Mississippi River Basin Nutrients Science Workshop

Meeting Proceedings

October 4-6, 2005
St. Louis, Missouri

Introduction and Welcome

Session A: The Status of Nutrient Criteria Development in the States

Tuesday, October 4
***Session A*, 10:00 am–12:15 pm**

- EPA's Current Efforts in Nutrient Criteria Development (Amy Parker)
- Use of Large, Extant Datasets in Conjunction with Reference Sites to Develop Nutrient Criteria for Montana's Flowing Waters (Michael Suplee)
- Using Land-Use-Adjusted Spatial Regression-Tree Analysis To Estimate Reference Water Quality in Streams Throughout the Upper Mississippi River Basin (Dale M. Robertson)
- Spatial and Temporal Relationships between Biotic Integrity of Illinois Rivers, Dissolved Oxygen, and Nutrients (Mark David)
- Development of Nutrient Criteria in Large Rivers—New England States (David F. Mitchell)
- Question & Answer Summary

Session B: The Science Behind Nutrient Criteria Derivation in Large Rivers

Tuesday, October 4
***Session B, Part 1*, 1:30 pm–3:15 pm**

- Demonstrating a Consistent and Unified Approach for Monitoring and Assessing Ecological Conditions of the Missouri, Upper Mississippi, and Ohio Rivers (David Bolgrien)
- Chlorophyll *a* and Nutrient Monitoring in the Illinois Waterway (Jennifer Wasik)
- Establishing Relationships Among In-stream Nutrient Concentrations, Phytoplankton Composition and Abundance, Fish IBI, Macroinvertebrate EPT, and Biochemical Oxygen Demand in Minnesota, USA Rivers (Steven Heiskary)
- Question & Answer Summary

***Session B, Part 2*, 3:15 pm–4:30 pm**

- Spatial and Temporal Trends of Algal Biomass in Small and Large Streams in Indiana, 2001-04 (Jeffrey W. Frey)
- Developing Nutrient Criteria for the Ohio River (Gregory J. Youngstrom)
- Question & Answer Summary

Session C: The Science of Nutrients in the Upper and Lower Mississippi River Basins

Wednesday, October 5

Session C1: Mississippi River Nutrients, 8:30 am–12:00 noon

- The Sources and Transport of Nutrients in the Mississippi River Basin (Richard B. Alexander)
- Tracing Causes of Nutrients and Organic Matter in the Mississippi Basin Using Isotopic Techniques (Carol Kendall)
- The Use of Restored and Created Wetlands in the Mississippi-Ohio-Missouri (MOM) Basin for Water Quality Improvement and Environmental Enhancement (William Mitsch)
- The Effect of the Caernarvon Freshwater Diversion on Water Quality in the Breton Sound Estuary (John W. Day)
- Nitrogen Retention Within Active Natural Floodplains of Southeastern Watersheds (Durelle Scott)
- Aerobic Denitrification: Implications for Nitrogen Fate Modeling (Robert C. Thomas)
- Question & Answer Summary

Wednesday, October 5

Session C2: Upper Mississippi River Basin Nutrients, Part 1, 8:30–10:00 am

- Nutrient Concentrations and Loads in Three Ohio Tributaries of the Ohio River (R. Peter Richards)
- Floods Control Export of Nitrogen from Agricultural Regions in Illinois: Implications for Nutrient Loading to the Mississippi River (Todd V. Royer)
- The Impact of Sediments on the Potential Bioavailability of Phosphorus in Illinois Streams (Michael L. Machesky)
- Lake Pepin Phosphorus Study (Catherine E. Larson)
- Question & Answer Summary

Session C2: Upper Mississippi River Basin Nutrients, Part 2, 10:15 am–12:00 pm

- Nutrients and Chlorophyll in the Upper Mississippi River: Patterns in Time and Space (Jeff Houser)
- Nutrient Impairment Identification in the Upper Mississippi River (John Sullivan)
- Inter-River and Downstream Patterns in Si, N and P: A Preliminary Assessment of the Upper Mississippi, Missouri, and Ohio Rivers (Brian H. Hill)
- Nutrient Criteria Development in Upper Midwestern Rivers Using Mechanistic Ecosystem Modeling (James N. Carleton)
- Question & Answer Summary

Session D: The Science of Nutrients in the Gulf of Mexico: The Far-field Downstream Effect

Wednesday, October 5

Session D, Part 1, 1:30–3:00 pm

- Multiple-Century Low-Oxygen Bottom-Water Record on the Louisiana Shelf (Richard Z. Poore – not in attendance)
- Seasonal Phosphorus Limitation on the Louisiana Shelf: A Result of Nitrogen Loading from the Mississippi River? (James W. Ammerman)
- Large-Scale Hypoxia in the Gulf of Mexico: When Did It Begin and How Much Nitrogen Reduction is Needed? (Victor Bierman)
- Question & Answer Summary

Session D, Part 2, 3:15–5:00 pm

- Multimedia Mass Balance Modeling and Seasonal Monitoring of Hypoxia in the Northern Gulf of Mexico (Richard M. Greene – not in attendance – presented by Jan Kurtz and Russell Kreis)
- A Non-Steady-State Diagenetic Model for Changes in Sediment Biogeochemistry in Response to Seasonally Hypoxic/Anoxic Conditions in the "Dead Zone" of the Louisiana Shelf (Peter M. Eldridge)
- A Numerical Study of the Effects of Bottom Oxygen Demand in Controlling the Structure of Hypoxia on the Texas-Louisiana Continental Shelf (R. D. Hetland)
- Mississippi River/Gulf of Mexico Watershed Nutrient Task Force (Katie Flahive)
- Question & Answer Summary

