HEALTHY SOILS & HEALTHY WATERS

A Community Strategy for the Eau Claire River Watershed

July 10, 2017

WCWRPC
WEST CENTRAL WISCONSIN
REGIONAL PLANNING COMMISSION

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Subject: DNR and EPA determination that Eau Claire Watershed Plan is consistent with 9 Elements - 07-10-2017

Importance: High

Chris Straight, County Conservationists, and others:

Congratulations.

We (WDNR and EPA Region 5) are pleased to confirm today that the Eau Claire River Watershed Plan is consistent with all 9 elements (see specific watershed names and locations from plan below).

The final draft Eau Claire Watershed Strategy we approved is available online – use links within ORANGE box at top of page: http://wcwrpc.org/Eau-Claire-Watershed-Plan.html

The Eau Claire River watershed (HUC 0705006) is now eligible for grants using federal section 319 funds. This determination also confirms you have met a DNR 2015 grant contract proposal to develop and approved 9 Key Element plan for this watershed (see pdf attachment below)

HEALTHY SOILS & HEALTHY WATERS: A COMMUNITY STRATEGY FOR THE EAU CLAIRE RIVER WATERSHED

Prepared by:
Eau Claire River Watershed Coalition

With assistance by:
West Central Wisconsin Regional Planning Commission
Land Conservation Departments of Eau Claire, Clark, Chippewa, Taylor, and Jackson Counties
Olson Environmental Research, LLC
Wisconsin Department of Natural Resources

Final Draft completed:
July 13, 2016

EPA & WDNR approval:
July 10, 2017

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The Eau Claire River Watershed Coalition guided the development of this Watershed Strategy. The issues, ideas, goals, strategies, and priorities within this plan originated with the Coalition members and participants during the public discussion meetings.

Who is the Coalition?

The Coalition is a network of residents, landowners, lake groups, farmers, governmental bodies, and various other stakeholder groups located or working within the Eau Claire River Watershed. The Coalition is about people. It is a way to bring the watershed community together to engage in a discussion, share resources, and build the capacity of stakeholders to address our soil health and water quality issues and opportunities. Everyone is welcome.

Why Create a Coalition?

The idea of forming a Coalition for the Eau Claire River Watershed originated with the Lake Eau Claire District and Association who promoted the Coalition's formation through their webpage (http://www.lakeeauclaire.org/ecrw-coalition). As their webpage states, "[t]here is a growing awareness that there are many benefits to developing a formal coalition between the various lake associations (districts), other government bodies, and other organizations such as nonprofits which share the responsibility for protecting and rehabilitating the whole river basin."

This idea is not a new one. Within the watershed, the Mead Lake and Watershed Partnership was formed in 2008 with the mission "to create and implement strategies to raise awareness of the interdependent link between people, land and water, and to protect and restore Mead Lake and its watershed in order to preserve the ecological, recreational and aesthetic value of these resources for future generations." And we only need to look to our west to see similar such coalitions for the Red Cedar River and St. Croix River watersheds.

Role of the Coalition

During Fall 2015, Coalition members completed a web-based survey that provided the following guidance regarding the long-term role of the Coalition:

- 93% agreed that the Coalition should have an active role in monitoring progress on implementation of the watershed plan.
- Only 43% agreed that the primary role of the Coalition should be coordination, information sharing, and education, rather than actively managing pollutant-load reduction projects.
- 57% agreed that the Coalition should be a more "organic", less formal entity working to nurture relationships between stakeholders.
- Only 36% agreed that the Coalition should be a formal organization with bylaws, a committee/board structure, and potentially be incorporated as a non-profit

Initial Structure of the Coalition

The following is the initial structure for the Eau Claire River Water Coalition:

- The Coalition, overall, should be community-led, relying on the volunteer efforts of its members, with technical support and guidance from governmental agencies as resources allow. The Coalition is the entire watershed community (public and private sectors, residents, and other stakeholders) working together to realize the vision and goals of this plan
- All members of the Coalition have a responsibility to provide support to the Coalition's activities. For the Coalition to be a success, active participation by everyone is vital; all of the work cannot fall on the shoulders of one group or a small number of individuals.

THE EAU CLAIRE RIVER WATERSHED COALITION

- Initially, the Coalition would be less formal, without robust by-laws and would not be incorporated. However, this could change over time as the Coalition develops. Again, the role of the Coalition is to foster community networking and coordination.
- The Coalition has the opportunity to create a "recognizable face" for soil health and water quality in the watershed that is community-led and is not limited by municipal or county boundaries. While the Coalition may be less formal in structure, it may want to create a logo, branding, etc., to build name recognition and increase awareness. There are many stakeholders in the watershed that support the vision and goals of this Watershed Strategy, but currently are unaware of the Coalition.
- Coordination of the Coalition's activities (and the implementation of this plan), at least initially, will be led by a Watershed Coalition Plan Implementation Team. It is envisioned that the Team will include representation from 13-30 key stakeholder groups from across the watershed and may grow over time. The County Land Conservation Departments, lake associations/districts, and representatives from the agricultural community will be core Team members, with additional participation from watershed residents and other stakeholder groups as discussed later in this plan.
- Initially, quarterly Plan Implementation Team meetings are envisioned, including an annual meeting of the overall Coalition at which time progress on the Watershed Strategy will be reviewed. A Plan Implementation Team Coordinator will help facilitate communication and coordinate meetings. Funding will be pursued to fund the Coordinator's time and allow the development of initial infrastructure and outreach materials for the Team and overall Coalition.
- The Coalition may create and delegate to work groups to address specific topics and tasks, such as the Citizen-Led Monitoring Group recommended later in this plan.

EAU CLAIRE RIVER WATERSHED COALITION ROLE

The Eau Claire River Watershed Coalition will take a lead advocacy and coordinating role for good soil health and water quality in the watershed, including the following activities:

- Create and maintain a shared vision, goals, and strategies (the Watershed Strategy) to address soil health and water quality issues in a citizen-led, bottom-up fashion;
- Foster partnerships, build relationships, share experiences, and encourage discussion among the entire watershed community;
- Coordinate projects and leverage resources;
- Educate, raise awareness, nurture a “water ethic”, and build community capacity to address our shared soil health and water quality issues;
- Recognize that everyone in the watershed has a shared responsibility to address our soil health and water quality issues;
- Take an active role in coordinating the implementation of this Watershed Strategy, advocate for the plan’s goals and strategies, and monitor the plan’s progress; and,
- Continue to reach out to additional watershed community members and stakeholder groups to invite them to become active members of the Coalition.

SECTION I. INTRODUCTION

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A. WHY FOCUS ON THE EAU CLAIRE RIVER WATERSHED?

- As of Fall 2015, there are 143 miles of streams and 1,272 acres of lake or impoundment waters within the Eau Claire River Watershed that are 303(d) listed or proposed impaired waters. These waters do not meet Clean Water Act water quality standards.
- The Eau Claire River Watershed also boasts streams, natural areas, habitat, and scenic beauty that have not yet been significantly impaired, such as the 195 miles of Class I and Class II trout streams. This Watershed Strategy can help restore or protect these assets from degradation.
- The three lake districts within the watershed—at Lake Altoona, Lake Eau Claire, and Mead Lake—are located within three different subwatersheds, but have similar non-point source pollution challenges related to phosphorus and sedimentation. This Watershed Strategy provides an efficient approach to address shared water quality issues.
- Water quality planning requires a watershed-level approach. For example, nearly all of the Eau Claire River Watershed drains into Lake Altoona. To effectively address phosphorus at Lake Altoona, best practices and water quality improvements are needed further upstream, beyond Lake Altoona's immediate subshed.
- Prior to this Watershed Strategy, a watershed-wide community discussion on surface water quality had not occurred within the Eau Claire River Watershed. A coordinated, multi-jurisdictional effort was needed to bring together the five counties, municipalities, lake groups, and other stakeholders within the watershed to develop an efficient and effective strategy that leverages available resources and shares responsibility to meet common water quality goals.

