NEAL T. O'REILLY, Ph.D., PH

EDUCATION

Ph.D. Environmental Engineering and Environmental Law, Marquette University, 2007

M.S. Environmental Engineering, Marquette University, 1999

B.S. Aquatic Biology and Environmental Geology, University of Wisconsin-Oshkosh, 1977

PREVIOUS EMPLOYMENT

Ecological Research Partners, Principal (2010 to Present)

Hey and Associates, Inc., Vice President Water Resource Management (1998 to 2012)

Marquette University, Adjunct Professor, Department of Civil and Environmental Engineering (2004 to present)

University of Wisconsin – Milwaukee, Adjunct Professor, Conservation and Environmental Science (2011 to present)

R. A. Smith & Associates, Inc., Manager Water Resources, Brookfield, Wisconsin (1992-1998)

Wisconsin Department of Natural Resources, Senior Water Resources Planner, Milwaukee, Wisconsin (1977-1992)

Fox Valley Water Quality Planning Agency, Research Scientist, Neenah, Wisconsin (1977)

SELECTED TEACHING AND SPEAKING ASSIGNMENTS

"Principals of Natural Resource Management" (CES 471), University of Wisconsin – Milwaukee, Conservation and Environmental Science Program, fall semester 2011, Spring 2012, Fall 2013, Spring 2014, Fall 2014, Spring 2015.

"Principles of Stream Management and Restoration (CES-499)", University of Wisconsin – Milwaukee, Conservation and Environmental Science Program, Fall 2014.

"Senior Seminar: Conservation and Environmental Science" (CES 490), University of Wisconsin – Milwaukee, Conservation and Environmental Science Program, Spring 2014.

"Use of Enhanced Ditch Plugs and Riparian Wetlands to Reduce Nitrogen and Phosphorus Export from Small Agricultural Watersheds", Soil and Water Conservation Society International Annual Conference, Chicago IL, July, 2014.

"Advanced Rive Engineering" Marquette University, Department of Civil and Environmental Engineering, 2013.

"Geographical Information Systems in Engineering and Planning" Marquette University, Department of Civil and Environmental Engineering, 2004 through 2013.

"Urban Hydrology and Stormwater Management" Marquette University, Department of Civil and Environmental Engineering, 2005 and 2012.

"Design and Maintenance of Stormwater Infiltration Practices", University of Wisconsin – Milwaukee School of Continuing Education, Milwaukee, WI, January, 2011, January, 2012, September 2012, January, 2013, September 2013 January, 2014, September 2014 January, 2015.

"Water Quality and the Local Economy: Lessons Learned from Delavan Lake", Changing Lakes, Changing Policy a Workshop for Lake Communities, Wisconsin Association of Lakes, Pewaukee, WI, February 13, 2010.

"Infiltration Basin/Trenches Design Considerations, Construction Issues, Problems and Solutions", Stormwater Infiltration Workshop, Waukesha County Land Resource Division, March 14, 2007.

Wingspread Conference on "Cities of the Future - Blue Water in Green Cities", sponsored by National Science Foundation, The Johnson Foundation, CDM, and International Water Association, Wingspread, Racine, WI, July 12-14, 2006.

"Use of Biological Stream Assessment in Determining Compliance with the Clean Water Act and Potential for Ecological Restoration.", Northeastern University, Boston, MA, May 30, 2003.

"What is Nonpoint Source Pollution", Greater Milwaukee Clean Water Forum – Protecting the Watershed and Improving Water Quality, University of Wisconsin Milwaukee, October 5, 2002.

"Emerging Trends in Stormwater Management", Stormwater Management and Erosion Control Workshop, Waukesha & Washington County Land Conservation Departments, WDNR and UW-Extension, Milwaukee, Wisconsin, January 24, 2002.

"Seasonal Impacts of Urban Stormwater Runoff on Wetland Ecology", 5th International Conference on Diffused Pollution and Watershed Management, International Water Association, Milwaukee, Wisconsin, June 10-15, 2001.

"Tour of Innovative Stormwater Technologies", 5th International Conference on Diffused Pollution and Watershed Management, International Water Association, Milwaukee, Wisconsin, June 10-15, 2001

"Pretreatment Alternative for Stormwater Infiltration", Stormwater Management and Erosion Control Workshop, Waukesha & Washington County Land Conservation Departments, WDNR and UW-Extension, Waukesha, Wisconsin, February 23, 2001

"Innovative Stormwater Management Practices", Stormwater 2000 Conference, Fox-Wolf Basin 2000, Appleton, Wisconsin, February 2000

"Infiltration/Biofiltration Management Practices", Designing Infrastructure and Implementing Practices for Stormwater Quality Improvement, " Department of Engineering Professional Development, University of Wisconsin-Madison/Extension, May 1999.

"Water Quality Issues-Sources and Types of Pollutants Common to Highway Runoff. Procedures to Assess Impacts and Methods for Mitigation", Preparing Environmental Impact Statements for Highway Projects, Department of Engineering Professional Development, University of Wisconsin-Madison/Extension, April 1999.

"Habitat Suitability Indices", Urban Channel Design and Rehabilitation, Department of Engineering Professional Development, University of Wisconsin-Madison/Extension, February 1999.

"Urban Channel Design and Rehabilitation" Department of Engineering Professional Development, University of Wisconsin-Madison/Extension, February 1998.

"Urban Channel Design and Rehabilitation" Department of Engineering Professional Development, University of Wisconsin-Madison/Extension, 1998.

"Water Quality Issues - Source and Type of Pollutants Common to Highway Run-off", Environmental Analysis of Highway Projects, Department of Engineering Professional Development, University of Wisconsin-Madison/Extension, March 19, 1996, and April 14, 1997

"Integrating Fish and Wildlife Habitat and Other Natural Features into Shoreline Stabilization", Fox Lake Inland Lake Protection and Rehabilitation District, March, 1997

"Construction Site Erosion Control and Sediment Control Plan Design Workshop", University of Minnesota, December, 1996, January, 1997, March, 1997, and April, 1997

"Development of Stormwater Management Ordinances", presented to the Engineering and Public Works Institute-League of Wisconsin Municipalities, March, 1996

"Effective Streambank Stabilization and Stormwater Channel Design, Department of Engineering Professional Development, University of Wisconsin-Madison, February 12-14, 1996

"Bio-filtration: Using Natural Systems to Manage Stormwater," Lakes and Development: Proactive Stormwater Management Symposium, USEPA, April 6, 1995

"NR 216 Stormwater Regulations, Permitting, and Impacts," WisDOT District 2, 1994

"Water Quality Issues: Sources and Types of Pollutants Common to Highway Runoff," Environmental Impacts of Highway Projects, Wisconsin Department of Transportation, 1994

"A Down to Earth Approach to Stormwater: Sensible Solutions," presented to government agencies and districts, municipal officials, land conservationists, and private developers; Pewaukee, WI, 1993

"Practicable Alternatives for Stormwater Runoff from Highways," presented to Wisconsin Department of Transportation District 1, 1993

"A Down to Earth Approach to Stormwater: Sensible Solutions," presented to the Engineering and Public Works Institute-League of Wisconsin Municipalities, 1993

"The Delavan Lake Story: An Overview of a Comprehensive Lake Rehabilitation Project, North American Lake Management Society, 12th Annual International Symposium, Cincinnati, OH, 1992

"The Delavan Lake Story: An Overview of a Comprehensive Lake Rehabilitation Effort Using Alum Injection," North American Lake Management Society, 12th Annual International Symposium, Cincinnati, OH, 1992

"Construction Site Erosion Control," University of Wisconsin Extension (ten dates in 1990 through 1996)

"Controlling Construction Site Erosion on State Highway Projects," Wisconsin Department of Transportation (WisDOT), 1987, 1988, 1991, 1993, 1994

"Environmentally Sensitive Stream Bank Erosion Practices," USDA Soil Conservation Service, Jefferson, Wisconsin, 1990

"Urban Stream Corridor Management," University of Wisconsin-Milwaukee, 1990

RECENT PUBLICATIONS

O'Reilly. N. (2007)*The Development and Evaluation of Methods for Quantifying Environmental Stress to Fish in Warm-water Streams of Wisconsin Using Self-Organized Maps: Influences of Watershed and Habitat Stressors.* Marquette University, Milwaukee WI.

