

# 2019 Act 157 Demonstration Projects Ashland County Report Summary

## Table of Contents

Executive Summary  
Lessons Learned  
Recommendations

## Executive Summary

### BACKGROUND

Northern Wisconsin has faced significant flooding challenges due to multiple 100 and 500-year storms in recent years. These severe events have endangered public safety and inflicted substantial damage at vulnerable road-stream crossings. County level departments, including those concerned with emergency management, public safety, conservation, transportation, and economic development, are proactively preparing for floods with actions that mitigate future flood damages and enhance climate resilience.

### 2019 ACT 157

To address these challenges and pilot new approaches to flood mitigation, 2019 Act 157 allocated \$150,000 to Ashland County from the urban nonpoint source water pollution abatement and stormwater management fund to support up to three innovative natural flood risk reduction demonstration projects. The legislation required Ashland County to submit a report to the Department of Natural Resources (DNR) summarizing the outcomes of these projects. The DNR, in turn, was tasked with reporting to the Legislature and Wisconsin Division of Emergency Management, recommendations for state policy or funding adjustments to improve the use of nature-based solutions to reduce flood risks. This report satisfies Ashland County's reporting requirements and provides input to the DNR and other decision makers on policy and funding recommendations.



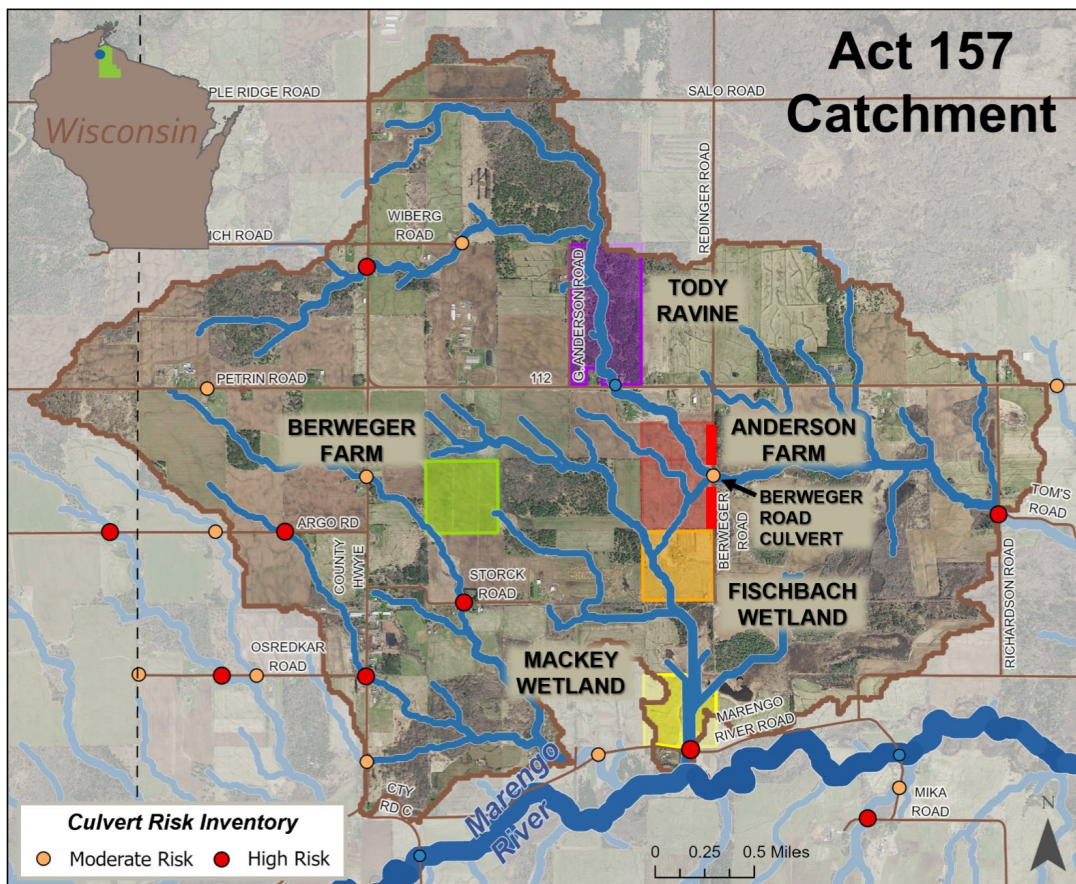
## PROJECT LEADERSHIP

The Ashland County Land and Water Conservation Department led the Act 157 project in collaboration with staff from the Wisconsin Department of Agriculture, Trade, and Consumer Protection's Conservation Engineering Section, Wisconsin Wetlands Association, and many other collaborators. The County was uniquely qualified for this work due to recent flood vulnerability assessments and the adoption of climate adaptation and hazard mitigation strategies focused on restoring hydrology to reduce flood risks and damages.

