

# LARGE-SCALE REGIONAL WATER RESOURCES PLANNING

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# LARGE-SCALE REGIONAL WATER RESOURCES PLANNING

The North Atlantic Regional Study

by

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"As planners it is your job to illuminate the choices."

Dr. Abel Wolman

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## Preface

This is a book on the application of large-scale regional water resources planning methods in the North Atlantic Regional Water Resources Study (NAR), a study completed in 1972 for the United States Water Resources Council. This framework study, designed to serve as a guide for subsequent detailed basin and project planning in the region, took place following the development of new methods of water planning in the 1960's and is notable for the integration of these into the planning process. The study is important for its contributions to multiobjective (including the environmental objective) planning, for the use of mathematical models, and for the development of institutional and organizational measures to shape the planning process. The aim of this book is to make accessible to professionals and advanced students the lessons of what we believe to be a landmark study in the development of water planning methods.

The book is based on the 25 volumes of the study report, on other study drafts and publications, on articles written about the study, and on our own reflections on the study experience. The work discussed in this book represents the combined efforts of many professionals. The NAR is their accomplishment and we are grateful to them.

We are grateful in particular to the successive Division Engineers of the North Atlantic Division, Corps of Engineers, who provided both the leadership and the freedom for innovative work that made the NAR possible. They were, in chronological succession: Brigadier General David S. Parker; Brigadier General Harry G. Woodbury; Brigadier General Francis P. Koisch; Major General Charles M. Duke; and Major General Richard H. Groves.

We owe a great debt to the distinguished members of the study's Board of Consultants, who encouraged us to use new techniques and who acted as our collective conscience. The members of the Board, with their positions at the time of the study, were: Mr. David V. Auld, Consulting Engineer and former Director of Sanitary Engineering for the District of Columbia; Dr. Arthur Maass, Professor of Government, Harvard University; Mr. Eugene W. Weber, Consultant and former Deputy Director, Civil Works, Corps of Engineers; Dr. Gilbert F. White, Professor of Geography, University of Colorado; Dr. Nathaniel Wollman, Dean, College of Arts and Sciences, University of New Mexico; and Dr. Abel Wolman, Professor Emeritus of Sanitary Engineering, Johns Hopkins University. The injunction following the title page was given to us at the first meeting of the NAR Coordinating Committee by the late Dr. Wolman, our role model, advisor and friend.

We are grateful also to the members of the Coordinating Committee and their alternates. The 84 professionals who served in these capacities during the course of the study worked hard and well in an innovative institutional structure.

We wish to thank also the members of our own staff at the North Atlantic Division, U.S. Army Corps of Engineers, New York, and the staffs of the cooperating States and agencies who worked with them. More than 200 Corps, State, and agency personnel contributed full or part time to the study.

We acknowledge also the contributions to the study of an exceptional group of contractors: Research Planning and Design Associates, Amherst, Mass.; Cornell University, Ithaca, N.Y.; Regional Plan Association, New York, N.Y.; The Travelers Research Corporation, Hartford, Conn.; Peter S. Eagleson, Consulting Engineer, Cambridge, Mass.; Meta Systems Inc., Cambridge, Mass; and Ralph M. Field, Planning Consultant, New York, N.Y.

For reading the manuscript in whole or in part, we are indebted to Eugene Fleming, Arthur Maass, Peter Rogers, Ira Silver, Abel Wolman and Ervin Zube.

Major wishes to record his gratitude to the family of Phyllis Ann and Stephen A. Hart for their hospitality during the writing of the book, and to the President and Fellows of Clare Hall, The University of Cambridge, who extended to him a Visiting Fellowship during which the book was completed. Schwarz thanks his colleagues at Clark University for their understanding during the many hours when he was hidden away from university duties, and his wife Elizabeth for her patience on evenings and weekends.

The authors also wish to acknowledge their happy professional collaboration of 25 years, beginning with the participation of both in the Harvard Water Program and continuing with their work as Branch Chief and Chief Planner (Schwarz) and Chief Economist (Major) for the North Atlantic Regional Water Resources Study. This book is affectionately dedicated to our spouses, Patricia Hart and Elizabeth Schwarz.

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