



# Huron to Erie Corridor (HEC) Hydrodynamic Model Project

## Great Lakes Observing System

**Current Status**  
**July 2008**



### Background

The HEC Hydrodynamic Modeling Project is a multi-year, binational and interagency effort to create state-of-the-science computer modeling tools to simulate real-time flows in the waterway and to predict future conditions affected by changing hydrology, climate and land uses. The project is conducted under the auspices of the Great Lakes Observing System (GLOS), a non-profit organization formulated as the regional component of the U.S. Integrated Ocean Observing System (IOOS).

GLOS was established to provide public access to critical, real-time and historical information about the Great Lakes, St. Lawrence River and interconnecting waterways for use in managing, safeguarding and understanding these immensely valuable freshwater resources. GLOS is working to gather and integrate chemical, biologic and hydrologic data across the region, assess trends over time and distribute customized products to a wide array of users. IOOS has seven societal goals, which all can be addressed within the HEC through implementation of hydrodynamic modeling tools. These seven societal goals are as follows:

- Improve predictions of climate change and weather and their effects on coastal communities and the nation;
- Improve the safety and efficiency of maritime operations;
- Mitigate the effects of natural hazards more effectively;
- Improve national and homeland security;
- Reduce public health risks;
- Protect and restore coastal ecosystems more effectively; and
- Enable the sustained use of ocean and coastal resources.

### Progress to Date

A multi-faceted modeling program has been initiated for the HEC starting in October 2007. Model development and implementation is being conducted primarily to address critical needs for protecting drinking water supplies for over 4 million people within the corridor who could be affected from oil and hazardous spills (GAO, 2006). Other ancillary uses of the modeling tools are expected to include: reducing beach closures due to better predictions of pathogen movements in the nearshore; improved knowledge of winds, waves, currents and water temperatures for recreational boaters; improving responsiveness for search and rescue operations; improving reactions and recovery from toxic and oil spills within the waterway; and, improving near-term predictions of channel depths to assist freighters to load cargo to the maximum extent practical.

The HEC hydrodynamic modeling project is currently focusing in on three tasks; these being:

- Linking an existing 2-dimensional (2d) model to the NOAA Great Lakes Coastal Forecasting System (GLCFS) and running this 2d model of the HEC on a daily basis, with conditions updated every six hours;
- generating a 3-dimensional (3d) public domain model for the main stem of the St. Clair River to inevitably replace the 2d model for future continuous operations; and
- applying an existing proprietary 3d model to test up to six spill scenarios of toxic contaminants to improve knowledge of cross-channel mixing that occurs within the waterway and provide advance warnings to water treatment plant operators about the travel time of these spills.

Significant work has already been completed on all three of these tasks, engaging affected stakeholders within the local geography. Results from this work will be made publicly available by October 2008. Additional work has been funded to continue 3d model development for Lake St. Clair, its delta and the Detroit River through September 2009.

The initial focus on the 3d model development is limited to water movement. Follow-on work is required to address sediment transport, moving bed dynamics and ice movement within the corridor. The long-term objective of this modeling effort is to generate an integrated suite of hydrodynamic models for the HEC to support emergency responses to toxic spills/releases; management of contaminated sediments through improved knowledge of transport mechanisms; prediction of pathogen movement affecting contamination at public bathing beaches; and predictions of conveyance to optimize commercial transportation of goods and materials.

## Benefits to the Region

Observing systems – including sensors, stations, networks, field data collection and state-of-the science numerical modeling – are the primary means for gathering information on the chemical, biological and physical characteristics of the interconnecting waterways within the Great Lakes-St. Lawrence River system. These observations are used in a host of monitoring programs to take the pulse of the Great Lakes, assess natural variability, drive ecosystem forecasting models, and assess the progress of restoration efforts. Implementation of GLOS long-range plans would help to facilitate: 1) developing a complete inventory of federal, state/provincial and municipal observation and monitoring activities; 2) improving the spatial density of basic observations across the system; 3) improving coverage of information over varying time scales (real-time to historic) and over space (site-specific, watershed and regionwide); 4) promoting implementation of uniform monitoring protocols; and 5) providing for broad access to information on Great Lakes conditions and trends to users and resource managers of the system.

## Funding History

U.S. Federal Fiscal Year	Fiscal Year Funding (millions of dollars)						
	2004	2005	2006	2007	2008	2009 Request	2010 Request
Appropriations directed to GLOS	\$0.10	\$0.10	\$0.25	\$0.90	\$0.75	\$3.90*	\$3.90*
HEC Hydrodynamic Modeling Project	\$0.00	\$0.00	\$0.00	\$0.35	\$0.15	\$0.40*	\$0.40*
Other Great Lakes Projects	\$0.10	\$0.10	\$0.25	\$0.55	\$0.75	\$3.50*	\$3.50*

\* Contingent upon competitive awards

## Great Lakes Commission Congressional Priorities for IOOS:

The Great Lakes Commission in its February 2008 request to Congress identified the following priorities to advance the implementation of IOOS and GLOS:

- **Pass legislation authorizing IOOS**, introduced in the Senate as the Coastal and Ocean Observation System Act of 2007 (S. 950) and passed in the House (H.R. 2342).
- **Appropriate \$38 million in Fiscal Year 2009 to NOAA to implement the IOOS program**, including a proportional share to the Great Lakes region.

## Links for More Information

Great Lakes Observing System (GLOS): [www.glos.us](http://www.glos.us)

NOAA Integrated Ocean Observing System Program: [ioos.noaa.gov](http://ioos.noaa.gov)

Huron Erie Connecting Waterway Forecast System: [www.glerl.noaa.gov/res/hecwfs](http://www.glerl.noaa.gov/res/hecwfs)

## For further information on the HEC Hydrodynamic Modeling Project, contact

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