O'Reilly, N., T. Ehlinger and R. Shaker (2007) *Developing Risk Propagation Model for Estimating Ecological Responses of Streams to Anthropogenic Watershed Stresses and Stream Modifications*. USEPA/NSF/USDA STAR Program, Center for Urban Environmental Studies, Northeastern University, Boston, MA 02115.

Novotny,V.; Ehlinger, T.; Manolakos, E.; Bartosova, A.; **O'Reilly, N**.; Bedoya,D.; McGarvey,K.; Brooks, J.; Beach, D.; Farah, J.; and Shaker, R.(2007) *Technical Report # 15. Final Report. Developing Risk Propagation Model for Estimating Ecological Responses of Streams to Anthropogenic Watershed Stresses and Stream Modifications*, USEPA/NSF/USDA STAR Program, Center for Urban Environmental Studies, Northeastern University, Boston, MA 02115.

V. Novotny, **N. O'Reilly**, T. Ehlinger, T. Frevert, and S. Twait (2007) A River is Reborn: The Use Attainability Analysis for the Lower Des Plaines River, Illinois. *Water Environment Research* 79(1):68-80

Novotny, V., A. Bartosova, **N. O'Reilly**, and T. Ehlinger (2005) Unlocking the relationship of biotic integrity of impaired waters to anthropogenic stresses. *Water Research*, 39: 184-198.

Novotny, V., **N. O'Reilly**, S. Alexander, and W. Salomons (2003)*Water Quality: Diffused Pollution and Watershed Management*, published by John Wiley and Sons, New York, NY.

V. Novotny, D. Booth, D. Clark, R. Griffin, and **N. O'Reilly** (2000) " Reconciling flood and diffuse pollution control objectives in urban watershed management," Proc. 4th International Conference on Diffuse Pollution, Bangkok, Thailand, January 2000, also to be published on *Water Sci. & Technology*

N. O'Reilly and V. Novotny (1999) *Water Quality, Ecological, and Flood Control Benefits of Urban Stormwater Management Practices. Technical Report.* USEPA/NSF/USDA STAR Watershed program, Institute of Urban Environmental Risk Management, Marquette University

N. O'Reilly and V. Novotny (1999) *Water Quality, Ecological, and Flood Risks to Receiving Waters due to Urban Runoff and Urbanization. Technical Report.* USEPA/NSF/USDA STAR Watershed program, Institute of Urban Environmental Risk Management, Marquette University

O'Reilly, Neal (1995) *Financing of Stormwater Management for Urban Areas*. RA Smith & Associates, Inc. Brookfield

William W. Jones, **Neal O'Reilly**, Robert Pitt, Richard Wedepohl, Douglas Knauer, and Spencer Peterson (1986) Lake Sediment Management Workshop Summary. *Lake and Reservoir Management*, Volume 2, Issue, pages 431 - 435

Neal O'Reilly, Joel Schilling, James C. Schmidt, Ray Kipp, Sandy Engel and Peter Newroth (1986) Aquatic Plant Management. *Lake and Reservoir Management*, Volume 2, Issue 1, pages 443 - 446

RESEARCH

- **The Development and Evaluation of Methods for Quantifying Watershed Risk Using Self-Organizing Feature Maps: Land Cover, Hydrologic and Habitat Factors Influencing Biotic Integrity in Streams.** The purpose of the project was to see if advanced statistical tools could be used to help explain nonlinear relationships that often exist in natural systems. The project developed a better understanding of the linkages between watershed and habitat conditions and biological response in warm water streams by evaluating the use of a series of multivariate statistical tools using a database developed for 1,768 warm water stream reaches in the State of Wisconsin. The analysis illustrated that the combination of Artificial Neural Network Self-

Organized Maps (SOM), Principal Component Analysis (PCA), Analysis of Variance (ANOVA), and discriminant function analysis provided a tool that could accurately explain the effects of watershed and habitat conditions on the response by fish communities using metrics used in the Wisconsin fish Index of Biological Integrity (IBI). The results of the research illustrated that (1) unlike many water quality relations that are linear in nature, the relations between watershed and habitat stressors and biological response are not linear and that to understand the relations nonlinear tools such as SOM are required, (2) stressors to stream environments are cumulative in nature and a multivariate approach is necessary to explain the relation, (3) different fish communities respond to different stresses in different ways, therefore strategies for watershed management need to be tailored specifically to the aquatic community that is being protected or managed. The project was funded by a U. S. Environmental Protection Agency (USEPA)/National Science Foundation (NSF)/U. S. Department of Agriculture (USDA) Science to Achieve Results (STAR) Program grant. I was one of the three lead authors of the grant application and a Principal Investigators (PI) on the project that was conducted from 2004 through 2007. The work on this project was the subject of my Doctoral Dissertation for my Ph.D. in Civil and Environmental Engineering from Marquette University.

- **Investigating Data Needs for Urban Stormwater Modeling Using Remote Sensing.** In partnership with the NASA Stennis-supported Affiliated Research Center (ARC) program at the University of Wisconsin Madison, I investigated the extent to which impervious surfaces could be extracted "automatically" from IKONOS satellite data to support water quality modeling using the Source Load and Management Model (SLAMM). The general geometric integrity of IKONOS data was assessed as well. The Lake Wingra watershed in Madison, Wisconsin was used as the study area. Some of the key results from the project were that image-based impervious surface percentages were consistent with literature values for residential areas, but not for commercial areas; that the prevalence of shadows in the late fall satellite images provided by NASA were problematic when attempting "automatic" impervious surface extraction. The project did find that pattern recognition software could be used to recognize specific impervious surface patterns such as roof tops, sidewalks, and streets within specific land use categories. The project suggested that the use of a late spring image when the sun angle is higher and new leaves have not yet emerged could provide better results and that the use of IKONOS satellite data could be a useful tool in mapping urban impervious surfaces. The project was sponsored by the National Atmospheric and Space Administration (NASA)(2000).
- **Risk Based Urban Watershed Management Integration of Water Quality and Flood Control Objectives Project.** Assisted the Marquette University Institute for Urban Environmental Risk Management with the evaluation of the water quality, ecological, and flood risks to receiving waters due to urban runoff and urbanization. The project was funded under a U. S. Environmental Protection Agency (USEPA)/National Science Foundation (NSF)/U. S. Department of Agriculture (USDA) Science to Achieve Results (STAR) Watershed Program grant (1998). The work for this project was used for completing my Masters of Science degree in Civil and Environmental Engineering. Work on this project became a chapter in the textbook Water Quality: Diffused Pollution and Watershed Management, published by John Wiley and Sons, New York, NY.
- **National Urban Runoff Program.** Conducted field monitoring for this national research program that was the first major effort to understand the chemical constituents of urban runoff. Installed and maintained 12 gauging and automated water quality monitoring station. The project was sponsored by the U. S. Environmental Protection Agency, U. S. Geological Survey and Wisconsin Department of Natural Resources (1979-1983).
- **National Urban Lakes Initiative.** Conducted a two year comprehensive research study of seven urban lakes owned by the Milwaukee County Parks Department. The purpose of the study was to understand the impacts of urban runoff on the ecology of small lakes and determine if a sustainable fishery program could be developed in these heavily utilized intercity lakes. The project involved installation and maintenance of 12 gauging and automated water quality monitoring stations, installation of 20 groundwater monitoring wells, and bi-weekly sampling for water quality, and surveys of plankton, fish and aquatic plants. The study identified important relationships between urban runoff and response of aquatic organisms to urban pollution. A management plan for each lake was developed. The program resulted in one of the first urban fishing programs in the United States to serve low income neighborhoods. The research project was sponsored by the U. S. Environmental Protection Agency Clean Lakes Program and Wisconsin Department of Natural Resources (1979-1983).