B. WATERSHED STRATEGY SCOPE AND 9-KEY ELEMENT WATERSHED PLANNING

This Watershed Strategy was funded with Federal Section 319 funds and meets the EPA's minimum requirements for 9-key element plans. This has three primary implications for the scope of this effort:

- Section 319 of the Federal Clean Water Act focuses on non-point source (NPS) pollution, such as phosphorus run-off.
- 9-key element plans must have measurable estimates for NPS pollutant loading, expected load reduction, and progress indicators.
- This Watershed Strategy must meet the 9-key element requirements in order for NPS practices recommended in the plan to be eligible for Section 319 grant dollars. The grant programs funded, in part, by Section 319 dollars are identified in Appendix B.

The 9-key elements are addressed within this Watershed Strategy in order to reduce phosphorus impairments on our streams, rivers, and lakes. Sections IV and VIII include measurable, estimated phosphorus pollutant loading, load reductions, and 10-year milestones, as well as related measurable milestones.

During the planning process, watershed residents requested that this strategy go beyond the minimum 9-key element requirements to include fisheries, habitat health, and invasive species. And for many residents and lake groups, sedimentation was equally (if not more) important than phosphorus.

SUMMARY OF THE 9-KEY ELEMENT PLAN MINIMUM REQUIREMENTS

1. Identify causes & sources of pollution
2. Estimate pollutant loading and expected load reductions
3. Describe management measures to meet load reductions and target critical areas
4. Estimated amounts of technical & financial assistance and relevant authorities
5. Information & education component
6. Implementation Schedule
7. Interim, measurable milestones
8. Indicators to measure progress
9. Monitoring component

While sedimentation, fisheries, and habitat are important to watershed residents, the watershed currently lacks measurable, baseline data and estimates for these issues. It was not feasible to develop target objectives and indicators for these at this time.

Instead, the Coalition decided upon an "additional inherent benefits" approach. The plan recommendations that will address phosphorus will also benefit sedimentation, fisheries, and habitat. For example, we need to address sedimentation if we intend to address phosphorus loading. And the practices that decrease run-off, reduce nutrient loading to our waters, and protect shoreline areas will benefit our fisheries and habitat. As such, these "sub-objectives" are treated within this plan as additional inherent benefits that will be realized as phosphorus loading is addressed.

C. A CITIZEN-LED PLANNING APPROACH

In coordination with the Wisconsin Department of Natural Resources, lake groups, West Central Wisconsin Regional Planning Commission (WCWRPC), and other county land conservation departments (LCDs), the Eau Claire County Land Conservation Division secured grant funding in late 2015 to develop this Watershed Strategy. The proposed project envisioned the creation of a 9-key element plan focusing on phosphorus and sedimentation pollutant loading under the guidance of a Coalition that included:

- Lake Groups, watershed residents, farmers, municipal officials, and other stakeholder groups
- County LCDs, NRCS, and FSA representatives (general guidance and identification of current/projects BMPs)
- Wisconsin DNR staff (technical guidance and phosphorus targets/modeling)
- UW-Extension Agricultural Agents and Natural Resources Educator (overall guidance)
- Olson Environmental Research, LLC (EVAAL & STEPL modeling)
- UW-Stevens Point—Center for Land Use Education (sociological survey)
- WCWRPC (plan facilitation and development)

At the project kick-off meeting in February 2015, stakeholders from throughout the watershed came together to discuss the project scope and planning process. These initial Coalition members stressed that this should be a bottom-up, citizen-led planning effort. With this in mind, the following approach was used to develop this plan:

- A diverse steering committee (the Eau Claire River Watershed Coalition) guided the development of the plan through eight full group meetings. Everyone was welcome to participate.
- At its first full meeting in April 2015, the Coalition spent considerable time identifying stakeholders, messaging, and other public engagement ideas. Following the meeting, efforts were made to invite a wide variety of stakeholders to join the Coalition's effort.
- Ad hoc work groups were formed to guide the development of the fisheries & habitat section and the civic leadership, citizen engagement, and capacity-building strategies.
- A MailChimp e-mail list and a project webpage was developed to facilitate communications with Coalition members and

interested stakeholders.

- Three community discussion meetings were held in Summer 2015, in addition to numerous additional presentations and meetings with local officials, lake districts, graziers groups, conferences, etc., throughout the process.
- A farmer sociological survey was performed and the plan includes a strong sociological and civic governance component.
- A number of press releases were issued and other outreach activities were conducted during the process.
- Coalition members participated in a web-based goal-setting and strategy survey.
- Existing watershed and lake management plans were reviewed and integrated into this document in a bottom-up fashion (see Appendix A and C).

This bottom-up, citizen-led planning approach required significantly more educational and discussion time than more traditional, top-down models and more effort than what was envisioned under the original project scope of work. We believe the plan and the Coalition is much stronger for these efforts.

D. PLAN TENETS

Early in the planning process, the Coalition identified the following guiding tenets for this watershed planning effort:

- While this plan's focus is on phosphorus and sedimentation, the plan should be comprehensive and address other water quality issues, including fisheries, habitat, wetlands, and invasives.

- The plan should address water quality for streams within the entire watershed, and not just the Eau Claire River and on major lakes.
- The top-down, regulatory-based approaches of the past have not worked. A new, social-based approach is needed that emphasizes civic leadership, soil health, and the economic value of our surface waters.
- The plan needs to have honest and realistic goals and strategies.
- Incorporate, reference, and support existing water quality plans from the watershed; do not repeat them.
- This should be a citizen-led planning effort. The vision, goals, and plan recommendations should largely come from the ideas of watershed residents. Coalition members were invited to take an active role in writing the plan.
- The Coalition should have a long-term role in helping to implement the plan. The Coalition can grow over time and everyone has a role in helping to build the Coalition.
- As a society, we have helped create the current problems over many decades. Everyone has a responsibility to help address our shared water quality issues. The public sector cannot do it alone; partnerships and collaboration are vital. Positive change will take time and effort involving the entire watershed communtiy.

SECTION II: OVERVIEW OF THE EAU CLAIRE RIVER WATERSHED

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A. WATERSHED DYNAMICS

i. The Water Cycle

Earth's water is always in movement, and the natural water cycle, also known as the hydrologic cycle, describes the continuous movement of water on, above, and below the surface of the Earth. Water is always changing states between liquid, vapor, and ice, with these processes happening in the blink of an eye and over millions of years. The precipitation that falls to earth is collected within a watershed.

A watershed is an area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel. The word watershed is sometimes used interchangeably with drainage basin or catchment and is an area which consists of surface water lakes, streams, reservoirs, wetlands, and all the underlying ground water.

While watersheds are precipitation collectors, not all precipitation that falls in a watershed flows out. There are many factors that determine how much water flows in a stream and include components of the water cycle such as:

- ***Precipitation***
- ***Infiltration***
- ***Evaporation***
- ***Transpiration***
- ***Storage***
- ***Water use by people***

In the Eau Claire River Watershed, our streams, rivers, and lakes are fed primarily by precipitation, surface water runoff, and groundwater. Our cool groundwater springs are particularly

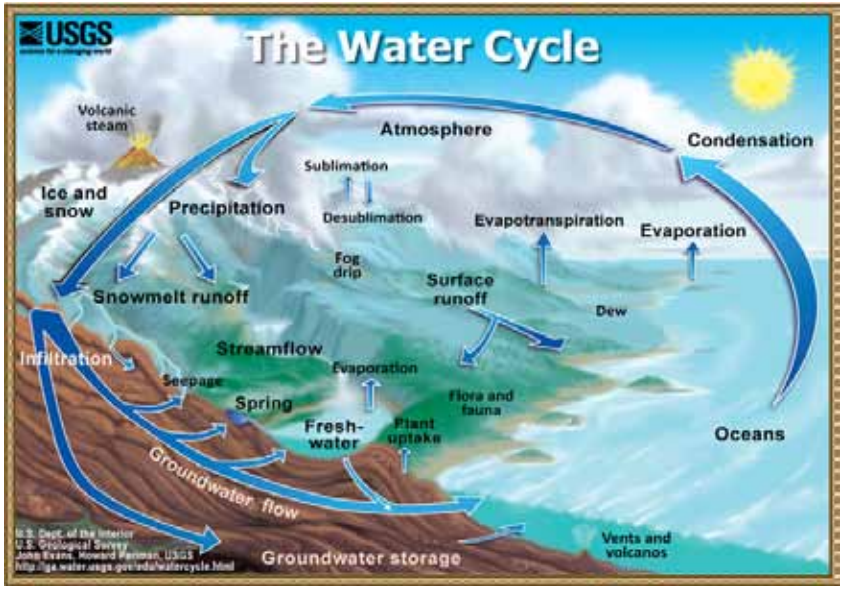


Figure 1: *The graphic above helps to illustrate the dynamics and complexity of the water cycle. The process begins with precipitation as water moves through the cycle in various forms and processes. This includes the important relationship between groundwater and surface water.*

important water sources for many of our smaller streams that are highly vulnerable to changes in land use, soil health, and surface water runoff.

