

PRELIMINARY SCIENTIFIC EVALUATION OF PHYSICAL IMPACTS RESULTING FROM LARGE STORM BARRIERS IN THE NEW YORK-NEW JERSEY HARBOR ESTUARY

Constructing large barriers at the mouths of rivers and estuaries is now under consideration in many regions throughout the world as a potential way to mitigate flood damage from storm surges resulting from hurricanes, nor'easters, and other extreme weather events. The construction of barriers to protect the New York-New Jersey Harbor has been specifically discussed for many years, but has gained greatly increased attention in the aftermath of Hurricane Sandy. Notably, the United States Army Corps of Engineers (the "Corps"), with post-Sandy federal appropriations, is now examining a broad range of options to address coastal storm risks through the New York – New Jersey Harbor and Tributaries Coastal Storm Risk Management Feasibility Study (HATS), including construction of massive barriers in the Harbor and Long Island Sound.

This attention to surge barriers has generated considerable interest among a wide range of parties in the region—in part because barriers may provide substantial flood mitigation benefits, but also because these barriers pose the possibility of generating very serious—and negative—ecosystem-wide impacts. As there are substantial uncertainties in reliably assessing the full range of these impacts, relevant new and existing scientific research and analysis will be critical in evaluating potential physical, chemical and biological effects associated with any barrier proposal.

The Hudson River Foundation supports scientific research about the Hudson River Estuary, and is particularly interested in advancing science related to public policy and resource management. The New York - New Jersey Harbor and Estuary Program (HEP) managed by the Foundation provides a forum for convening partners for the collective and collaborative exploration of important issues in the Harbor and Estuary and the implementation an action agenda to protect and conserve estuarine resources. Consequently, the Foundation is committed to sorting through and advancing science that will be important in understanding and discussing the scope of impacts that could result from the construction and operation of barriers. As a first step, the Foundation has preliminarily undertaken these specific tasks:

- Identify and evaluate possible hydrodynamic and hydrologic changes resulting from a large barrier at the Harbor's entrance;
- Evaluate the utility of existing mathematical models; and
- Identify model issues, data gaps, and research needs.

The Foundation's goal is an independent and objective examination of these issues. With financial support from HEP, the Foundation engaged Dr. Philip Orton (Stevens Institute of Technology) and Dr. David Ralston (Woods Hole Oceanographic Institution) to develop background information about barriers in other regions and to conduct preliminary hydrodynamic modeling for a range of flow conditions that barriers might present. The resulting information and analyses were then discussed in a meeting with other technical experts and managers involved in coastal resiliency planning. The results of this overall study to date are presented in the accompanying report by Drs. Orton and Ralston. It is important to note that this was not an effort to assess the value or efficacy of surge barriers to mitigate risk to people and property associated with the threats of coastal storms and sea level rise, but the first major step in examining the potential ecosystem impacts associated with barriers in the overall evaluation of options to respond to these threats.

We expect and encourage this work to:

- Provide a basis for an integrated investigation of how potential hydrodynamics changes could affect water quality, fish and marine mammal migration, larval recruitment, contaminant transport, wetlands stability, and related issues;
- Inform HEP's many partners, including the public agencies, utilities and civic partners represented on the Policy Committee; and
- Inform the Corps' HATS Study and the work of its other partners, including the New York State Department of Environmental Conservation, the New Jersey Department of Environmental Protection and the City of New York).
- Inform the Foundation's 2019 Call for Proposals for future scientific research;

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