MAJOR CONSULTING PROJECTS

Urban Stormwater Planning and Design

- **Sterling Woods Park Stormwater Plan**. Prepared watershed modeling for a floodplain analysis of the impacts of a park expansion at the Sterling Woods Park in the Lake County Forest Preserve, Illinois (2010).
- **Messenger Woods Nature Preserve Stormwater Plan**. Prepared watershed modeling for the design of stormwater management facilities as part of the expansion of the visitor center and parking lots at the Messenger Woods Nature Preserve, Will County Forest Preserve, Illinois (2010).
- **City of Crystal Lake Stormwater Management Practice Manual.** Developed a stormwater design manual for the City of Crystal Lake, Illinois. Under the city's stormwater requirements, infiltration of all stormwater runoff for storms less than 100-year in frequency is required. The manual focused on the design of stormwater storage and treatment systems that require pretreatment and infiltration. City of Crystal Lake, (2006-2007).
- **Village of Greendale, Stormwater Management Plan.** Preparation of a stormwater management master plan for the entire Village of Greendale, a suburb of Milwaukee, Wisconsin. The plan incorporating, development of a GIS system of drainage and land use, water quality modeling and management alternative analysis using the Source Loading and Management Model© (SLAMM), identification of stream bank erosion problems. The plan was developed to comply with the NPDES stormwater permit requirements of Wisconsin's stormwater regulations. Village of Greendale, (2002).
- **City Wide Stormwater Management Plan, City of Waukesha, Wisconsin.** Preparation of a stormwater management master plan for the entire City of Waukesha. The plan incorporated development of a GIS system of drainage and land use, water quality modeling and management alternative analysis using the Source Loading and Management Model© (SLAMM), hydraulic analysis of the stormwater drainage system, and development of a stormwater management ordinance. The plan was developed to comply with the NPDES stormwater permit requirements of Wisconsin's stormwater regulations. City of Waukesha, (2002).
- **Village of Allouez Stormwater Management Plan.** Preparation of a comprehensive stormwater management plan to manage surface runoff, including water quality management, channel maintenance, and wetlands protection. The plan incorporated development of a CADD system of drainage, water quality modeling and management alternative analysis using the Source Loading and Management Model© (SLAMM), and development of a stormwater management ordinance. The plan was developed to comply with the NPDES stormwater permit requirements of Wisconsin's stormwater regulations. Village of Allouez, (1998).
- **Southwick Creek Stormwater Management Plan.** Preparation of a comprehensive stormwater management plan to address water pollution input to Lake Geneva and Southwick Creek. The plan included management of surface water pollutants and restoration of a Brown Trout stream. Lake Geneva Environmental Agency, (1998).
- **Town of Brookfield Stormwater Management Plan.** Project manager for the preparation of a comprehensive stormwater management plan to manage surface runoff, including drainage, water quality management, channel maintenance, and wetlands management for existing and future developments in urbanized areas of the Town. The plan was developed to comply with the NPDES stormwater permit requirements of Wisconsin's stormwater regulations. Town of Brookfield, (1997-1998).
- **City of Watertown Northeast Side Stormwater Management Plan.** Project manager for the development of a stormwater drainage and flood control plan for an area of the community that has experienced increasing flooding problems. Solutions were developed using the XPSWMM computer model. City of Watertown, (1997).
- **City of Oak Creek Stormwater Management Master Plan.** Preparation of a master stormwater management plan for the entire 36 square mile city, incorporating quantity and quality stormwater controls. Establishing essential political and policy decisions for stormwater planning, ordinances, drainage, channel maintenance, and funding options. Conducted detailed analysis of city's entire storm sewer system using XPSWMM. Developed a GIS system of properties, drainage network, and topography. City of Oak Creek, (1996-1998).

- **City of Beloit West Side Detention Project.** Detention pond design with integration of stormwater storage, stormwater diversion, water quality treatment, wildlife habitat, environmental education, fishing, and recreational trails. City of Beloit, (1995-1997).
- **City of Watertown Stormwater Management Ordinance.** Prepared a stormwater management and construction site erosion control ordinance; addresses pre- and post-development runoff and identifies standards for control of peak flood flows and water quality pollution. Worked with an advisory committee to customize the ordinance to the community's needs. City of Watertown, (1996).
- **Village of Germantown Stormwater Management Plan.** Preparation of a comprehensive stormwater management plan to manage surface runoff, including drainage, water quality management, channel maintenance, and wetlands management for existing and future developments in urbanized areas of the Village. Village of Germantown, (1994).
- **Dunn's Marsh Stormwater Management Plan.** Preparation of a stormwater quantity and quality plan for the drainage area discharging into Dunn's Marsh to prevent further water quality and natural habitat degradation of a regionally significant wetland complex in the Cities of Madison and Fitchburg. Project included water level management of Dunn's Marsh. To evaluate various water level control alternatives, hydrologic analysis of the watershed was conducted using HEC-1 and HEC-2. Estimates of pollutant inputs to the marsh were calculated using the water quality model SLAMM. City of Madison, (1994-1995).
- **City of Mequon East Side Drainage Basin Stormwater Management Plan.** Preparation of a stormwater management plan including hydraulic and hydrologic analyses of existing flooding problems, water quality analyses, and preliminary design of alternative improvements. City of Mequon, (1993-1994).
- **Village of Fredonia Stormwater Management Plan.** Preparation of a community wide stormwater management plan to address drainage and water quality in the Village of Fredonia, Wisconsin. The project included sitting of several regional detention facilities. Village of Fredonia, (1994).
- **Freedom Square Stormwater Management Demonstration Project.** Preparation of a stormwater management plan to demonstrate alternatives to retrofit existing stormwater detention ponds for water quality treatment. The project included retrofitting three existing detention facilities in the downtown commercial district of the City of Muskego. City of Muskego, (1993).
- **Menomonee River Valley Conservation Project.** Evaluation of the potential of returning the channelized sections of the Menomonee River and its banks to a more natural state, creating wetlands and improving recreational access to the river, including a recreational trail. The project includes construction of one of the first wetland restoration projects located in a major downtown urban center. City of Milwaukee, (1993-1997).
- **Village of Grafton Stormwater Management Plan - City of Grafton**. Wisconsin Department of Natural Resources member of Stormwater Planning Technical Advisory Committee, (1992).
- **Deer Creek Stormwater Plan, City of New Berlin.** Wisconsin Department of Natural Resources representative on Deer Creek Stormwater Advisory Committee. Provided technical assistance on state regulations, stream restoration and plan implementation, (1990-1992).
- **Lilly Creek Stormwater Plan, Village of Menomonee Falls**. Wisconsin Department of Natural Resources representative on Stormwater Advisory Committee. Provided technical assistance on state regulations, stream restoration and plan implementation, (1987-1992).