Watersheds are important because the streamflow and water quality of a river or lake are affected by things, human-induced or not, happening in the land area "above" the river outflow point. In the past, management of water resources traditionally focused on surface water or ground water as if they were separate entities. As development of land and water increases however, it is observed

that both resources are affected by the quantity and quality of the other since nearly all surface water features interact with groundwater (USGS, 2013).

Of all freshwater on earth, only .007 percent composes surface water for human use, while 30 percent is located in the ground. As changes occur in the water cycle, these changes impact the quality (e.g. chemistry, temperature, pollutant load) and quantity (e.g. depth, peak flows, flooding) of both surface and groundwater. For example, contaminated aquifers that discharge to streams can result in long-term contamination of surface water; conversely, streams can be a major source of contamination to aquifers.

ii. HUC's - We're Part of Something Bigger

The Eau Claire River Watershed is part of the larger, Upper Mississippi River Basin, which is home to approximately 30 million people with three major cities and many smaller cities and towns. Forests and lakes in the northern headwaters and highly productive agricultural land to the south dominate the landscape. An extensive series of locks and dams regulate water levels on the Mississippi River south of Minneapolis and St. Paul, Minnesota, and on the Illinois River, providing navigation on the Mississippi River and to the Great Lakes through Chicago, Illinois.

The United States is divided and sub-divided into successively smaller watersheds, which are classified into different geographic levels. Each watershed is identified by a unique hydrologic unit code (HUC) consisting of two to twelve digits, depending on the level of the hydrologic unit.

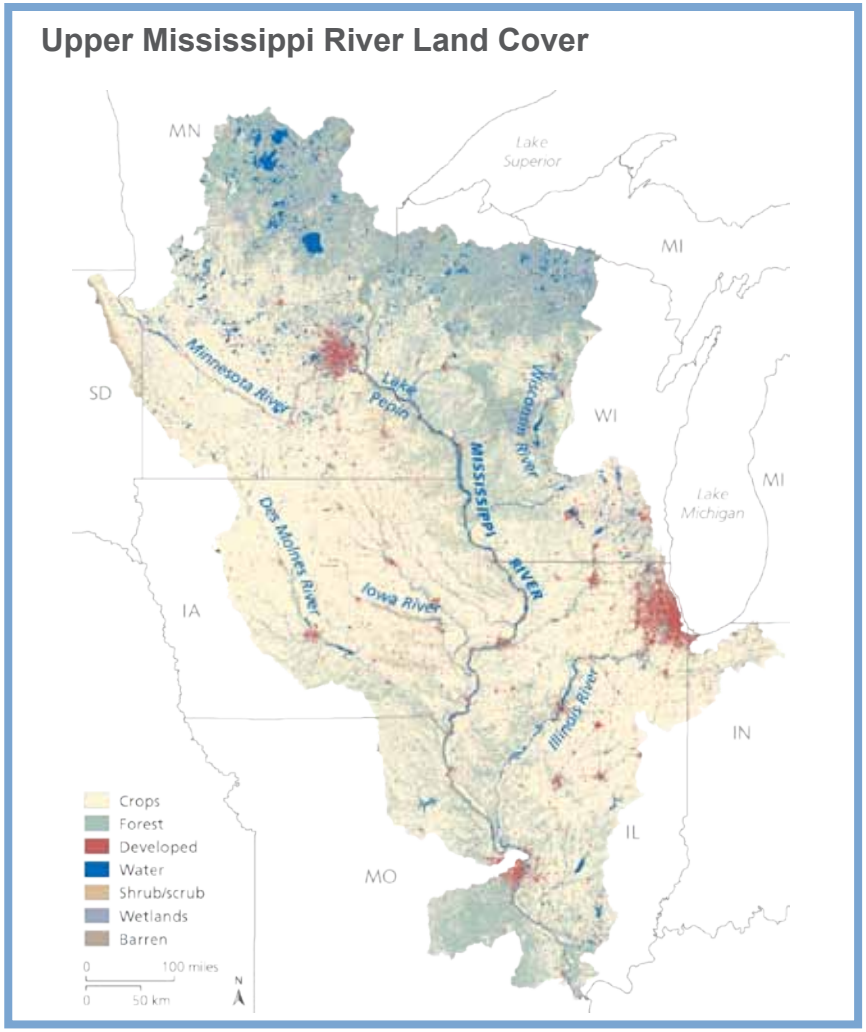


Figure 2: *Land cover map of the Upper Mississippi River Basin. Over half of Wisconsin lakes and streams flow into this system. Intense agricultural use and large population centers contribute to poor water quality and wetland losses (America's Watershed Initiative, 2015).*

SECTION II. OVERVIEW OF THE EAU CLAIRE RIVER WATERSHED

The relationship of the Eau Claire River Watershed and its subwatersheds to the Upper Mississippi River Region is best illustrated with the nested list showing the name and HUC of each smaller hydrologic unit shown below.

WATERSHED CLASSIFICATION	
NAME	HUC (2-10)
Upper Mississippi Region	07
Chippewa River Basin	0705
Eau Claire River Watershed	07050006
North Fork-Eau Claire River (LC 17)	0705000601
South Fork-Eau Claire River (LC 16)	0705000602
Black & Hay Creeks (LC 15)	0705000603
Otter Creek (LC 25)	0705000604
Lower Eau Claire River (LC 14)	0705000605

The waters of the higher-numbered HUC's contribute to the lower-numbered HUC's downstream. The surface water pollutants we are dealing with in the Eau Claire River Watershed, such as phosphorus and sedimentation, combine with those of other watersheds as the Mississippi River flows towards the Gulf of Mexico.

The results of this downstream accumulation of nutrients and other pollutants is an ecological disaster known as the Gulf of Mexico Hypoxic Zone. This is an area along the Louisiana-Texas coast in which water near the bottom of the Gulf contains less than 2 parts per million of dissolved oxygen, causing a condition referred to as hypoxia. Hypoxia can cause fish to leave the area and can cause stress or death to bottom dwelling organisms that can't move out of the hypoxic zone. The most extreme effects of hypoxia are fish kills. More common effects include shifts in spatial distribution and emigration. The potential impact of worsening hypoxic conditions could be the decline of ecologically and commercially important fisheries and other aquatic species such as brown shrimp.

The American Watershed Initiative Report Card was developed over two years ago with significant input from hundreds of experts and stakeholders throughout the watershed and nation. The report card measures six goals for which the Upper Mississippi River Basin received an average of a C grade with a D+ grade of the overall Mississippi River Watershed.

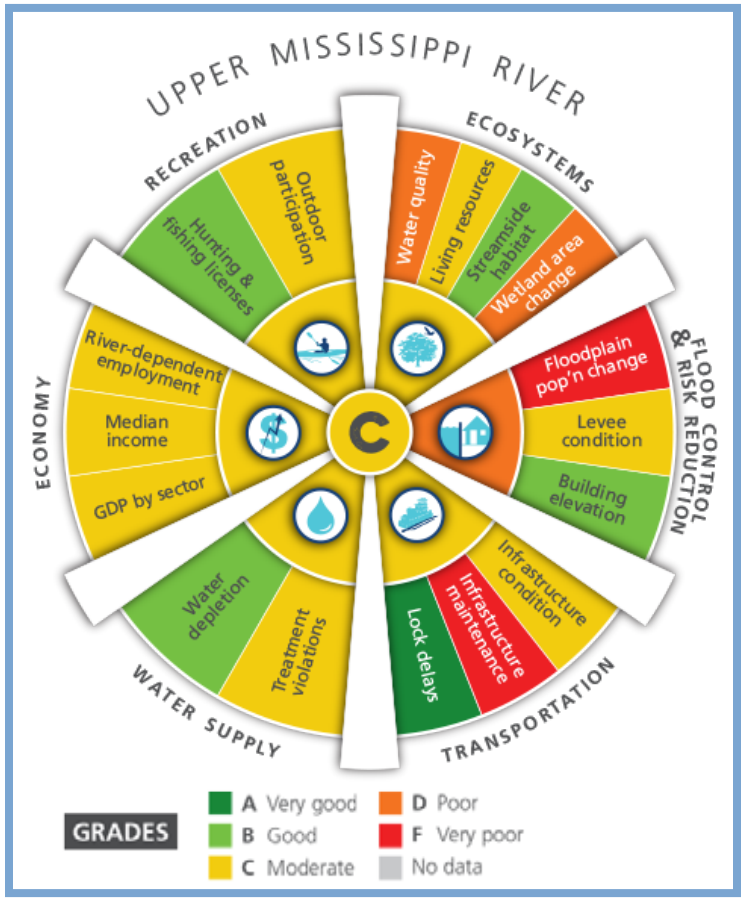


Figure 3: *This paddlewheel shows the report card grades for indicators in each of the six goals for the Upper Mississippi River Watershed.*

