Storm Surge Barriers to Protect New York City

Against the Deluge

Edited by

Douglas Hill, Eng.Sci.D., P.E.
Malcolm J. Bowman, Ph.D., P.E.
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"*It is not a question of **if** a major hurricane will strike the New York area, but **when**...*"

—Max Mayfield, Director of the Tropical Prediction Center/National Hurricane Center, May 24, 2006

"*The worst part is that we saw it coming*."

—Lawrence Roth, Deputy Executive Director, American Society of Civil Engineers, Chief of Staff, Hurricane Katrina External Review Panel, March 30, 2009

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Preface

This report contains papers presented at a conference, *Against the Deluge: Storm Surge Barriers to Protect New York City*, held on March 30 and 31, 2009, at the Polytechnic Institute of New York University in Brooklyn, New York. The conference was convened by the Infrastructure Group of the Metropolitan Section of the American Society of Civil Engineers. It was cosponsored by the Environmental Sciences Section of the New York Academy of Sciences, and the Department of Civil Engineering, Polytechnic Institute of NYU. The proceedings consist of formal papers prepared by most of the conference speakers and, in a few cases, a summary or transcript of the spoken remarks. In addition, there are transcripts of the question-and-answer periods following many of the papers, and of a review panel held at the conclusion of the first day's session.

We wish to thank the many speakers for their considerable efforts in preparing and presenting the information contained herein. In addition, we appreciate the participation of the session chairpersons: Michael Lorczak, Michael Bobker and Rae Zimmerman. For their assistance in preparing this conference, we also thank Bernard Tuchman, Lawrence Chiarelli, and our host, F.H. Griffis.

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Chapter 1
Introduction

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We are here to consider the idea of storm surge barriers to protect inner New York City and nearby New Jersey from a future deluge. This might result from another hurricane striking the city. It has happened before; it will happen again. With sea level rising at an increasing rate, the barriers may be needed as well to protect the city from what are now minor surges.

The objective of the conference is to begin to develop the scientific and engineering information base needed to evaluate the barrier concept and perhaps point the way to its further development.

I start with the hypothesis that we are on a path to disaster. This hypothesis will be informed and can be examined by these proceedings, and then it can be accepted or rejected.

The Threat

In 1995, 14 years ago, the U.S. Army Corps of Engineers and other agencies published a report with maps showing the extent of flooding that would occur with hurricanes of various categories striking the metropolitan region in a worst-case scenario. These were calculated with the SLOSH model (U.S. Army Corps of Engineers et al. 1995).

Figure 1 shows downtown Manhattan. In a Category 1 hurricane, the borders of all of lower Manhattan would be under water. A Category 2 hurricane would flood the financial district. An insurance consultant has estimated that the economic consequences of a Category 2 hurricane striking New York would exceed $200 billion. Considering that the effect of such a disruption would be felt not only in New York City but also around the world, this seems a modest estimate indeed.

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