Watershed Management Planning

- **Evaluation of Management Alternatives for the Control of Sediment and Nutrient Inputs to the Miljola Channel and Rock Lake.** Conducted analysis of existing water quality data. Calculated peak discharge rates for a series of storms using WinTR-55. Evaluated a series of management alternatives including stream bank stabilization, wetland restoration, sedimentation basins, alum injection, and sand filters. Prepared recommendations for future actions and two grant applications for project implementation. Rock Lake Improvement Association (2010)
- **Upper Kishwaukee River Monitoring Program**. Developed a stream monitoring program for Upper Kishwaukee River watershed to (1.) estimate flow-weighted average total nitrogen, total phosphorus, and

sediment loading in the study reaches on a monthly basis; (2.) make improved estimates of loading due to agriculture (row crops), urban runoff, point sources, pasture, and forest/grassland; (3.) provide field data to allow CMAP staff to calibrate a watershed loading model that can predict how improvements in point and nonpoint source pollution management would help meet watershed loading targets; (4.) determine the rate of sediment accumulation at representative points in the study reaches and to estimate the proportion of sediment yield that originates from stream banks vs. sheet/rill erosion. Project included selection and installation of monitoring stations to measure instream flows, drain tile discharges, groundwater inputs, surface runoff, rates of stream bank erosion, and rainfall. As part of the project a Quality Assurance Program Plan (QAPP) and associates Standard Operating Procedure (SOP's) were prepared. Chicago Metropolitan Agency for Planning and Illinois Environmental Protection Agency (2009 to 2011)

- **Crystal Lake (Illinois) Watershed Monitoring Project.** Monitoring of two inlet streams, outlet stream, lake levels, and six groundwater wells to collect base information for the development of annual water and nutrient budget for Crystal Lake, Illinois. Included development of a detailed Quality Assurance Program Plan (QAPP), Sampling Operation Plans (SOPs). Crystal Lake Park District, (2006 to present).
- **Cambra Creek Wetland Restoration Project.** Creation of a of low-head hydraulic structures to improve water quality treatment in the Cambra Creek watershed of Fox Lake, Wisconsin. The project involved construction of a low-head weir structures designed to force runoff to spread into the riparian floodplain vegetation during small and moderate sized storms. The project included acquiring of permits from federal, state and local units of government, and construction observation. Fox Lake Protection and Rehabilitation District, (2004).
- **Mound Road Wetland Treatment System Rehabilitation Plan, Delavan Lake Wisconsin.** Developed a restoration plan and bidding documents for improvements to a 90-acre wetland treatment system located upstream of Delavan Lake in Wisconsin. The treatment wetland was constructed in the early 1990's to trap sediment and phosphorus on the main inlet stream to the lake. Based on monitoring by the U. S Geological Survey (USGS) the current wetland was only 25% efficient in trapping phosphorus. The redevelopment plan included redesign and dredging of two sedimentation basins and installation of several berms to reduce short-circuiting of flow through the wetland vegetation. The proposed plan increased phosphorus removal efficiencies from 25% to 57%. Town of Delavan, (2002 to 2003).
- **Alto Creek Wetland Restoration Project.** Creation of a series of low-head hydraulic structures to improve water quality treatment in the Alto Creek watershed of Fox Lake, Wisconsin. The project involved construction of four low-head weir structures designed to force runoff to spread into the riparian floodplain vegetation during small and moderate sized storms. The project included acquiring of permits from federal, state and local units of government, and construction observation. Fox Lake Protection and Rehabilitation District, (2002).
- **Jefferson County Flood Mitigation Plan, Jefferson County, Wisconsin**. Prepared a flood mitigation plan for entire 372,223 acre county in Southern Wisconsin. The plan included both incorporated and unincorporated areas of the county. Potential flood risks properties were identified using GIS analysis. The degree of flooding depth and potential degree of damages were estimated for 688 structures. Recommendations to reduce flood damages were prepared. The final plan has been adopted by Jefferson County, Wisconsin Department of Emergency Management, and the Federal Emergency Management Agency (FEMA). Jefferson County Department of Emergency Management, (2001).
- **Pebble Creek Stormwater Management Plan, City of Waukesha, Wisconsin.** Preparation of a stormwater management master plan for the East Branch of Pebble Creek. The plan focused on protection of a cold water fishery and maintenance of stream base-flow and groundwater recharge. City of Waukesha, (2001).
- **New Berlin Flood Mitigation Plan, City of New Berlin, Wisconsin.** Prepared a flood mitigation plan for the entire city. Potential flood risks properties were identified using GIS analysis. The degree of flooding depth and potential degree of damages were estimated for 166 structures. Recommendations to reduce flood damages were prepared. City of New Berlin, (2001).
- **Genesse Creek Wetland Restoration Project.** Prepared and implemented a wetland restoration plan for a 50-acre wetland at the headwaters of Genesse Creek a major trout stream in Waukesha County, Wisconsin. The project included installation of water level control structures, reestablishment of native vegetation, control of nuisance vegetation and acquisition of needed permits. Waukesha County Land Conservancy, (2002).