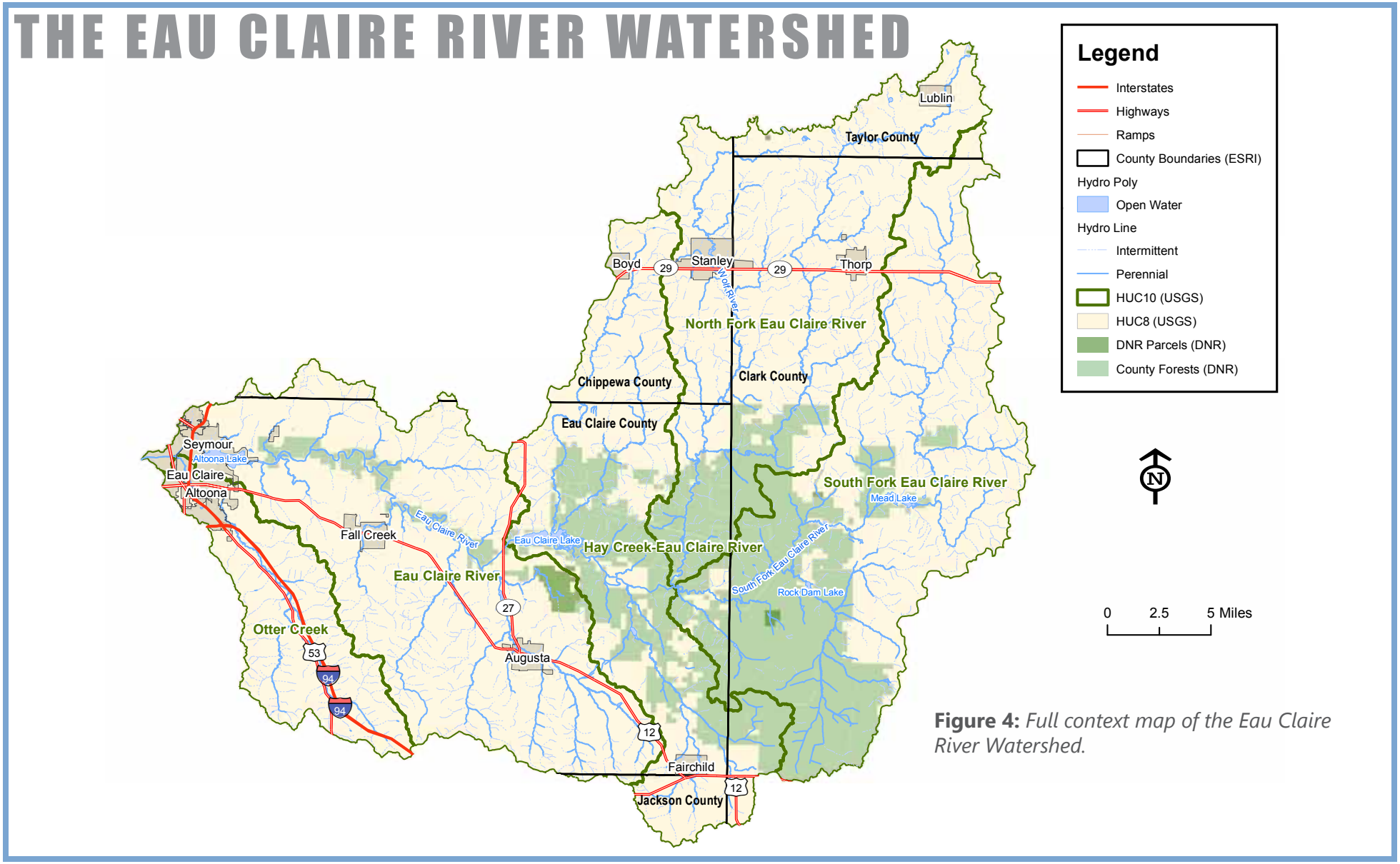


Figure 4: *Full context map of the Eau Claire River Watershed.*

B. EAU CLAIRE RIVER WATERSHED (HUC 8)

i. General Location

The Eau Claire River Watershed is located in west-central Wisconsin and covers an area of 882 square miles or approximately 564,536 acres. The largest administrative areas within the watershed include Eau Claire County (47 percent), and Clark County (38.5 percent). The watershed also covers portions of Chippewa County (9 percent), Taylor County (3.8 percent) and Jackson County (1.5 percent).

As part of the larger Lower Chippewa River Basin, the Eau Claire Watershed flows into the Chippewa River in northwestern Eau Claire County at the confluence of the Eau Claire River and Chippewa River in downtown Eau Claire. The watershed consists of five smaller watersheds (HUC 10) that are summarized in Section III of this plan.

ii. Ecological Landscapes

The Wisconsin Department of Natural Resources (WDNR) has defined 23 different Ecological Landscapes within Wisconsin (WDNR 2010). Ecological Landscapes are areas that differ from each other in ecological attributes and management opportunities. They have unique combinations of physical and biological characteristics that make up the ecosystem, such as climate, geology, soils, water, or vegetation. They differ in levels of biological productivity, habitat suitability for wildlife, presence of rare species and natural communities, and in many other ways that affect land use and management.

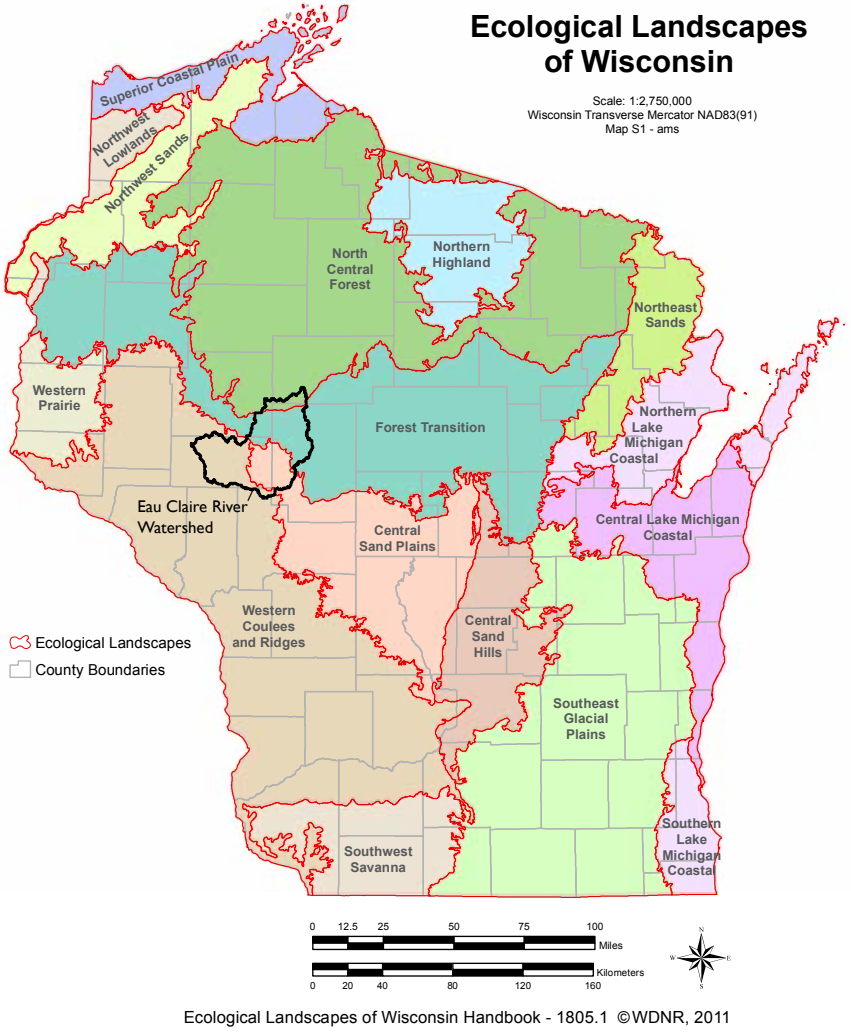


Figure 5: *Map of Wisconsin's Ecological Landscapes with the boundary of the Eau Claire River Watershed Shown to scale.*

