



NEW YORK STATE WATER RESOURCES INSTITUTE

Department of Biological & Environmental Engineering
B60 Riley-Robb Hall, Cornell University
Ithaca, NY 14853-5701
t 607.254.7163 | f 607.255.4449 | nyswri@cornell.edu

Statewide Water Research and Outreach Agenda

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Theme A. Water Quality

1. Analyze and model previous, current, and future nutrient and sediment loads to help control and limit their impacts to NYS waterbodies.
2. Engage in water quality monitoring method development and policy analysis to assess the effectiveness of pollution control policies and their public awareness/acceptance.
3. Identify strategies to incorporate water quality data and information into local land use decision making processes and policies.
4. Continue to improve conceptual models of integrated watershed health and assist NY stakeholders in utilizing such models.

Micropollutants & Emerging Contaminants

5. Conduct hydrological studies to identify major sources of micropollutants, transport pathways, frequency of occurrence, impacts, and opportunities for mitigation.
6. Identify the occurrence, distribution, and effects of micropollutants and emerging contaminants on source and drinking waters to assist in mitigating their impacts on public health.
7. Analyze the connections between access to safe drinking water and community demographics (e.g., race, income, and housing).
8. Determine the degree of success of conventional water and wastewater treatment plants in the removal of micropollutants.
9. Create research summaries to effectively communicate the findings of WRI to local communities, municipalities, and state and local government agencies.

10. Synthesize the research findings to create ArcGIS StoryMaps that can be shared with the staff of state and federal agencies.

Harmful Algal Blooms

11. Evaluate the effectiveness of watershed nutrient control strategies and best management practices (BMPs) in preventing and mitigating HABs.
12. Identify the factors that impact the efficacy and feasibility of available in-waterbody HABs control methods.
13. Evaluate the environmental conditions that influence the occurrence, severity, toxicity, and duration of HABs in NY's surface waters.

Theme B. Watershed Management

Stream Barrier Assessment and Mitigation

1. Efficiently identify previously un-inventoried dams and contribute to a state-wide dam inventory that can be used for aquatic connectivity restoration and assessment.
2. Implement a dam barrier mitigation analysis which identifies optimal strategies to improve aquatic connectivity restoration given the realities of limited restoration budgets and on-the-ground social obstacles to barrier mitigation.
3. Monitor barriers for biological, chemical, physical, and landscape impacts associated with management decisions such as removal or alteration.
4. Improve understanding of social barriers to aquatic connectivity restoration; develop tools to inform decision making processes in communities; and improve outreach and communication practices utilized by resource managers.
5. Identify and assess the impacts of undersized culverts on local hydrology as it pertains to both flooding risk and aquatic community health.
6. Identify approaches that incorporate transportation and other infrastructure considerations into analyses of stream barriers and subsequent efforts to manage them.

Watershed Planning and Modelling

7. Identify strategies to incorporate water quality data and information into local land use decision making processes and policies.
8. Continue to improve conceptual models of integrated watershed health, and assist NY stakeholders in utilizing such models.
9. Analyze traits of effective local watershed groups, as well as outline strategies for their success. Identify challenges and solutions encountered by said groups.
10. On a tributary scale, identify reasonable and technically feasible approaches that stakeholders may use to monitor pollutants and determine pollution sources.
11. Assist stakeholders in developing and understanding watershed planning processes, including 9e and TMDL.
12. Provide technical and outreach support to community groups, watershed groups, and municipalities on water resource information, watershed management, water quality monitoring, and assessments, etc.
13. Develop inter-municipal arrangements and strategies to address watershed water resource challenges and needs.
14. Build the capacity of local watershed groups, municipalities, regional environmental groups, county agencies, and other partners.

Roadside and Agricultural Ditches

15. Identify and assess best management practices (BMPs) for in-ditch management of sediment and nutrients, particularly from agricultural runoff.
16. Better understand the role and prevalence of tile drains and their impact on ditch sediment and nutrient loading.
17. Develop policy and planning tools that can be employed by local municipalities and highway personnel to improve ditch management (e.g., flood damage prevention ordinance; stormwater management plans; etc.).
18. Model and assess the impact of roadside ditches on watershed hydrology, transport of nutrients and sediment, and the morphology and function of receiving waters.

Riparian Buffer Restoration and Assessment

19. Explore the benefits of and ways of knowing about riparian systems from multiple perspectives, including Traditional Ecological Knowledge, and develop approaches to better communicate those benefits and knowledge systems.
20. Seek to understand and reduce the barriers to implementation of riparian protection and restoration efforts.
21. Assess and develop tools for riparian protection and restoration.
22. Understand and promote equitable distribution of the benefits of riparian areas in NYS.
23. Analyze trends in green gentrification resulting from green infrastructure projects, including riparian efforts. Where possible develop and promote tools and approaches that would reduce the impacts of green gentrification on marginalized communities.
24. Develop and promote equitable community engagement in the planning process for riparian restoration and protection efforts.
25. Provide materials, tools, and trainings for groups that are looking to protect or restore riparian areas that help promote the benefits of riparian areas, prioritize where to site projects based on biophysical and socioeconomic goals, and promote protection and restoration through municipal actions.
26. Promote coordination and networking throughout NYS of practitioners working to protect and restore riparian areas.