## FOCUS AREA

Act 157 projects were centered in the Marengo River Watershed, an area characterized by steep terrain and erodible clay and sandy soils. Historic hydrologic alterations and intense rain events have exacerbated erosion and deposition, impacting transportation infrastructure, water quality, and habitat conditions.

Restoration projects were informed by recently generated data on erosion hazards and hydrologic conditions, through discussions with local landowners and the input of engineers, hydrologists, and program managers at a field-based design session. These efforts culminated in the decision to focus on the restoration of multiple hydrologically connected sites within a defined drainage area (see map below). The project team also leveraged the Act 157 award to secure additional funding to expand the number of projects pursued.





## PROJECT SUMMARY

The project team completed two projects (including four conservation practices), both of which focused on mitigating erosion hazards and restoring headwater wetlands and streams. A third complementary project was designed and built with leveraged funding to restore wetlands and reduce flood flashiness and sediment loads. See Appendix A of the full *2019 Act 157 Demonstration Projects Ashland County Report* for descriptions of the site conditions, goals, results, and reflections from built projects.

Two additional projects were considered, but not implemented due to regulatory challenges, state agency coordination issues, and other constraints which forced project dollars to be turned back and flood risks to remain unaddressed. See Appendix B of the full report for descriptions of projects that did not advance.

The project team embraced a hydrologic restoration strategy, in which projects are designed, to the extent possible, to return wetland, stream, and floodplain hydrology to a more natural and self-regulating condition to achieve a variety of goals. Therefore, elements of projects that involved the restoration of wetland, stream, and floodplain hydrology are also referred to as hydrologic restoration throughout this report.

The hydrologic restoration goals at multiple sites included reducing flood peaks and improving flood resilience. To work toward these goals, the project team proposed using a combination of nature-based and structural solutions to reestablish the landscape's capacity to capture, store, infiltrate, and slowly release runoff. This hydrologic restoration strategy is also known as natural flood management (NFM). The project team placed specific emphasis on mitigating the loss of headwater wetland storage and floodplain connectivity along the small tributaries to prevent future flood damages.



*Headcut causing loss of soil and flood storage in a headwater wetland.*








*Stream incision preventing water from accessing the floodplain, resulting in floodplain disconnection.*

## SUMMARY OF LESSONS AND RECOMENDATIONS

The lessons learned in this report resulted from knowledge gained and the project team’s direct experiences working on both built and projects not pursued. Though experiences differed somewhat at each site, the lessons learned are broad takeaways that apply over multiple sites.

Likewise, the recommendations address these larger lessons and are actionable in the near term. Highlights of lessons learned and recommendations from the Act 157 projects include:

<p><b>Lesson:</b> There is an urgent need for hydrologic restoration to enhance flood resilience, and recent legislative and program developments provide valuable funding opportunities.</p> 	<p><b>Recommendation:</b> Continue to advance state strategies to increase flood resilience, including reauthorization of funding for Wisconsin’s Pre-Disaster Flood Resilience Grant Program, and review state grant programs (i.e., DATCP Soil and Water Resource Management Program) to create alignment of incentives for hydrologic restoration work.</p>
<p><b>Lesson:</b> Clear team structures are needed to improve coordination and understanding among partners in complex projects.</p> 	<p><b>Recommendation:</b> Develop streamlined regulatory approaches for hydrologic restoration projects enabled through the above new policies and operationalize those systems through establishment of interagency memoranda of understanding. Listing key staff or key agency positions would help improve communication.</p>
<p><b>Lesson:</b> Stream and floodplain regulations stifle innovative approaches to hydrologic restoration.</p> 	<p><b>Recommendation:</b> Identify and enact policy improvements to better enable hydrologic restoration in regulated waters.</p>
<p><b>Lesson:</b> Implementing hydrologic restoration at a catchment scale can maximize benefits but adds complexity.</p> 	<p><b>Recommendation:</b> Adjust program criteria to better enable multi-site and multi-year projects and establish funding for the coordination of efforts to plan and implement restoration opportunities at a catchment-scale.</p>
<p><b>Lesson:</b> A lack of data and decision support tools hinders hydrologic restoration work.</p> 	<p><b>Recommendation:</b> Invest in data that helps identify and evaluate flood vulnerabilities and prioritize strategic restoration opportunities.</p>



# Ten Lessons Learned

## 1. NEED FOR HYDROLOGIC RESTORATION

Like many rural communities, Ashland County faces erosion and hydrologic challenges that require urgent attention. Recent legislative and programmatic developments in Wisconsin, such as the Hydrologic Restoration General Permit (2019 WI Act 77), cost-share eligibility for hydrologic and stream restoration under ATCP 50, and the Pre-Disaster Flood Resilience Grant program present valuable opportunities for flood-prone communities to restore hydrology to increase flood resilience.

