

Proceedings of the National Wetland Symposium:
Wetland Hydrology

September 16-18, 1987
Chicago, Illinois

Symposium Chairman: Jon A. Kusler

Co-Chairmen: William Niering
Richard Novitzki

Editors: Jon A. Kusler
Gail Brooks

Cooperating Parties:

National Wetland Technical Council
North American Riparian Council
U.S. EPA
U.S. Fish & Wildlife Service
U.S. Army Corps of Engineers
U.S. Geological Survey
Illinois Department of Conservation
Wisconsin Department of Natural Resources

UB/TIB Hannover 89
111 858 763



TABLE OF CONTENTS

Recommendations: Strategies for Addressing Hydrologic Issues Jon A. Kusler	1
Chapter 1: Introduction	
Hydrology: An Introduction for Wetland Managers Jon A. Kusler	4
Chapter 2: Hydrology and Wetland Classification	
Hydrogeologic Classification of Wetlands in Glaciated Regions Garrett G. Hollands	26
A Multi-Purpose Wetland Characterization Procedure, Featuring the Hydroperiod James Hall Zimmerman	31
Chapter 3: Hydrologic Requirements of Wetlands	
Hydrology, Disturbance, and Vegetation Change William A. Niering	50
The Influence of Hydrologic Maxima and Minima on Wildlife Habitat and Production Values of Wetlands Milton W. Weller	55
Peat Stratigraphy Evidence of the Influence of Hydrology on Succession in a Freshwater Wetland, Sandwich, Massachusetts Colen R. Peters	61
Plant Community Boundaries and Water Levels at Lake Hatchineha, Florida Michael J. Duever, Jean McCollom and Lou Neuman	67
Hydrologic Regime of a Floodplain Wetland in Massachusetts Nancy C. Suurballe	73
Chapter 4: Hydrologic Changes and Wetlands	
Hydrology as an Index for Cumulative Impact Studies Nancy C. Taylor Leibowitz, Roel Boumans, and James G. Gosselink	83
Cumulative Impacts of Historical Hydrologic Changes, Bolsa Chica Lowland, Orange County, California Keith B. Macdonald, Thomas Bilhorn, and C. Robert Feldmeth	91
Response of Mountain Stream Channels to Flow Regime Alteration Thomas A. Wesche, Quentin D. Skinner, Steven W. Wolff, and Victor R. Hasfurther	99
Chapter 5: Wetlands and Flooding	
Evaluating Wetlands for Flood Storage Byron Dale Simon, Lois J. Stoerzer, and Robert W. Watson	104
The Charles River Watershed: A Dual Approach to Floodplain Management Arthur F. Doyle	110
Predicting the Impact of Vegetation on Storm Surges Christopher D. Miller	113
Wetlands and Flooding: Assessing Hydrologic Functions Larry A. Larson	122

Cumulative Impacts of Agricultural Land Drainage on Watershed Hydrology Michal Bardecki	124
Effects of Wetland Channelization on Storm Runoff in Lamberts Creek, Ramsey County, Minnesota R.C. Brown	130
Glaciated Prairie Wetlands: Soils, Hydrology, and Land-Use Implications Daniel E. Hubbard, Jimmie L. Richardson, and Douglas D. Malo	137
Hydroperiod Prediction for Four New Palustrine Wetlands Donald L. Raisanen, Steven D. Leimer, and G. Nicholas Textor	144
Forested Buffers for Overbank Flow Velocity Reduction Along the Lower Mississippi River Charles V. Klimas	152
Historical Flooding Patterns and Vegetation Changes Along Shingle Creek, Orlando, Florida R.W. Ogburn, B.W. Breedlove, and A.M. Watson	156

Chapter 6: Hydrology and Wetland Quality

Wetland Hydrology and Water Pollution Control Functions Robert H. Kadlec	168
Nutrient and Sediment Removal in Wetland Buffers J.W. Gilliam and R.W. Skaggs	174
Factors Affecting Wetland Retention of Nutrients, Metals, and Organic Materials John F. Elder	178
Rapid Assessment of the Hydraulics and Hydrology of Wetlands for Wastewater Treatment Martha Jarosewich	185
Wetlands: Toxicant Sinks or Reservoirs? Mark L. Kraus	192
Hydrology and Water Quality of a Wetland Used to Receive Wastewater Effluent, St. Joseph, Minnesota J.R. Stark and R.C. Brown	197
Differences in Oxygen Productivity Rates and Reaeration Coefficients for Wetland Reaches of Natty Pond Brook, Massachusetts Gene W. Parker and Nancy C. Suurballe	205

Chapter 7: Wetlands and Stormwater

Wetlands and Stormwater Pollution Management David F. Lakatos	214
The Creation and Use of Wetlands for Stormwater Treatment Chris Athanas	224
Use of Wetlands in Stormwater Management: A Case Example of Local Government Involvement Peggy B. Johnson	232

Chapter 8: Wetlands and Groundwater

Assessing the Relationship of Groundwater and Wetlands Garrett C. Hollands	240
Inundation of Characteristics of Wet Prairie and Marsh Wetlands in Southwestern Florida Brian H. Winchester, James S. Bays, and John C. Higman	243
Geomorphological Controls on Subsurface Transport in Two Salt Marshes William K. Nuttle and Judson W. Harvey	253

Hydrology of Arctic Wetlands Scott B. Robertson	262
Groundwater Transport Between Hillslopes and Tidal Marshes Judson W. Harvey, Randolph M. Chambers, William E. Odum	270

Chapter 9: Hydrology and Restoration/Creation

Artificially Created Wetlands: Myth or Mysticism Robert J. Pierce, Mary C. Landin, and Hollis H. Allen	278
Hydrology and Hydraulic Requirements of Successful Wetlands Harold A. Vance	283
Creation of Streams, Wetlands and Riparian Corridors to Improve Environmental Quality Within Developments Robert J. O'Brien	287
Hydraulic Design in Salt Marsh Restoration Jeffrey Haltiner and Philip B. Williams	293
Utilizing a Tire Reef and Vegetation for Restoration of a Backwater Lake Habitat Donald Roseboom, Richard Twait, and Thomas Hill	300

Chapter 10: Hydrology and Legal Issues

Hydrology, Wetlands Systems, and The Law Alexandra D. Dawson	306
The U.S. Supreme Court and the Taking Issue Jon A. Kusler and Edward A. Thomas	309

Chapter 11: Multiobjective Management of Wetlands

Floodplain and Wetland Coordination Edward A. Thomas	314
Planning for Multi-Purpose Use of Greenway Corridors Ronald D. Flanagan	318
Acquisition and the Federal Emergency Management Agency Flood Loss Reduction Program Frank H. Thomas	323
The Implications of Hydrology and Landscape Ecology on the Maintenance of Freshwater Wetland Ecosystems in Florida Kevin L. Erwin	327

Chapter 12: Research Needs

Wetland Management: Hydraulic and Hydrologic Research Needs Jon A. Kusler	331
--	-----

Glossary of Technical Terms

Speakers, Panelists, and Moderators