Theme C. Climate Change and Resilience

1. Work towards identifying, understanding, and lowering the inequitable distribution of flood, drought, and water scarcity vulnerability in NYS.
2. Research and employ approaches, when possible, that minimize green gentrification from green infrastructure projects, particularly for projects that we facilitate or fund.
3. Identify and evaluate actions that could increase resiliency to flooding, erosion and other climate stressors, including policy changes and outreach.

4. Produce analyses that connect various climatological drivers of extreme events with impacts, managements actions, and outreach that are tailored to the various watersheds of NYS.
5. Advance our understanding of how human decision making and infrastructure systems can impact drought likelihood.
6. Develop probabilistic forecasting streamflow models based on historic records, and accounting for climate non-linearity.
7. Research into the carbon sequestration potential of natural lands, especially with respect to freshwater and tidal wetlands.

Building Community Climate Resilience

8. Better understand how individuals and communities perceive flood risk and define resilience with the goal of improving extension and outreach to achieve flooding mitigation and adaptation.
9. Identify barriers to the adoption of climate adaptation actions and strategies to overcome those barriers.
10. Identify how equity concerns intersect with flooding and adaptation planning.
11. Help to develop methods for of predicting flood flows and their impacts in NYS under future climatic and landscape conditions.
12. Identify means and strategies for reducing the magnitude of flooding, particularly using green infrastructure and nature-based solutions.
13. Create and support networks of research, outreach, governance, and implementation practitioners that promote learning and coordinate to leverage opportunities to promote flood and drought resilience in NYS.
14. Promote tools, materials, and practices that reduce inequities in flood resiliency.
15. Establish links between different NYS, other state, and federal programs designed to assist communities become more flood resilient: CSC, CRS, EDEN, Flood Smart, etc.
16. Promote and develop web-based applications that allow users to better understand and plan for drought.
17. Assist in the creation of drought management plans where appropriate.

18. Create summaries of research findings and engage with local/regional stakeholders involved in drought forecast and response.

The Food-Energy-Water Nexus

19. Evaluate the water-related impacts of expanded renewable energy development, especially renewables such as solar and wind.
20. Identify the benefits of land use conversions between food and energy in terms of water quantity and quality.
21. Analyze the effect that climate change has on the tensions and trade-offs across the water-energy-food nexus.
22. Assess how climate change effected the tensions across the water-energy-food nexus.
23. Create summaries of research findings and engage with local/regional stakeholders involved with energy development and/or food production, including Cornell University and their contractors.

Theme D. Urbanization and Infrastructure

1. Assess opportunities to fund and finance infrastructure projects and delineate the impacts of financing choices on project development.
2. Identify effectiveness of asset management at helping municipalities operate their infrastructure systems and summarize how to structure asset management programs in a way that is beneficial to NY's various communities.
3. Outline available options for managing onsite wastewater treatment at the community level in NY. Assess how can we best match governance models to community characteristics for maximum effectiveness.
4. Assess the results of state and federal programs with respect to ultimate improvement of water resources and community vitality.

Theme E. Aquatic Invasive Species

1. Implement an effective AIS public awareness campaign that will target those likely to introduce AIS or be impacted by AIS introductions. Regularly evaluate these efforts to ensure their effectiveness in preventing the introduction and spread of AIS in New York State.
2. Identify and evaluate risks associated with pathways for AIS introduction into and movement within New York State.
3. Identify AIS species most likely to be moved to and within New York State.
4. Identify and evaluate mechanisms for preventing transport to and within New York State, including boat wash stations, and implement effective options.
5. Incorporate potential impacts of climate change on AIS introductions to New York State over various time horizons.
6. Research efficacy, safety, and utility of practical materials, equipment, and techniques for preventing AIS transport.
7. Develop a means of identifying waters that are/are not high risk for AIS invasion and adverse impacts.
8. Identify a common set of monitoring metrics to be used in AIS impact assessments addressing ecological, health, water quality, recreational, economic, and social factors.
9. Conduct a review of existing laws and regulations that may be impediments to AIS prevention, and develop and propose consolidated, coordinated replacements.
10. Identify and seek technology for identification of invasive species, including environmental DNA (eDNA) and remote sensing.
11. Explore innovative control strategies, including biological control and integrated pest management.
12. Investigate potential beneficial uses for harvested AIS.

13. Research connections between dams, impoundments, canals, and other infrastructure alterations and opportunities they provide to both inhibit and foster the movement and occupation of invasive species such as carp and knotweed.

Theme F. Water Literacy

1. Engage with students, communities, and statewide stakeholders to increase water literacy in NY.
2. Partner with State and Federal agencies to improve their water literacy and communication efforts in geographies of interest.
3. Develop water literacy curriculum, events, and programs for K-12 students.
4. Evaluate the use of outreach and educational programs in post-flood awareness efforts to reduce community risks/vulnerability to future flood events.
5. Investigate how watershed outreach and support correlate with stream health. Assess if watershed outreach and stewardship lead to an improved water resource.
6. Understand how field experiences improve classroom learning and change student attitudes and behavior towards the environment.
7. Outline what makes an effective and sustainable community science project.
8. Assess how to make student-collected data appropriately robust for various stakeholders, including the public, decision makers, and scientists.