SECTION II. OVERVIEW OF THE EAU CLAIRE RIVER WATERSHED

The Eau Claire River Watershed comprises four ecological landscapes in west-central Wisconsin:

ECOLOGICAL LANDSCAPES	
NAME	% of watershed
Forest Transition	34
Western Coulee & Ridges	34
Central Sand Plains	24
North Central Forest	7

The **Forest Transition** was entirely glaciated with moderately well-drained sandy loam soils derived from glacial till resulting in considerable diversity in the range of soil attributes. Prevalent landforms include till plains and moraines with postglacial erosion, stream cutting, and deposition formed floodplains, terraces, and swamps along major rivers.

The **Western Coulee & Ridges** ecological landscape is characterized by its highly eroded, unglaciated topography with steep sided valleys and ridges, high gradient headwaters streams, and large rivers with extensive, complex floodplains and terraces.

The **Central Sand Plains** represent an extensive, nearly level expanse of lacustrine and outwash sand that originated from a huge glacial lake characterizes much of the Central Sand Plains. Sand was deposited in Glacial Lake Wisconsin by outwash derived from melting glaciers to the north. Exposures of eroded sandstone bedrock remnants as buttes, mounds, and pinnacles are unique to this ecological landscape.

Landforms in the **North Central Forest** are characterized by end and ground moraines with some pitted outwash and bedrock-controlled areas. Kettle depressions are widespread and steep; bedrock-controlled ridges are found in the northern portion of the North Central Forest.

Historic vegetation in the watershed consisted of southern hardwood forests, oak savanna, scattered prairies, and floodplain forests and marshes along the major rivers. With Euro-American logging and settlement, most of the land on ridgetops and valley bottoms was cleared of oak savanna, prairie, and forest for agricultural purposes. The steep slopes between valley bottom and ridgetop, unsuitable for raising crops, grew into oak-dominated forests after presettlement wildfires were suppressed.

WETLANDS

State statutes define a wetland as “an area where water is at, near or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions.” Historically, the Eau Claire River Watershed included some of Wisconsin’s most extensive wetlands, especially within and on the margins of the old glacial lakebed.

Early in the 20th century, many of the wetlands west of the Wisconsin River were drained for agriculture and with the notable exception of commercial cranberry production, attempts to farm many of these areas failed. The high water table, low soil fertility, and growing season frost made agriculture in the area generally unsuccessful and these areas now make up significant portions of county forest land in both Clark and Eau Claire Counties.

Of the remaining wetland areas that were not converted to agricultural uses in the region, many have been partially restored

LOSS OF WETLANDS

As one Coalition member put it, "wetlands are the kidneys of our water system." Wetlands hold water like a sponge and help clean and filter our surface waters. They store floodwaters, prevent shoreline erosion, help maintain surface water flow during dry periods, and recharge our groundwater. They are also "biological supermarkets," providing food and habitat for many animal species, including fish and game animals important to outdoor recreation in our watershed.

Wisconsin has lost about 4.7 million of the 10 million acres of wetlands that were present in 1848, mostly from farm drainage and filling for development and roads. While the conversion of wetlands to other uses has slowed, they continue to be degraded and destroyed by stormwater runoff, sedimentation, invasive plants, and localized changes in natural drainage systems.

and in some areas constitute the core conservation areas of extensive public lands in the watershed. Based on the Wisconsin Wetland Inventory, there are over 96,000 acres of wetlands in the Eau Claire River Watershed.

Major wetland threats in the watershed today include hydrologic disruption, heavy grazing by domestic livestock, development, and the spread of invasive species. The latter have spread rapidly throughout some of our wetland communities in recent decades.

iii. History & Development of the Watershed

AMERICAN INDIAN SETTLEMENT

There is well-documented archaeological evidence of human habitation by various groups and cultures in the region as early as 11,000 years ago (Mason 1997). The ecological landscape has long been inhabited by Native peoples ranging from small, nomadic hunter-gatherer groups to more semi-permanent habitations associated with river systems and the advent of agriculture. Lakes and rivers in the watershed were sources of food, water, and transportation.

EURO-AMERICAN SETTLEMENT

During the 17th century, French fur traders, soldiers, and missionaries began arriving here. As a result of contact with the American Indian tribes, trading posts, missions and forts along river routes and lakes were established. During the 1800s, however, the tribes began ceding large chunks of land to the U.S. Government, and permanent Euro-American settlement began in earnest.

EARLY LOGGING ERA

Sawmills were first built along rivers in areas containing large stands of timber. Where the rivers made it difficult to float logs, lumbermen built mills as close to the cutting area as possible, while on easier rivers, sawmills were generally more centralized (Ostergren and Vale 1997). The continual westward surge of the agricultural frontier by Euro-Americans increased the demand for lumber from northern Wisconsin. Wisconsin also had the

advantage of an extensive network of waterways flowing south from the northern timber region. Wisconsin lumber production reached its annual peak at more than 3 billion board feet cut in 1892 (The Wisconsin Cartographer's Guild 1998).

Some of the more prominent mills in the region were located in Eau Claire, Chippewa Falls, La Crosse, and Menomonie and utilized mainly southern Wisconsin hardwood forest and oak savanna stands of timber.

EARLY AGRICULTURE

Along with logging, many Euro-American settlers in the region began farming well before 1850 when the first agricultural census data became available. In 1850, this region of the state had only 2,813 farms, but by 1890, this number had swelled to 44,074 (ICPSR 2007). As the logging industry established itself in the watershed, large areas of land were cleared, making land available for agricultural production. Populations and farm numbers continued to grow over time up until the 1930's when marginal farms were driven out of production or incorporated into larger farms during the Great Depression.

MODERN ERA (POST WWII)

Following World War II, a combination of the failure of many smaller marginal farms, subsequent consolidation, and mechanization increased the average size of farms in the region, much as it did in the state as a whole. That trend continued throughout much of the remaining 20th century while the type of farming underwent some fundamental shifts as Wisconsin became a national leader in the growing dairy industry.

iv. Climate

Climate and weather are not interchangeable. Weather is a short-term atmospheric condition that may last a few minutes or even months. Climate is the atmospheric condition that is averaged over a much longer time, usually in years or even decades.

Regardless of the debate over the causes of climate change, there is substantial evidence that Wisconsin's climate is indeed changing. The 2003 report entitled Confronting Climate Change in the Great Lakes Region published by the Union of Concerned Scientists and the Ecological Society of America projected that by 2030, summers in Wisconsin may resemble those in Illinois overall, in terms of temperature and rainfall. By 2100, the summer climate will generally resemble that of current-day Arkansas and the winter will feel much like current-day Iowa.

To further document these climate changes and explore their impacts on our State, the Wisconsin Initiative on Climate Change Impacts (WICCI) was formed as a collaborative effort of the University of Wisconsin and the Wisconsin Department of Natural Resources. Findings from WICCI anticipate that future climate projections will affect the state's water resources in both quality and quantity.

The two driving forces of climate change affecting water resources are increased temperatures and shifting precipitation patterns. Climate models forecast that Wisconsin's temperature will increase in all four seasons, with the greatest increase in winter. These changes in temperature and precipitation will affect Wisconsin's water cycles, with major impacts on lakes, streams, groundwater, and wetlands.