## 2. ESTABLISHING EFFECTIVE TEAMS

Some complex restoration projects would benefit from a clear, field integration team structure. This would help clarify complex roles and responsibilities, especially in multi-partner or large-scale projects, leading to better understanding and coordination among applicants, collaborators, and regulatory agencies.

## 3. ENGAGING LANDOWNERS AND UTILIZING LOCAL KNOWLEDGE

Making strides for flood resilience requires work on privately owned lands. County Land Conservation Departments are particularly well suited to cultivate the necessary relationships with landowners. The Act 157 project team collaborated with agricultural landowners and needed to incorporate the landowners' vision and goals for their property.

## 4. CATCHMENT-SCALE APPROACH BENEFITS & CHALLENGES

Implementing hydrologic restoration at a catchment scale can leverage funding and amplify benefits but it also increases complexity. The project team needed to manage a higher volume of programs, grants, and regulatory coordination, highlighting the need for more resources and planning for such large-scale efforts.

## 5. IMPORTANCE OF HEADWATERS REPAIR

Proactively addressing issues in headwaters can prevent problems from worsening downstream. Restoring headwaters is essential for reducing high-energy flows, sediment loads, and water quality impairments. However, there is a need for better data and tools to identify opportunities and effectively design projects to restore hydrology in degraded headwaters.



*The project team engaged area agricultural producers and town officials to understand local flood risks.*



*Project team and collaborating state agencies met to tour the PALs at Tody Ravine.*

## 6. OUTCOME-BASED RESTORATION STRATEGIES

The Act 157 project emphasized achieving healthier hydrologic outcomes rather than focusing on individual practices. Combining innovative, low-tech, and structural approaches to address flood vulnerabilities offered an effective way to ensure restoration efforts fit within the modern landscape and meet landowner needs. Regulatory decision support tools are also needed to recognize and account for the diversity of flow paths in headwater settings.

## 7. EMBRACING INNOVATION AND LOW-TECH PRACTICES

The Act 157 project highlighted the effectiveness of innovative approaches, including low-tech, process-based practices such as Post-Assisted Log Structures (PALs), which are designed to restore natural processes. These practices were impactful and cost effective, but also faced regulatory challenges in part because these are not currently permitted practices in Wisconsin. The project demonstrated that while innovative methods can address complex hydrologic problems, the existing regulatory framework often struggles to accommodate and support these novel approaches.

## 8. IMPORTANCE OF FIELD-BASED DATA

In this project field-based assessments complemented spatially generated data, helping to identify vulnerable areas and evaluate restoration options to adapt to rapidly changing conditions. Balancing field-based insights with technical standards compliance is crucial for effective project design and implementation.

## 9. CHALLENGES WITH FLOODPLAIN REGULATIONS

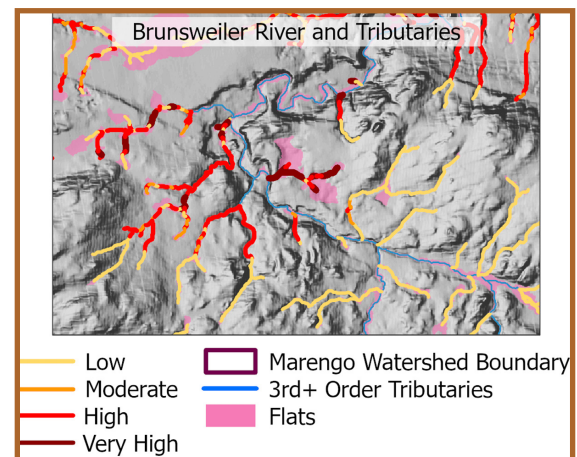
Complex regulations can hinder flood resilience projects. For example, the proposed replacement of the Berweger Road culvert faced obstacles due to timelines and costs associated with required flood insurance rate map amendments. Outdated floodplain data and rigid regulatory requirements remain significant challenges.

## 10. IMPORTANCE OF CONSERVATION PARTNERSHIPS

The work to be done surpasses what Ashland County can accomplish alone. Developing a shared vision with other regional organizations for supporting or nature-based solutions in Ashland County and the greater Wisconsin Lake Superior Basin has helped extend the possibilities and impact of proactive restoration.



*The project team met with landowners and elected officials to discuss local flood risks, project goals, and regulatory challenges.*



*Spatially generated data and field-assessments identified vulnerable areas within this area and inform future natural flood management work sites.*

# Recommendations

Building upon the key findings and lessons learned from the Act 157 projects, the project team identified various needs and opportunities that could improve incentives to protect and restore wetlands, streams, and floodplains to increase flood resilience. The recommendations below reflect those most immediately actionable.