- **Gladhurst Road Detention Pond Design.** Preparation of plans and specifications for the design of an infiltration basin. The pond's function is to reduce sediment and pollutant loadings to Lauderdale Lakes, Wisconsin. Lauderdale Lakes Lake Management District, (2000).
- **Surface Water Runoff Study for Lauderdale Lakes, Wisconsin.** Preparation of a nonpoint source control plan for two watersheds that drain into Lauderdale Lakes, including calculations of pollutant loadings, evaluation of alternatives, and recommendation of management measures. Lauderdale Lakes Lake Management District, (1998).
- **Evaluation of Detention and Stream Buffers to Protect Fox Lake from Uncontrolled Upland Erosion.** Performed a watershed analysis to determine if stream buffers and /or wetland restoration would be cost effective alternatives to protect Fox Lake. As part of the project a nutrient and water budget for the lake was prepared. Fox Lake Inland Lake Protection and Rehabilitation District, (1997-1998).
- **Wind Lake/Muskego Canal Nutrient Inactivation Project.** Studied alternatives to reduce nutrient and sediment inputs to Wind Lake based on the identification of high phosphorus concentrations; explored traditional approaches and innovative technologies to solve the unique water quality problems at Wind Lake. A 23-year water budget was developed for Big Muskego Lake to analyze long-term trends. The project now in implementation includes construction of a 257-acre wetland treatment system designed to reduce phosphorus inputs to Wind Lake to predevelopment conditions. Hydraulic analysis of the wetland system was conducted using HEC-2. The unique project has received funding from both USEPA and the State of Wisconsin. Wind Lake Management District, (1994-1998).
- **Fox River Priority Watershed Plan.** Wisconsin Department of Natural Resources Southeast District representative on technical workgroup, (1990-1992).
- **Acting Unit Leader, Technical Unit, Nonpoint Source Section, Bureau of Water Resources, Wisconsin Department of Natural Resources.** State program grant administration, preparation of state technical guides on stormwater practice design, and technical review of plans and specifications for the design of nonpoint source practices, (August 1991-January 1992).
- **Muskego/Wind Chain of Lakes Priority Watershed Plan.** Wisconsin Department of Natural Resources Southeast District representative on technical workgroup, (1990-1992).
- **Sheboygan River Remedial Action Plan - City of Sheboygan.** Co-author of restoration plan for Lower Sheboygan River and Harbor prepared for Wisconsin Department of Natural Resources and USEPA Great Lakes Program Office, (1990).
- **Oak Creek Watershed Plan Committee**. Wisconsin Department of Natural Resources Southeast District representative on technical Advisory Committee, (1989-1990).
- **Sheboygan River 208 Plan** (Sheboygan, Fond Du Lac, and Manitowoc Counties). Prepared 208 Water Quality Management Plan for the Sheboygan River Watershed, Wisconsin Department of Natural Resources, (1987).
- **Flood and Drainage Control System Plan for the Milwaukee Metropolitan Sewerage District.** Wisconsin Department of Natural Resources representative on Technical Advisory Committee. Provided technical assistance on state regulations, stream restoration and plan implementation, (1985-1989).
- **Oconomowoc River Priority Watershed Plan** (Washington, Waukesha and Jefferson Counties). Wisconsin Department of Natural Resources Southeast District representative on technical workgroup and project implementation, (1990-1992).
- **Pike River Management Plan** (Kenosha and Racine Counties). Wisconsin Department of Natural Resources Southeast District representative on SEWRPC Watershed Committee, (1985-1992).
- **Sheboygan River Priority Watershed Plan** (Sheboygan, Fond Du Lac, and Manitowoc Counties). Wisconsin Department of Natural Resources Southeast District representative on technical workgroup, (1985-1992).
- **Seven Mile/Silver Creek Priority Watershed Plan** (Sheboygan and Manitowoc Counties). Wisconsin Department of Natural Resources Southeast District representative on technical workgroup, (1985-1990).
- **Turtle Creek Priority Watershed Plan** (Walworth and Rock Counties). Wisconsin Department of Natural Resources Southeast District Project Manager for implementation of a nonpoint source pollution abatement grant program, (1984-1992).

- **Root River Priority Watershed Plan** (Milwaukee, Waukesha and Racine Counties). Wisconsin Department of Natural Resources Southeast District Project Manager for implementation of a nonpoint source pollution abatement grant program, (1983-1987).
- **Pike River Watershed Committee** (Racine and Kenosha Counties). Wisconsin Department of Natural Resources representative on Pike River Advisory Committee. Provided technical assistance on state regulations, stream restoration and plan implementation, (1985-1992).
- **Shoreline Erosion Control Plan for the North Shore Area of Milwaukee County.** Member of technical advisory committee providing technical assistance on bluff erosion control and state regulatory process, (1985-1986).

Stream Monitoring and Restoration Projects

- **Upper Kishwaukee River Water Quality Monitoring Project.** This project was funded by a $100,000 grant from the IEPA thru CMAP to collect parameters for calibration of a HSPF model of the Upper Kishwaukee River. The modeling will be used to create a management plan for the Upper Kishwaukee Watershed. 270 water quality samples were analyzed from in-river locations, tile line discharges, shallow groundwater discharges, swales, and wastewater treatment plant discharges. Stream bank and bed erosion rates were measured at six sites. In addition a continuous flow gauging station was also installed, providing two years' of flow data, Chicago Metropolitan Agency for Planning (CMAP)(2009 – 2011).
- **Alto Creek Monitoring Project**. Conducted one year stream monitoring project at five stations to determine sources of elevated nitrogen and phosphorus inputs to Fox Lake. Project documented a major problem of groundwater contamination that is entering the lake through stream base flow. Fox Lake Protection and Rehabilitation District, (2010).
- **Cambra Creek Monitoring Project**. Conducted one year stream monitoring project at seven stations to determine sources of elevated nitrogen and phosphorus inputs to Fox Lake. Fox Lake Protection and Rehabilitation District, (2010).
- **Stream Restoration West Brach Chicago River.** Conducted hydraulic analysis of proposed stream restoration project to evaluate the potential impacts of new riffles and pools on flood elevations using the hydraulic model HEC-RAS. Village of Glenview, Illinois (2009).
- **Drew Creek Monitoring Project.** Conducted one year stream monitoring project at five stations to determine sources of elevated nitrogen and phosphorus inputs to Fox Lake. Project documented a major problem of groundwater contamination that is entering the lake through stream base flow. Fox Lake Protection and Rehabilitation District, (2009).
- **Bohner's Lake Inlet Sediment Transport Study.** Conducted a study to estimating the total amount of sediment entering the inlet of Bohner's Lake. Conducted one year of hydrologic, suspended sediment and bed load sampling. The project included development of a one year hydrologic budget and sediment loading model calibrated with measured field data. Bohner's Lake Sanitary District, (2007).
- **Tyler Creek Restoration Plan.** Preparation of a restoration plan for Tyler Creek in the City of Elgin, Illinois. City of Elgin, (1998).
- **Oconomowoc River Stabilization Project.** Preparation of stream restoration project for the Oconomowoc River below the recently removed Funk's Dam, including a feasibility study of alternatives and preparation of final plans and specifications, bidding documents and regulatory permits. Wisconsin Department of Natural Resources and North Lake Management District, (1998).
- **Lake George Tributary Streambank Stabilization Project.** Design and installation of bioengineering bank stabilization practices for approximately 1-mile of streambank in an urban watershed in Southern Cook County, Illinois. Village of Richton Park, (1998).
- **Former Funk's Dam Impoundment Study, Waukesha, County, Wisconsin.** Prepared a management plan for stabilization of a former mill dam impoundment on the Oconomowoc River. The study included analysis of stabilizing the in-place soft sediments behind the old dam and the new stream channel downstream.

Hydraulic analysis was conducted using HEC-2. Wisconsin Department of Natural Resources and North Lake Management District, (1995).

- **Menomonee River/Honey Creek Streambank Stabilization Project, Milwaukee, Wisconsin.** Design of streambank erosion stabilization for 14 sites on the Menomonee River and Honey Creek; innovative soil bioengineering to design stabilization measures compatible with the Menomonee River Parkway and fish/wildlife habitats along the river. Milwaukee County Department of Parks, (1994-1998).
- **Stream Restoration Plan: South Branch Crawfish Creek - City of Oak Creek.** Stream habitat restoration plan, Wisconsin Department of Natural Resources, (1991).