Change in Annual Average Temperature (°F) From 1950 to 2006

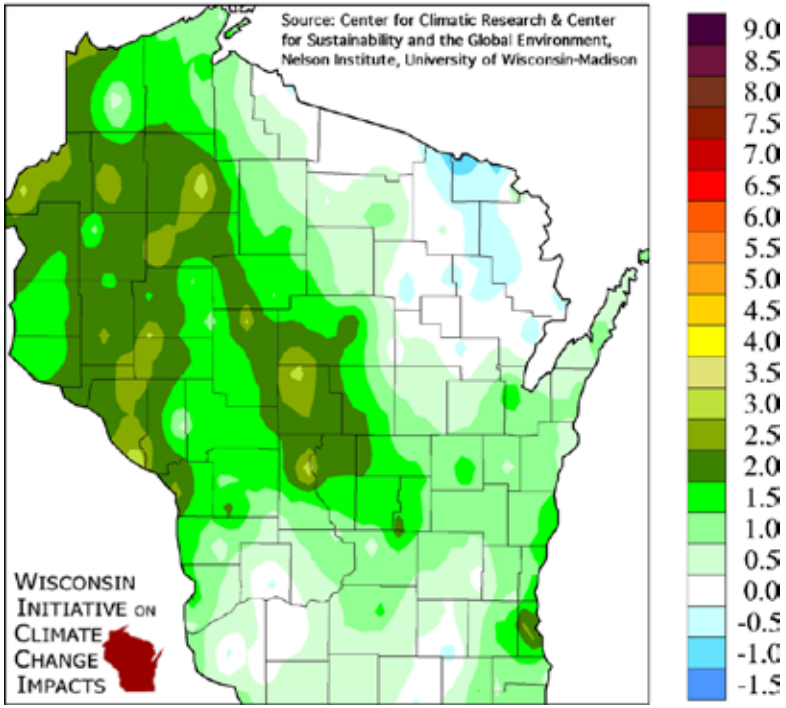


Figure 6: *Except for northeastern Wisconsin, most of Wisconsin has warmed since 1950. Averaged across the state, the warming has been +1.1°F, with a peak warming of 2-2.5°F across northwestern Wisconsin. Wisconsin is becoming "less cold," with the greatest warming during winter-spring and nighttime temperatures increasing more than daytime temperatures. This trend can increase evapotranspiration and impact the temperature of our surface waters, along with impacting flora, fauna, and invasives.*

Projected Change in the Frequency of 2" Precipitation Events (days/decade) From 1980 to 2055

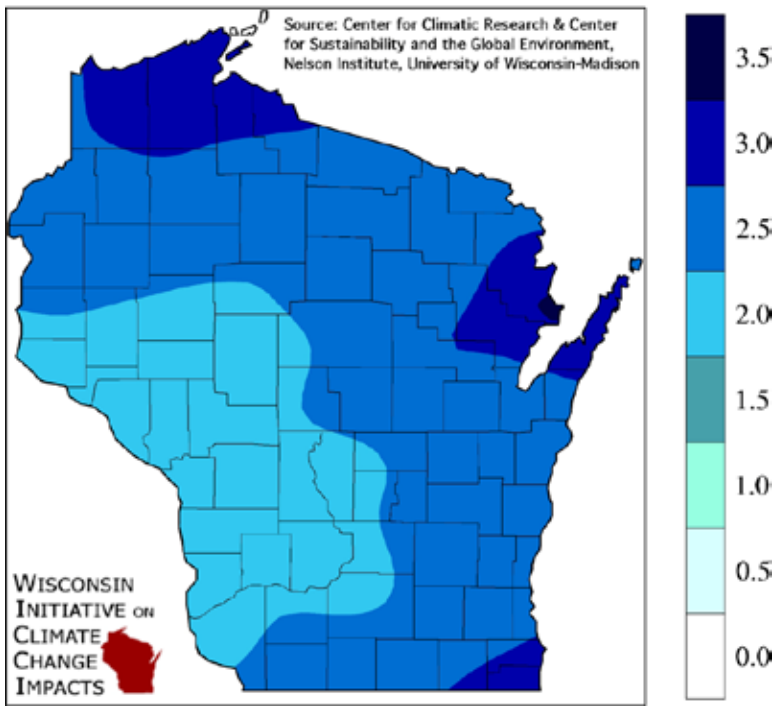


Figure 7: *Typically, heavy precipitation events of at least two inches occur roughly 12 times per decade (once every 10 months) in southern Wisconsin and 7 times per decade (once every 17 months) in northern Wisconsin. Based on one emission scenario, by the mid-21st century, Wisconsin may receive 2-3 more of these extreme events per decade, or roughly a 25% increase in their frequency. This trend can increase the frequency of "peak flow" events, resulting in more flooding, runoff, and bank erosion.*

Some of the physical responses we can expect to see include:

- **Increased average surface water and groundwater temperatures**
- **Shorter periods of ice cover on lakes and streams**
- **Decreases in the thickness of lake ice cover**
- **Increased evapotranspiration rates during the longer growing seasons**
- **Increased number of freeze-thaw events**
- **More groundwater recharge due to increases in winter and spring precipitation**
- **Changes in recharge and discharge based on whether precipitation falls as rain or snow**
- **Increased number of high water events causing flooding and more peak flow events (increased surface runoff, bank erosion, sedimentation)**
- **Changes in water biochemistry when water levels are low during drought-like conditions/events**

v. Demographics & Economics

According to the 2010 U.S. Census, there are an estimated 48,937 people living and consuming water resources within the watershed boundary, with a population density of around 55.5 persons per square mile. A significant portion of the residents in the watershed however, live in the Cities of Eau Claire and Altoona - 20,873 people (Source: ESRI).

Population of the watershed without these two urban cities is 19,813 people (Source: ESRI), with a population density of 22.5 persons per square mile. This translates to roughly 43 percent of the Eau Claire River Watershed population that lives in the cities of Eau Claire and Altoona, a 12 square mile area that is equivalent to 1 percent of the total watershed.

POPULATION CHANGE

Population	Year
44,160	2000
48,937	2010
49,997	2015

The Eau Claire River Watershed is mostly composed of rural communities that have increasing dependency on urban centers for the bulk of local economic output. Population is growing in urban areas while the population in rural areas is getter older, becoming smaller, and experiencing decreased economic activity. Throughout the watershed, counties are especially dependent on government, manufacturing, health care and social services, retail trade, and tourism for the majority

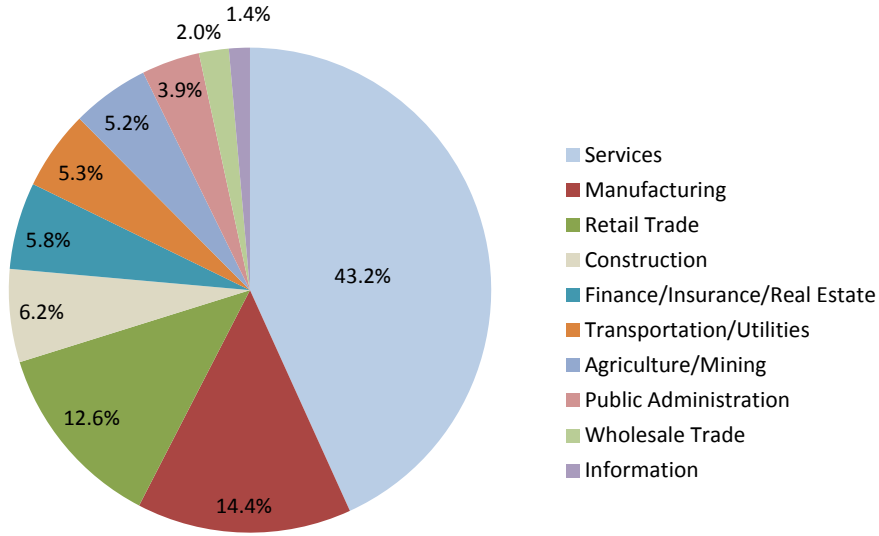


Figure 8: *The pie chart shows 2015 employment by industry for individuals age 16 or higher in the Eau Claire River Watershed, U.S. Census Bureau, Census 2010 Summary File 1 with ESRI 2015 forecast.*

of jobs. This area is experiencing a net in-migration of retirement age adults and out-migration of young adults, with negative implications for the available workforce.