## 1. ADVANCE STATE STRATEGIES

Degraded hydrologic conditions are pervasive in Ashland County and throughout much of the state. Many opportunities exist to utilize nature-based solutions to reduce flood risks, and Wisconsin should embrace initiatives that can help us realize more of this important work.

- Maintain or increase funding for the statewide Pre-disaster Flood Resilience Grant, which was funded at \$2 million in the 2023-25 state budget. This state-directed program helps communities assess flood vulnerabilities and plan and implement hydrologic restoration projects that reduce flood risks.
- Incorporate a strategy for restoring hydrology to reduce flood risks and damages into the 2026 State Hazard Mitigation Plan update.
- Review existing DNR/DATCP grant programs to create incentives for hydrology-focused assessment and restoration, which yields benefits for flood resilience, water quality, and fish and wildlife habitat.

## 2. BUILD CAPACITY

Proactive nature-based flood resilience work is rare due to a lack of dedicated staff, time, data, and understanding of how to go about these efforts at a stream-reach or catchment scale. In addition to the recommendations below under “Data,” we need to build workforce capacity incrementally.

- Consider adjustments to the Soil and Water Resource Management program to support counties interested in hydrologic restoration at the stream or catchment-scale by enabling multi-site and multi-year projects.
- Explore opportunities to increase access by Wisconsin’s rural communities to hydrologic engineering services for restoration work (e.g., public private partnerships).
- Create opportunities for counties and Tribes that have adopted proactive flood risk reduction strategies in their Land and Water Resource Management Plan or Hazard Mitigation Plan to receive funding for identifying and implementing restoration opportunities at a catchment or stream-reach scale.

## 3. IMPROVE DATA DEVELOPMENT AND DISTRIBUTION

Lacking appropriate data and patchwork approaches to data development can require time, expense, and technical expertise to adjust. To be strategic about restoring hydrology to reduce flood risks, Wisconsin should invest in baseline data useful for watershed-scale vulnerability assessments and scoping and designing hydrologic restoration projects.

- Invest in data that helps identify and evaluate flood risks and strategically prioritize restoration opportunities. Examples of this data include: hydro-enforced digital elevation models; better mapping and characterization of headwater streams and wetlands; streamflow conditions from gages; and improved flood models.



- Develop decision support tools that help engineers understand dynamic landscape characteristics and predict (and/or quantify) potential restoration responses related to water movement, storage, infiltration, and other hydrologic connections.
- Regulatory decision support tools such as the Stream Quantification Tool need to be adapted to better support restoration of headwater systems of multiple small channels or no channel at all.

#### **4. IMPROVE AGENCY COORDINATION:**

**It can be difficult to navigate the various programs, roles, and responsibilities involved in project review. Develop efficient approaches for inter- and intra-agency coordination and collaboration with project partners on complex hydrologic restoration projects.**

- Develop streamlined approaches for coordination on projects enabled through new policies such as the Pre-Disaster Flood Resilience Grant, new ATCP 50 Hydrologic Restoration and Stream Restoration practices, and Hydrologic Restoration General Permit. These approaches should enable the project to efficiently move through project scoping, design, permitting, and construction with a shared vision and continued focus on project outcomes. Operationalize this coordination in Memoranda of Understanding between WDNR and implementing agencies. (i.e., DATCP)
- Consider assigning a field integration team that includes the relevant state agencies and programs to improve coordination on large or complex hydrologic projects. This team should be transparent to the applicant, invite the applicant to key meetings, and remain focused on project outcomes.

#### **5. REFORM REGULATIONS:**

**Restoration projects can be altered or abandoned due to regulatory complexity. Restoring hydrology requires effective and efficient permitting processes that make sense in the context of project outcomes and the urgency of flood risks.**

- Review regulations in neighboring states to identify potential policy improvements, and update Wisconsin policies to better enable hydrologic restoration in regulated waters. Recommended topics to examine include:
  - i. The ability to use channel-spanning structures in stream and floodplain restoration without triggering dam safety regulations (i.e., when through-flow is maintained, absence of at-risk structures downstream, etc.);
  - ii. Exemptions from engineering analysis and floodplain permit requirements for projects designed to increase floodplain connectivity and storage along the small tributaries of rivers;
  - iii. Regulatory treatment of erosion-induced drainage features with no or uncertain stream history; and
  - iv. Cost-effective approaches to using best available data (i.e., dynamic 2D models) and tools for hydrologic and hydraulic analyses and engineering when mapped base flood elevations are tied to outdated models.
- Support efforts to change federal flood insurance program policies to reduce the regulatory burden on restoration projects in mapped floodplains. Changes should recognize the risk reduction benefits of restoration. Increases in base flood elevation may be a necessary and desirable outcome of reestablishing floodplain connectivity. There needs to be a more cost-effective and efficient process for the review and approval of projects that reduce risk and pose no risk to structures and nearby landowners.