Lake Monitoring and Restoration Projects

- **North Lake Inlet Dredging Project.** Prepared plans for the dredging of 38,000 cubic yards of sediment from the Oconomowoc River inlet of North Lake. The project included mapping of sediment types, sampling for chemical contamination, development of four alternatives, identification of disposal sites and methods, estimation of costs, and preparation of regulatory permits. North Lake Management District (2008-Present).
- **Fox Lake Management Plan.** Developed a long-range management plan to maintain the water quality of the recently restored Fox Lake, Dodge County, Wisconsin. The plan included development of a detailed water, sediment and nutrient budgets, statistical assessment of two decades of water quality, fishery, aquatic plant and zooplankton data; development of a plan to maintain aquatic plans, control of in-lake nutrients, fishery management, and watershed management. Fox Lake Inland Lake Protection and Rehabilitation District, (2007).
- **Crystal Lake (Illinois) Management Plan.** Preparation of long-term protection plan for Crystal Lake, one of Illinois's outstanding waters. The plan focused on protection of groundwater recharge, management of exotic species, and protection of water quality. Crystal Lake Park District, (2007).
- **Crystal Lake (Illinois) Water, Sediment and Nutrient Budgets.** Prepared detailed water, phosphorus and suspended solids budgets based on two years of inflow and outflow monitoring. The water budget included groundwater, surface water runoff, tile flow, sanitary sewer and storm sewer flow, precipitation, evaporation and lake storage. As part of the project nine flow gauging stations, six groundwater monitoring wells, a lake stage recorder and two recording rain gauges were installed and maintained. Crystal Lake Park District, (2007).
- **Crystal Lake (Wisconsin) Level Management Plan.** Preparation of long-term water budget analysis to determine the cause of a recent and dramatic 4-foot change in lake levels. The project included development of 40 years of monthly water budgets to understand the relationship between natural atmospheric variation and mad-made changes in the watershed. The water budget models were calibrated and verified with measured, precipitation, evaporation, stream flow and lake level data. A management plan for lake level recovery was developed. Crystal Lake Sanitary Distinct, (2006-2007).
- **Fox Lake Aquatic Plant Management Plan.** Developed a management plan for aquatic plant management following implementation of lake recovery project that switched the lake from a turbid to clear water state. Project included working with a 10 member citizen advisory committee, conducting of public information forums and coordination with state regulatory agencies. The plan focused on the protection of existing plant beds while providing navigational access through man-made channels. Fox Lake Inland Lake Protection and Rehabilitation District, (2006).
- **Elkhart Lake Groundwater Study.** Utilizing ArcGIS, prepared a detail map of the local groundwater table based on water level records from state submitted private well logs and local topographic maps. Developed a sampling program of the shallow near-shore aquifer, utilizing mini-piezometers, to identify groundwater flow directions and potential sources of groundwater contamination. Elkhart Lake Improvement Association, (2005-2006).
- **Fox Lake Evaluation Project.** In partnership with the University of Wisconsin Milwaukee conducted a two-year monitoring and evaluation project of the Fox Lake Restoration Project. Evaluation includes watershed and inlake monitoring, compilation of historic data, and preparation of a summary report outlining the success of the 10-year ecological restoration project on Fox Lake. Fox Lake Inland Lake Protection and Rehabilitation District, (2004 to 2006).

- **Crystal Lake Aquatic Plant Management Plan.** Preparation of an aquatic plant management plant for the control of the exotic species Eurasian milfoil on Crystal Lake, Illinois. Crystal lake Parks District, (2003).
- **Mill Creek Management Plan.** Preparation of a management plan for the restoration of Mill Creek in the City of Fox Lake. The plan evaluated alternatives to improve navigation from Mill Creek, the lake outlet channel of Fox Lake, to the main body of the lake. The project included evaluation of dredging alternatives, preparation of project costs, an implementation strategy, a financing plan, and outline of regulatory permits needed to implement the project. City of Fox Lake, (2003).
- **Water, Sediment and Nutrient Budget for Lake Sinissippi, Dodge County, Wisconsin.** Prepared detailed water, sediment and nutrient budget for Lake Sinissippi based on monitoring conducted by the U. S. Geological Survey and several local wastewater treatment plants. The project identified the major sources of pollutants that are causing eutrophication of the lake. Lake Sinissippi Association, (2003).
- **Monches Millpond Dam Replacement Planning.** Prepared a conceptual design for the replacement of the Monches Millpond Dam to be coordinated with the replacement of a county highway bridge. Facilitated an intergovernmental agreement between the North Lake Management District, Waukesha County Highway Department and the Town of Merton. Negotiated with the Wisconsin Department of Natural Resources to identify state regulatory requirements and final design criteria. Conducted an evaluation of floodplain impacts using HEC-RAS and a dam break analysis. North Lake Management District, (2003-2004).
- **Wetland and Habitat Restoration Planning, Lake Sinissippi and Rock River, Dodge County, Wisconsin.** Developed a management plan for the restoration and protection of wetlands in the watershed of Lake Sinissippi. The plan evaluated the use of zoning, lake drawdown, artificial plantings, burning of marsh fringe areas, construction of breakwaters and/or revetments, floating islands, lake use regulations, and activities local property owners can do to improve wildlife habitat on their shorelines. Lake Sinissippi Improvement District, (2003).
- **Eagle Spring Lake Water Quality Summary and Management Report.** Prepared of a detailed summary of ten-years of lake water quality data collected by the U. S Geological Survey (USGS) and developed a long-term management plan for the 310-acre lake located in the headwaters of the Mukwonago River watershed, an outstanding designated water in the State of Wisconsin. The plan included development of community consensus on long-term goals, protection of sensitive resources, improvements in water clarity and management of accumulated sediment. Eagle Spring Lake Management District (2002 to 2003).
- **Lake Management Plan for Lake Sedgwick, Orland Park Illinois.** Preparation of a lake restoration plan for a 74-acre lake located in Centennial Park. Plan included summary of a two-year water quality study, modeling of stormwater runoff, identification of management alternatives, and preparation of a long-range plan. Plan recommendations included watershed housekeeping practices, installation of two wetland treatment systems, installation of a biofilter system, lakeshore stabilization, nuisance aquatic plant control, restoration of native plant communities, and dredging. The project was sponsored with a Clean Lakes Program Grant from the Illinois Environmental Protection Agency. Village of Orland Park Recreation Department, (2002).
- **Lake Sinissippi Implementation Strategy**. Preparation of an implementation strategy for a lake restoration project on Lake Sinissippi, Wisconsin. Project components included fishery restoration, wetland restoration, dredging, and watershed management. The plan identified needed project components including feasibility studies, cooperating partners, regulatory permits, financing options, and realistic time schedules for successfully project implementation. Lake Sinissippi Improvement District 2002.
- **Carr Pond Design, Mequon Wisconsin.** Prepared hydrology analysis for a man-made lake in Mequon, Wisconsin. Analysis included preparation of a long-term water budget to determine appropriate pond dimensions, lake levels and outlet structure design. Carr Family, (2001).
- **Dredging Plan and Water Budget Study for the Highland Development.** Preparation dredging plans and long-range water budget for a 20-acre manmade lake in Mequon, Wisconsin. The purpose of the long-range water budget was to determine potential fluctuations in water levels and make recommendations to minimize lake level changes during draught periods. Highland Road Development Corporation, (1998).
- **Town of Fox Lake Boat Launch Navigation Channel.** Developed plans and specification for the dredging of a navigation channel at the Town of Fox Lake Boat Launch. The project included mapping of sediment types, sampling for chemical contamination, development of alternative channel locations, preparation of

bidding documents, preparation of permit applications and state waterway grant application. The 38,000 cubic yard project received 60% state cost share funding and was which implemented in 1999. Fox Lake Inland Lake Protection and Rehabilitation District (1998-1999).