Throughout the watershed, most counties' economies perform below the statewide averages along with having lower per capita income. Agriculture remains an important part of the local economy, but most economic growth appears to be occurring in tourism-related and service-oriented sectors. This includes a growing increase in recreational economies and higher levels of government jobs and service jobs compared to other areas of the state.

vi. Land Use

The Eau Claire River Watershed is mostly rural and land cover consists of large contiguous areas of forest and agricultural land. Human land use consists primarily of agriculture, home development, and timber harvest. Other uses include the long-term conversion of land to roads, buildings, and utility corridors. Water impoundments dot the landscape along major rivers that were originally constructed as restoration facilities to increase waterfowl habitat. Today, these impoundments continue to serve as habitat for several species while also providing year-round recreation opportunities for campers, boaters, and anglers. Shoreland property is also popular for both primary and secondary home development.

Land cover survey data from 2006 identifies forest (45 percent) and cropland (35 percent) as the primary types of land cover in the Eau Claire River Watershed.

Predominant land covers can vary significantly by subwatershed. For example, just over 20 percent of the total land base in the Watershed is public stewardship land, largely consisting of county forest, with over half of the South Fork-Eau Claire and Black-Hay Creek subsheds being forested. But at the HUC 12 subshed level, some areas are over 70 percent forested, while others have over 70 percent of its land cover in croplands

The following tables show HUC 12 land cover for each of the five subwatersheds in the Eau Claire River Watershed. This is also reflected in the map shown in Figure 10.

LAND COVER - EAU CLAIRE RIVER WATERSHED (ACRES)

North Fork Eau Claire River	Urban	Cropland	Pastureland	Forest	Water	Others
Headwaters	1,100	11,704	56	7,655	106	1,550
Goggle-Eye Creek	1,455	13,141	634	2,391	42	466
Sterling Creek	620	7,545	314	6,186	2	390
Little Otter Creek-Wolf River	1,668	14,737	81	5,684	95	901
Wolf River	1,228	17,986	733	8,172	29	728
Simes Creek	319	693	185	9,696	5	1,707
North Fork Eau Claire River	298	211	59	10,368	8	1,060
TOTAL	**6,688**	**66,017**	**2,062**	**50,152**	**287**	**6,802**
PERCENT	**5%**	**50%**	**2%**	**38%**	**0%**	**5%**

Figure 9: *Land cover by HUC 12 for the North Fork Eau Claire River subwatershed.*

SECTION II. OVERVIEW OF THE EAU CLAIRE RIVER WATERSHED

LAND COVER - EAU CLAIRE RIVER WATERSHED (ACRES)						
South Fork Eau Claire River	Urban	Cropland	Pastureland	Forest	Water	Others
Headwaters	719	10,318	359	2,313	23	697
St. Hedwig Cemetery	904	13,431	1,046	2,568	4	238
Norwegian Creek	563	6,663	686	9,307	10	532
Black Creek	419	1,626	173	7,337	-	216
Mead Lake	671	6,110	353	6,522	334	286
Hay Creek	882	4,296	362	27,893	140	5,654
Dickison Creek	186	888	228	9,734	13	1,302
South Fork Eau Claire River	315	66	8	16,857	66	4,147
TOTAL	**4,659**	**43,398**	**3,215**	**82,531**	**590**	**13,072**
PERCENT	**3%**	**29%**	**2%**	**56%**	**0%**	**9%**

Figure 10: *Land cover by HUC 12 for the South Fork Eau Claire River subwatershed.*

LAND COVER - EAU CLAIRE RIVER WATERSHED (ACRES)						
Lower Eau Claire River	Urban	Cropland	Pastureland	Forest	Water	Others
Thompson Valley Creek	428	4,058	2,544	1,064	8	275
Bridge Creek	2,358	9,029	7,118	13,577	116	5,527
Bears Grass Creek	861	9,406	4,111	2,749	0	539
Fall Creek	809	5,259	2,753	1,998	13	380
Beaver Creek	498	3,512	83	7,050	2	443
Sand Creek	901	4,948	818	9,156	157	1,731
Deinhammer Creek	621	3,653	123	6,821	84	1,158
Ninemile Creek	689	3,602	508	5,537	96	887
Altoona Lake	**3,176**	**3,135**	**237**	**4,962**	**904**	**858**
TOTAL	**10,341**	**46,602**	**18,295**	**52,914**	**1,380**	**11,798**
PERCENT	**7%**	**33%**	**13%**	**37%**	**1%**	**8%**

Figure 11: *Land cover by HUC 12 for the Lower Eau Claire River subwatershed.*

LAND COVER - EAU CLAIRE RIVER WATERSHED (ACRES)						
Black & Hay Creeks	Urban	Cropland	Pastureland	Forest	Water	Others
Black Creek	1,813	6,348	991	21,736	120	6,664
Muskrat Creek	650	5,657	104	14,109	5	1,130
Hay Creek	1,467	12,507	80	11,152	83	816
Lake Eau Claire	462	369	98	12,702	1,037	2,248
TOTAL	**4,392**	**24,881**	**1,273**	**59,699**	**1,245**	**10,858**
PERCENT	**4%**	**24%**	**1%**	**58%**	**1%**	**11%**

Figure 12: *Land cover by HUC 12 for Black & Hay Creeks subwatershed.*

LAND COVER - EAU CLAIRE RIVER WATERSHED (ACRES)						
Otter Creek	Urban	Cropland	Pastureland	Forest	Water	Others
Beaver Creek-Otter Creek	368	4,710	1,620	1,317	7	267
Otter Creek	5,623	13,338	6,040	7,415	15	1,754
TOTAL	**5,991**	**18,048**	**7,660**	**8,732**	**22**	**2,021**
PERCENT	**14%**	**42%**	**18%**	**21%**	**0%**	**5%**

Figure 13: *Land cover by HUC 12 for the Otter Creek subwatershed.*

The Importance of Agriculture

Over 35% of the Eau Claire River Watershed is Classified as Cropland

2012 Census of Agriculture Profile for Clark & Eau Claire Counties Combined (85 percent of the watershed)

	2012	2007	% change
Number of Farms	3,630	3,393	+ 7
Land in Farms	661,926 acres	645,751 acres	+ 3
Average Size of Farms	182 acres	190 acres	- 4
Market Value of Products Sold	$515,158,000	$362,842,000	+ 42
Average Per Farm	$141,917	$106,938	+ 32

Figure 14: *The table above helps describe the changing trends in agriculture from 2007 to 2012 for the counties that make up the largest part of the watershed. The number of farms and land in farms increased, while the average size of farms decreased. The market value of products sold rose significantly (42 percent) as did the average per farm for this metric. Government payments also increased despite the increase in corn and bean prices.*

Clark County alone ranked 1st in Wisconsin for: value of livestock, poultry, and their products, value of milk from cows, and top crop (acres) in corn for silage and oats for grain.

In The Eau Claire River Watershed

Conservation Reserve Program

The Conservation Reserve Program (CRP) pays a yearly rental payment in exchange for farmers removing environmentally sensitive land from agricultural production and planting species that will improve environmental quality.