Session E: The Approaches Needed to Address the Downstream Effect of Nutrients

Thursday, October 6

Session E, Part 1, 8:30–10:10 am

- Protection of Water Quality In Large Systems: Hard Lessons, Simple Truths (Paul L. Freedman)
- Developing Compatible Water Quality Standards for a Major Interstate River (Peter A. Tennant)
- Investigating Reciprocal Relationships Between Nutrient Reduction Goals for the Gulf of Mexico and the Inland Waters of the Mississippi Basin (Richard A. Smith)
- Question & Answer Summary

Session E, Part 2, 10:10 am–12:00 noon

- Assessing Alternative Policies for the Control of Nutrients in Large Water Body Systems: Local Versus Regional Local Water Quality (Catherine L. Kling)
- A Preliminary Analysis of Water Quality Trading Opportunities in the Great Miami River Watershed, Ohio (Mark S. Kieser)
- Question & Answer Summary

Wrap Up/Public Comments Session

Wrap up and Comments

Poster Presentations

Poster Presentations 1-11

1. Illinois Council on Food and Agricultural Research (C-FAR) Strategic Research Initiative (SRI) in Water Quality (George F. Czaper)

2. Nutrient Concentrations in Flowing Waters of the South Fork Broad River, Georgia Watershed (Roger A. Burke)

3. The USGS National Water Quality (NAWQA) Program: Challenges of Understanding Nutrient-Biota Interactions in Streams and Rivers (Mark D. Munn)

4. Nitrogen Distribution and Denitrification in the LaGrange Reach of the Illinois River and its Floodplain (Michael Lemke)

5. Nitrates from Sediment-Filtered Blue Earth River Water are the Major Inputs to the Minnesota River and Overtly Lethal to Xenopus Tadpoles on a Linear Concentration Basis in Combination with other Unknown Contaminants (Stephen D. Mercurio)

6. Evaluating Feasibility Of Nitrate TMDLs On Two Agricultural Watersheds In Southern Minnesota (Prasanna H. Gowda)

7. Importance of Aquatic Denitrification to Nitrate Export from Rivers of the Upper Mississippi River Basin (Mark B. David)

8. Seasonal Variability of the Chemical Composition of the Illinois River and Two of its Tributaries 2003-2005: The Effects of Waste Water Treatment Plants and Agriculture (Samuel V. Panno)

9. Nutrient and Sediment Losses from Wisconsin Agricultural Fields in the Mississippi River Basin (Matthew J. Komiskey)

10. SWAT Baseline Data Inputs and Simulation Results for the Upper Mississippi River Basin (Manoj Jha)

11. Internet-Based Site Assessment Tools to Manage Environmental Risk—A Demonstration (John A. Lory)

Poster Presentations 12-23

12. Detailed Assessment of Phosphorus Sources to Minnesota Watersheds (Mark Tomasek)

13. Fertilizer Nitrogen and Phosphorus Use, Improved Nutrient Management, and Hypoxia in the Gulf of Mexico (William C. Herz)

14. The Impact of Changing Land Use Practices and Climate Variability on Nitrate Export by the Mississippi River (Simon D. Donner)

15. Physical Processes Affecting Spatial Scales of Dissolved Oxygen Concentrations on the Texas-Louisiana Shelf (S. F. DiMarco)

16. Decreasing High Nitrates and Anoxia Within Closed Ecosystems: Possible Solution for Dead Zone Areas (Leonard Sonnenschein)

17. A Preliminary Assessment of the Importance of Point Source Nutrients on Primary Production in the Coastal Waters of the Virginian Province (Richard Isleib)

18. Seasonal and Inter-annual Variations of Sea Surface Chlorophyll *a* on the Louisiana and Texas Shelf and Correlations to Fluvial Nitrate Flux and Hypoxia (Jinchun Yuan)

19. Financial Safety Net for Corn Farmers: An Emerging Educational Tool to Increase Adoption of Nutrient BMPs (Thomas Green)

20. Designing Performance-based Environmental Policies for Agriculture (Jonathan R. Winsten)

21. Low Cost Algal Turf Scrubber Regional Stormwater Treatment Systems for Nonpoint Source Phosphorus and Nitrogen Control—A Case Study (Mark J. Zivojnovich)

22. Effectiveness of Agricultural Best Management Practices on the Ecological Integrity of a Mackinaw River Subwatershed, Illinois (Maria Lemke)

23. Effectiveness of Agricultural Runoff Wetlands in Reducing NPS Loading to Surface Waters of Illinois (David Kovacic)

Abstracts of Presenters Who Were Unable to Attend

Abstracts

- Global patterns of dissolved silicate and nitrogen in large rivers (Nancy Rabalais)
- Suspended sediment, C, N, P, and Si yields from the Mississippi River Basin (Nancy Rabalais)
- Eutrophication and Hypoxia Adjacent to the Mississippi River Plume (Nancy Rabalais)
- Using principal components analysis to determine relations among algal indicators to nutrients and fish- and invertebrate-community attributes in Indiana rivers and streams, 2001-03 (Brian J. Caskey)
- Biogeochemical Cycling of Carbon in the Lower Mississippi River (Thomas S. Bianchi)
- Loading rates and hydrologic retention times control nitrate transformation in backwater lakes of the Upper Mississippi River (William Richardson)
- Use of a Biophysical Model for the Mississippi River Turbidity Plume to Quantify Organic Carbon Sedimentation to Louisiana Shelf Bottom Waters (Rebecca E. Green)