- **Water Quality Management Strategy for Lake Sinissippi, Wisconsin.** Preparation of a long-range management strategy for a 2,300-acre drainage lake. Lake Sinissippi Improvement District, (1998).
- **Lake Drawdown and Refill Analysis, Fox Lake.** Prepared an analysis of the potential drawdown and refill rates for Fox Lake as part of a lake restoration project involving a 3-foot drawdown of the lake. A 48-year water budget for the lake was prepared from available USGS and NOAA data. Probability analysis of the drawdown and refill rates was conducted to provide decision makers information on the potential range of rates that could be experienced under different climatic conditions. Fox Lake Inland Lake Protection and Rehabilitation District, (1997).
- **Little Elkhart Lake Water Level Management Plan.** Prepared a plan for management of fluctuating water levels on a seepage lake. Alternatives included alterations to the outlet, bottom sealing, dredging and dilution pumping. Project included development of a 40-year water budget for the lake. Plans and specifications were prepared for improvements to the lake's outlet. Little Elkhart Lake Management District, (1996).
- **Fox Lake Shoreline Management Project.** Conducted an analysis of shoreline erosion rates on 400 developed properties on Fox Lake, Dodge County. Design of shoreline protection measures for approximately 6000 feet of shoreline. Provided construction inspection services for the 80 properties. Fox Lake Inland Lake Protection and Rehabilitation District, (1995-1998).
- **Long Lake Protection Plan.** Preparation of long-range protection plan for Long Lake in Waushara Co., Wisconsin. The plan includes identification of sensitive areas for the protection of fish spawning, nursery, and feeding areas. A lake use plan to protect sensitive species was developed including recommendations for improvements to the local boating ordinance. A watershed management plan was developed to maintain the existing high water quality of the lake, (1994-1995).
- **Delavan Lake Restoration Project.** The project involved the implementation of world's most comprehensive lake restoration project. The 2,000 acre lake restoration project included watershed management, installation of a 90 acre wetland treatment system, conservation zoning, construction of a $40 million waste water treatment system, fishery restoration, inflow short-circuiting, nutrient inactivation using alum, and lake use zoning. In 1991 the project received a national technical excellence award from U. S. Environmental Protection Agency (USEPA) and the North American Lake Management Society (NALMS). Wisconsin Department of Natural Resources, (1983-1992).
- **Milwaukee Urban Lakes Initiative.** Conducted a two year comprehensive study of seven urban lakes owned by the Milwaukee County Parks Department. The purpose of the study was to understand the impacts of urban runoff on small lakes and determine if a sustainable fishery program could be developed in these heavily utilized intercity lakes. The project involved installation and maintenance of 12 gauging and automated water quality sampling station, installation of 20 groundwater monitoring wells, and bi-weekly sampling for water quality, and surveys of plankton, fish and aquatic plants. A management plan for each lake was developed. The program resulted in one of the first urban fishing programs in the United States to serve low income neighbors. U. S. Environmental Protection Agency Clean Lakes Program and Wisconsin Department of Natural Resources (1979-1983).

Water Quality Modeling

- **Village of Spring Grove Waste Water Treatment Plant Zone of Initial Dilution (ZID) Study -** The purpose of the study was to determine the mixing zone and need for a "zone of initial dilution (ZID)" for the Village of Spring Grove Waste Water Treatment Plant. The project involved conducting a mixing zone dye study and monitoring the dilution of the effluent in Nippersink Creek (2011).
- **Impact of the City of Genoa (IL) Treatment Plant Expansion on South Branch of Kishwaukee River.** Assisted the City of Genoa with water quality modeling of a proposed a wastewater treatment plant expansion. The modeling, documented potential changes to instream dissolved oxygen levels using the Ponce Oxygen Demand Equation and Streeter-Phelps equation. The models were calibrated and verified using instream

monitoring data collected as part of the project. The analysis was used to amendment the regional water quality management plan. City of Genoa, Illinois, (2009).

- **Fox River Low Flow Dissolved Oxygen Monitoring Project.** Water quality monitoring of Fox River to acquire calibration parameters for a QUAL2 dissolved oxygen model. The project includes monitoring of continuous water quality using in-situ recoding sondes, stream flow and stage measurements, collection of discrete water quality samples, and sediment oxygen demand. Included development of a detailed Quality Assurance Program Plan (QAPP), Sampling Operation Plans (SOPs) and training program for thirty plus field staff. Fox River Study Group, (2006 to present).
- **Hampshire Wastewater Treatment Plant Anti-Degradation Analysis.** Assisted the Village of Hampshire with water quality modeling of a proposed a wastewater treatment plant expansion. The modeling, documented potential changes to instream water quality using the USEPA QUAL2 model and was used as part of an amendment to the regional water quality management plan. Village of Hampshire, Illinois, (2004).
- **Lower Des Plaines River Use Attainability Analysis and Classification.** Preparation of a Use Attainability Analysis under Federal Regulation 40 CFR 131 for the Lower Des Plaines River in Chicago, Illinois. The study area includes one of the most industrialized river sections in America, and the project involved several groundbreaking issues related to implementation of the clean water act. Based on a detailed analysis of water quality and aquatic resource data. The project team recommended a new classification for the water body that compiled with the Clean Water Act. Water quality standards for the new designation were developed. As part of the project acted as the facilitator for an advisory committee made up of stakeholders and several special topic sub-committees. Illinois Environmental Protection Agency, (2000 to 2003).

Permitting

- **Kettle Moraine Lake Seawall Project –** Designed the removal and replacement of an illegal seawall placed on Kettle Moraine Lake in Fond Du Lac County, Wisconsin. The project involved modeling of wave height and design of an appropriate revetment to protect the shoreline. State and Federal permits were acquired (2010).
- **City of Neenah Glatfelter Paper Mill Redevelopment Project.** Assisted the City of Neenah in the acquisition of environmental permits for the redevelopment of an abandoned paper mill site on the Fox River. The project included preparation of permit applications, erosion control and stormwater management plans, environmental assessments, and negations with regulatory staff at the Wisconsin Department of Natural Resources and U. S. Army Corps of Engineers. City of Neenah and City of Neenah Redevelopment Authority (2008).
- **City of Neenah West Canal Project.** Facilitation of state and federal permits for the filling in of an abandoned navigation canal to allow construction of a new office tower and parking structure. The project included preparation of permit applications, erosion control and stormwater management plans, environmental assessments, and negations with regulatory staff at the Wisconsin Department of Natural Resources and U. S. Army Corps of Engineers. City of Neenah Department of City Development, (2004).
- **City of Neenah North Riverwalk Project.** Facilitation of state and federal permits for construction of a riverwalk along the bank of the Fox River. City of Neenah Department of City Development, (2004).
- **City of Neenah Shattuck Park Project.** Facilitation of state and federal permits for construction of a riverfront park and marina facility on the Fox River. The project included preparation of permit applications, erosion control and stormwater management plans, environmental assessments, and negations with regulatory staff at the Wisconsin Department of Natural Resources and U. S. Army Corps of Engineers. City of Neenah Parks and Recreation Department, (2004).
- **Sams Club Environmental Permitting, Madison Wisconsin.** Prepared applications for federal, state and local permits for a large retail development on the east side of Madison, Wisconsin. Acquired federal and state permits for small wetland fill. Prepared Wisconsin NR 103 Practicable Alternatives Analysis and associated environmental assessment documents. Prepared reports on potential impacts on local groundwater hydrology and impacts to local stream. Wal-Mart Corporation (2001).
- **City of Elgin Riverfront Project, City of Elgin, Illinois.** Preparation of regulatory permit applications for installation of a river walk system for downtown Elgin. The project involved hydraulic modeling, preparation of environmental documents, including wetland delineations, and preparation of permit applications for federal, state, county and local permits. City of Elgin, (2000 to present).

