army Corps of Engineers, New Orleans District

<http://www.mvn.usace.army.mil/>

New Orleans District, located on the Mississippi River, designs, constructs, operates, and maintains navigation, flood control, hurricane protection, environmental enhancement, and water resource projects in Louisiana and the Mississippi River.

Mississippi River Research Consortium

<http://www.umesc.usgs.gov/mrrc.html>

A private, non-profit organization that encourages both pure and applied research on the water and land resources of the Mississippi River and its watershed.

Lower Mississippi River Conservation Committee

<http://www.lmrcc.org/>

A cooperative, nonprofit organization of state and federal agencies formed to address the challenges of renewing and effectively managing the natural resources of the Lower Mississippi River.

Mississippi River Basin Alliance

<http://www.mrba.org/>

A network of diverse organizations and individuals working to protect and restore the ecological, economic, cultural, historical, and recreational resources in the Mississippi River basin.

The Mississippi Levee System and the Old River Control Structure

<http://www.tulane.edu/~bfleury/envirobio/enviroweb/FloodControl.htm>

Web page written by Tulane University Ecology and Evolutionary Biology honors student, Katherine Kemp, to increase the environmental awareness of the Tulane community.

Mississippi River Delta Basin

<http://www.lacoast.gov/geography/mr/index.asp>

USGS National Wetlands Research Center information and links relating to coastal restoration projects in Louisiana.

The Natural Environment: The Delta and Its Resources

<http://www.cr.nps.gov/delta/volume2/natural.htm>

A section from Volume II of the Lower Mississippi Delta Region Draft Heritage Study and Environmental Assessment. Volume II contains cultural and historical, natural, recreational, and economic overviews of the Delta and an analysis on more than 2,000 resources that are now being preserved and used to attract visitors to the Delta.

Setting: Geology, Hydrology, Sediments and Engineering of the Mississippi River
<http://water.usgs.gov/pubs/circ/circ1133/geosetting.html>

A section of U.S. Geological Survey Circular 1133, Contaminants in the Mississippi River 1987-92, edited by Robert H. Meade. Discusses the river's geologic settings, water discharge, suspended-sediment discharge, particle sizes of sediments, effects of reservoirs, engineering activities, and major engineering works.

The Port of New Orleans

<http://www.portno.com/facts.htm>

The Port Of New Orleans' brief description of the Port.

Oceanography

Dinnel, S.P. and W.J. Wiseman, Jr. 1986. Fresh water on the Louisiana and Texas Shelf. *Continental Shelf Research* 6: 765-784.

Hitchcock, G.L., W.J. Wiseman, Jr., W.C. Boicourt, A.J. Mariano, N. Walker, T.A. Nelsen and E. Ryan. 1997. Property fields in an effluent plume of the Mississippi River. *Journal of Marine Systems* 12: 109-126.

Murray, S.P. 1997. An Observational Study of the Mississippi-Atchafalaya Coastal Plume: Final Report. OCS Study MMS 98-0040. U.S. Dept. of the Interior, Minerals Mgmt. Service, Gulf of Mexico OCS Region, New Orleans, LA. 513 pp.

Nowlin, W.D. Jr., A.E. Jochens, R.O. Reid, and S.F. DiMarco. 1998. Texas-Louisiana Shelf Circulation and Transport Processes Study: Synthesis Report, Volume I: Technical Report. OCS Study MMS 98-0035. U.S. Dept. of the Interior, Minerals Mgmt. Service, Gulf of Mexico OCS Region, New Orleans, LA. 502 pp.

Walker, N. D. 1996. Satellite Assessment of Mississippi River Plume Variability: Causes and Predictability. *Remote Sensing of Environment* 58: 21-35.

Wiseman, Wm. J., N.N. Rabalais, R.E. Turner, S.P. Dinnel, and A. MacNaughton. 1997. Seasonal and interannual variability within the Louisiana coastal current: stratification and hypoxia. *Journal of Marine Systems* 12: 237-248.

Wind and Weather

National Weather Service, Internet Weather Source (IWS): Louisiana Weather
http://weather.noaa.gov/weather/LA_cc_us.html
Current weather conditions and forecasts for locations throughout Louisiana.

Louisiana State Information from Interactive Weather Information Network (IWIN)
<http://iwin.nws.noaa.gov/iwin/la/la.html>
Current, site-specific weather observations.

Interactive Weather Information Network (IWIN), Forecasts from Louisiana (text only version)

<http://iwin.nws.noaa.gov/iwin/textversion/state/la.html>
State and zone forecasts and weather data for Louisiana.

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.