Estuarine and Coastal Modeling

Proceedings of the Eleventh International Conference

Edited by Malcolm L. Spaulding, Ph.D., P.E.

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COPRI COASTS, OCEANS, PORTS AND RIVERS INSTITUTE

ESTUARINE AND COASTAL MODELING

PROCEEDINGS OF THE ELEVENTH INTERNATIONAL CONFERENCE

November 4–6, 2009
Seattle, Washington

SPONSORED BY
Coasts, Oceans, Ports, and Rivers Institute (COPRI)
of the American Society of Civil Engineers

EDITED BY
Malcolm L. Spaulding, Ph.D., P.E.

Published by the American Society of Civil Engineers

Cataloging-in-Publication Data on file with the Library of Congress.

American Society of Civil Engineers
1801 Alexander Bell Drive
Reston, Virginia, 20191-4400

www.pubs.asce.org

ISBN 978-0-7844-1121-6
Manufactured in the United States of America.

Foreword

This conference represents the 11th in a biennial series to explore the development, testing, application, calibration, validation, and visualization of predictions from estuarine and coastal models. Application of models to problems in hydrodynamics, water quality, and sediment transport were presented. There were a substantial number of papers highlighting the advancement of modeling capabilities for storm surge and coastal inundation and now/forecasting. Attendance at the meeting was 125 and included representatives from both the US and many foreign countries. Participants were predominantly government and academic engineers and scientist, but also included a significant number of industry professionals.

As for the earlier conferences in the series, the goal of the present conference was to bring together a diverse group of model developers, users, and evaluators to exchange information on new directions in the field and the current state-of-the-art and practice in marine environmental modeling. The primary focus was on development of new models and the application of models to bays, sounds, lagoons, estuaries, embayments, bights, and coastal seas. The models were addressed at solving engineering and environmental impact assessment problems and also at better understanding circulation and pollutant transport in near shore waters. Model applications to address regulatory requirements for facility sighting and operation were also presented.

The conference included 20 oral sessions and 1 poster session, held over the two and one half day meeting period. Papers from both poster and oral sessions are included in the conference proceedings. Each paper in the proceedings was presented at the meeting, subjected to at least three or four external peer reviews, and accepted, if appropriate and after revision, by the proceedings editor.

The enthusiastic support and assistance of the Organizing and Advisory committees, whose names are listed below, are acknowledged. We welcome new Organizing Committee members Richard Signell and David Schwab. Joseph Pittle, University of Rhode Island Conference and Special Programs Development Office, managed the conference and contributed greatly to its success. Thanks are also extended to the many other individuals who generously served as session chairs and reviewers.

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Thanks are also due to Martha Simoneau who updated and maintained the conference web site.

Planning is currently in progress for the 12th International Estuarine and Coastal Modeling Conference (ECM 11) to be held in St Augustine, Florida in November 2011.

Malcolm L. Spaulding
Narragansett, RI
Conference Chairman
April 2010

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Hydrodynamic Analyses of Restoration Actions in the Flood Plain

Stephen Breithaupt[1], Devin Smith[2], and Tarang Khangaonkar[3]

Abstract

Over the last century, considerable near-shore tidal marshland as well as upriver freshwater habitat has been lost due to diking for agriculture, flood protection, and other development. While efforts to restore degraded coastal / estuarine habitats and re-establish migratory pathways for salmon, receive considerable attention and are supported through complex 3-D coastal circulation modeling, upstream restoration actions are sometimes neglected. The traditional approach of modeling upstream reaches has been to utilize one-dimensional hydraulic models developed for FEMA flooding analyses. While this approach may be sufficient for engineering design for peak flood protection, it is inadequate for most high flow events where flood waters often leave the channel and flow across the floodplain in a complex manner. This paper presents a hydrodynamic modeling analysis of the Skagit River and its floodplain to evaluate the effect of a proposed restoration project on flooding. It also shows the feasibility and advantages of using an unstructured multidimensional model for conducting such analyses. The site was located at approximately RM 28.5, within the lower Skagit River floodplain but upstream of tidal influence. The restoration proposal involves removal of a section of the existing dike as it is thought to be degrading habitat of the floodplain downstream by preventing flow into historic channels that could potentially provide refugia for salmon during migration. Previously a hydrodynamic model of the Skagit Basin including the Skagit Bay, estuary, and

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