Expert Witness

- **WDNR North Lake Boat Launch.** Provided engineering and ecological expert assistance to the Reddelien Road Neighborhood Association, Inc. in their battle to stop a public boat launch from being built in a wetland on the west side of North Lake. The project involved preparing expert reports on potential ecological damage to the wetland complex and flooding to neighboring properties, review of state and federal permits issued for the project, freedom of information requests, preparation of affidavits, and testimony at public hearings and trial.
- **Brown's Lake Drainage Problem Assessment**. As part of a drainage dispute between a property owner on Browns Lake and the Town of Burlington, Wisconsin, conducted a mapping of the drainage area, prepared a history of development in the watershed, and identified causes of the drainage problem and developed alternatives and costs for potential solutions. The case was settled out of court.
- **Bear Administrative Hearing Expert Witness.** Provided expert witness to a contested case hearing concerning the installation of a seawall and two piers on Alder Lake in Vilas County Wisconsin. Conducted surveys of near shore aquatic life and bathometric characteristics. Testimony included impacts of the project on near shore aquatic life, effects of wave action and local soils on shore erosion, and effects of water level management. Law firm of Brennen, Steil & Basting, S.C., (2002-2003).
- **Village of Brown Deer Lawsuit Expert witness.** Provided expert witness as part of a lawsuit brought against the Village of Brown Deer, City of Milwaukee, Milwaukee County and the Milwaukee Metropolitan Sewerage District for flooding on a private property along South Branch Creek. After documenting that the flooding problem existed prior to the development of the property the case was dismissed. Gunta & Reak, S.C. (2003).
- **City of Appleton Lawsuit Expert Witness.** Provided expert witness as part of a lawsuit brought by the Butte Des Morts Country Club against the City of Appleton, Town of Grad Chute, Winnebago County and Wisconsin Department of Transportation for drainage problems on the golf course. Documented that the City of Appleton was not a contributor to the problem resulting in the City being released from the case. Gunta & Reak, S.C. (2000).
- **Little Muskego Lake Sediment Problem Lawsuit.** Represented the Little Muskego Lake Association as part of a lawsuit against a land developer who discharged 50,000 cubic yards of sediment into Little Muskego Lake through construction site erosion. Calculated erosion rates for every storm during the development period to document erosion losses. Sampled and characterized deposited sediment to identify potential sources. Provided expert testimony at trial. (1997).
- **Lilly Creek Village of Menomonee Falls.** Expert for the Wisconsin Department of Natural Resources in a contested case hearing over the denial of a permit to channelize a natural stream for flood control. Conducted watershed modeling to illustrate alternatives to the proposed action. Provided testimony at hearing. Case was appealed to Wisconsin Court of Appeals resulting in major case law on stream alteration permitting. (1989).

Administrative

- **Lake Management Coordinator Wisconsin Department of Natural Resources Southeast Region.** Worked with lake management districts/associations in managing lakes for an eight-county area of Wisconsin, (1977-1992).
- **Regional Nonpoint Source Coordinator Wisconsin Department of Natural Resources Southeast Region.** Implemented state's nonpoint source pollution abatement program including development of watershed management plans and review of grant application. Watershed projects managed included the Milwaukee River, Menomonee River, Upper Fox River, Sheboygan River, Turtle Creek, Oconomowoc River, Root River, and Kinnickinnic River. (1983 to 1992).
- **Wisconsin Department of Natural Resources Liaison with Southeastern Wisconsin Regional Planning Commission (SEWRPC)**. State grant administration, annual work plan preparation, and technical assistance, (1983-1992).

PROFESSIONAL ADVANCEMENT

"Stream Restoration in the Great Lakes Basin: Using In-stream Structures & Natural Channel Design, USEPA, January, 2013

"Sustainable Water-Centric Communities", University of Wisconsin-Milwaukee, 2011

"Great Lakes Costal Processes and BMP's, Wisconsin Association for Floodplain, Stormwater, and Coastal Management and University of Wisconsin Sea Grant Institute, 2011

"Basics of Wisconsin Water Law", University of Wisconsin-Milwaukee, 2010

"Land Use Law", Marquette University, 2004

"Natural Resources Law", Marquette University, 2003

"Construction Equipment and Methods", Marquette University, 2002

"International Environmental Law", Marquette University, 2002

"River Engineering", Marquette University, 2002

"Environmental Law", Marquette University, 2001

"Advanced Hydrology", Marquette University, 2001

"Urban Nonpoint Source Pollution Modeling Using ArcView, University of Wisconsin-Madison, 2000

"Sediment/Pollutant Transport", University of Wisconsin-Milwaukee, 2000

"Geographical Information Systems", Marquette University, 2000

"Environmental Chemistry", Marquette University, 1999

"Infiltration of Urban Stormwater", Marquette University, 1999

"Ecological Benefits of Stormwater Practices", Marquette University, 1998

"Water Quality Modeling and Management", Marquette University, 1995

"Habitat Evaluation Procedure (HEP) ", University of Colorado, 1993

"Water and Wastewater Engineering", Marquette University, 1993

"Environmental and Water Resource Economy and Planning", Marquette University, 1993

"Urban Hydrology and Stormwater Management", Marquette University, 1992

"Designing Stormwater Quality Management Practices", University of Wisconsin-Madison, 1992

"Stormwater Management: Urban Runoff Management Workshop", USEPA & SCS, 1992

"Lake Trophic State and Toxic Modeling", Duke University, 1990

"Urban Hydrology and Detention Pond Design", University of Wisconsin-Milwaukee, 1990

"Oceanography", University of Wisconsin-Oshkosh (1977)

"Groundwater Hydrology", University of Wisconsin-Oshkosh (1977)

"Glacial Geology", University of Wisconsin-Oshkosh (1976)

"Freshwater Invertebrates" University of Wisconsin-Oshkosh (1976)

"Freshwater Algae", University of Wisconsin-Oshkosh (1976)

"General Ecology", University of Wisconsin-Oshkosh (1976)

"Hydrology", University of Wisconsin-Oshkosh (1976)

"Plant Physiology" University of Wisconsin-Oshkosh (1976)

"Limnology", University of Wisconsin-Oshkosh (1975)

"Structural Geology", University of Wisconsin-Oshkosh (1975)

"Urban Planning", University of Wisconsin-Oshkosh (1975)

NEAL T. O'REILLY, Ph.D, PH *(continued)*

PROFESSIONAL MEMBERSHIPS

Waukesha County Land Conservancy, Board of Directors
North American Lake Management Society
American Society of Civil Engineers
Waukesha County Stormwater Advisory Committee

REGISTRATION

Wisconsin Professional Hydrologist, No. 111-110