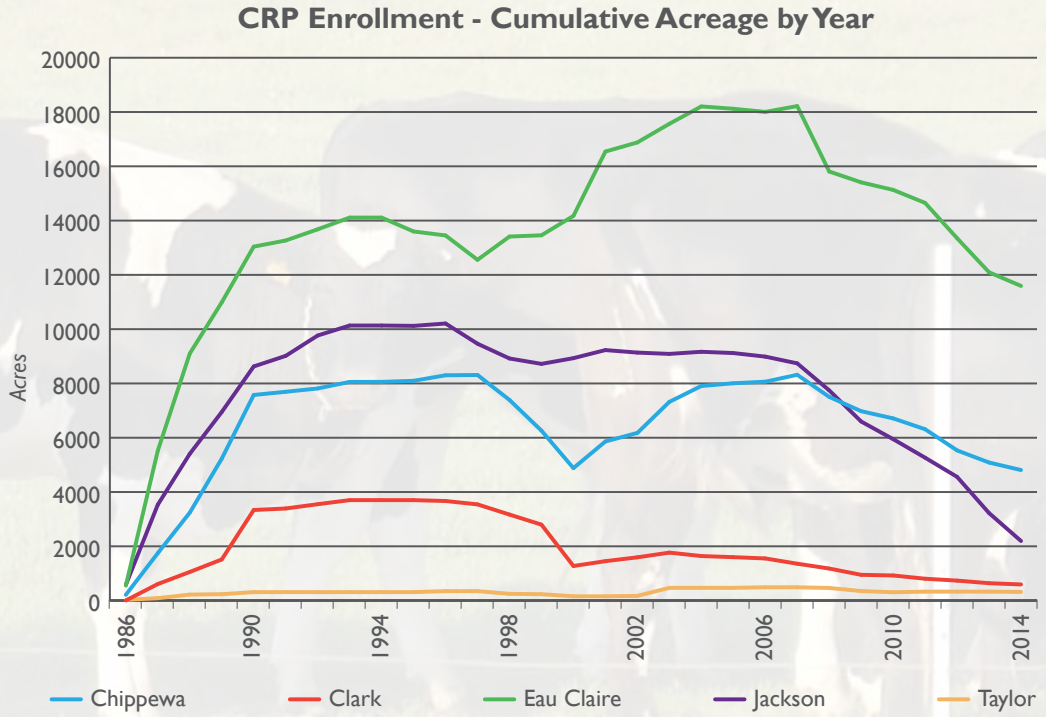
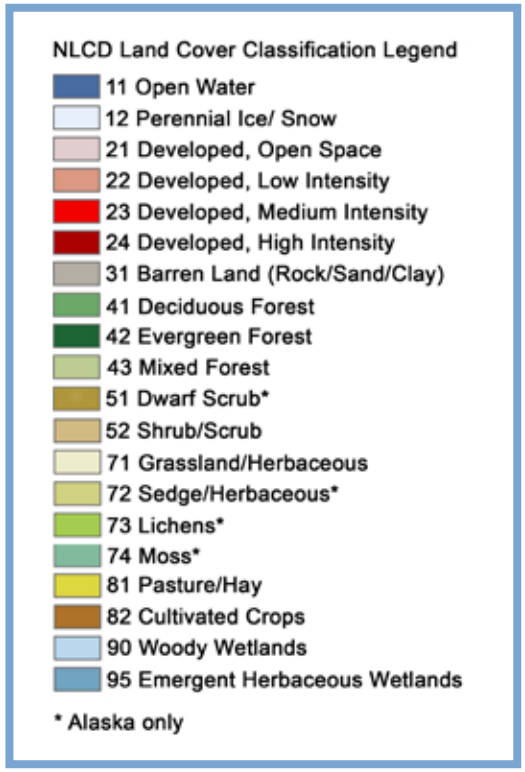


Figure 15: *Graph of CRP enrollment from 1986 to 2014.*
NOTE: The acreages shown are for the entire county, including areas of these counties outside the Eau Claire River Watershed.

Concerns for water quality and the future of farming includes...

- **Higher corn and bean prices has resulted in more cropped acreage, including the conversion of marginal and CRP lands and increased use of drain tiles and other drainage.**
- **The recent increases in cropped acreage are offsetting (at least in part) the water quality benefits of soil health best management practices and projects.**
- **Larger farm equipment allows a single farmer to farm more land, but also has soil health implications.**
- **How to provide education and outreach for future soil health best practices, especially for the large Amish and Mennonite populations practicing farming in the region.**

LAND USE MAP OF THE EAU CLAIRE RIVER WATERSHED



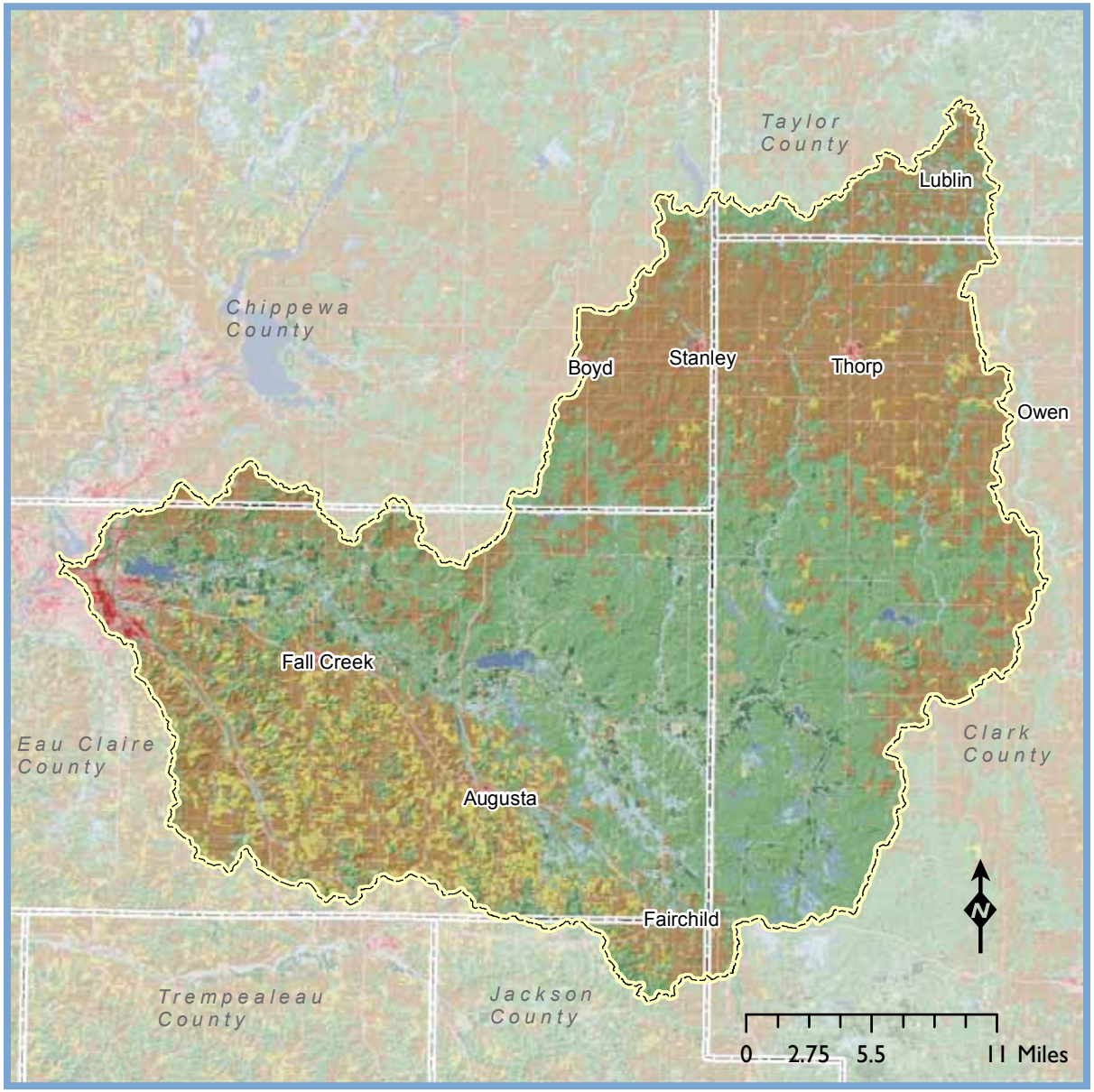


Figure 16: *Land cover in the Eau Claire River Watershed based on 2006 National Land Cover Dataset (Multi-Resolution Land Characteristics Consortium MRLC).*

C. DEMANDS ON OUR SURFACE WATERS

i. Water Demands by Fisheries, Flora, Fauna & Invasives

FISHERIES

There are several important fisheries in the watershed that support populations of Northern Pike, Walleye, Smallmouth and Largemouth Bass, Bluegill, Yellow Perch, Musky and other panfish sought by anglers. There are also several important streams with Brook Trout, non-native Brown Trout, and to a lesser extent, Rainbow Trout.

The entire Eau Claire River is classified as Class II trout water, with some stretches classified as Class I trout water. Within the entire Eau Claire River Watershed, there are approximately:

45 miles - Class I Trout Streams: *High quality trout waters that have sufficient natural reproduction to sustain populations of wild trout, at or near carry capacity. Consequently, streams in this category require no stocking of hatchery trout. These streams or stream sections are often small and may contain small or slow-growing trout, especially in the headwaters.*

150 miles - Class II Trout Streams: *Streams in this classification may have some natural reproduction, but not enough to utilize available food and space. Therefore, stocking is required to maintain a desirable sport fishery. These streams have good survival and carryover of adult trout, often producing some fish larger than average size.*

45 miles - Class III Trout Streams: *These waters are marginal trout habitat with no natural reproduction occurring. They require annual stocking of trout to provide trout fishing. Generally, there is no carryover of trout from one year to the next.*

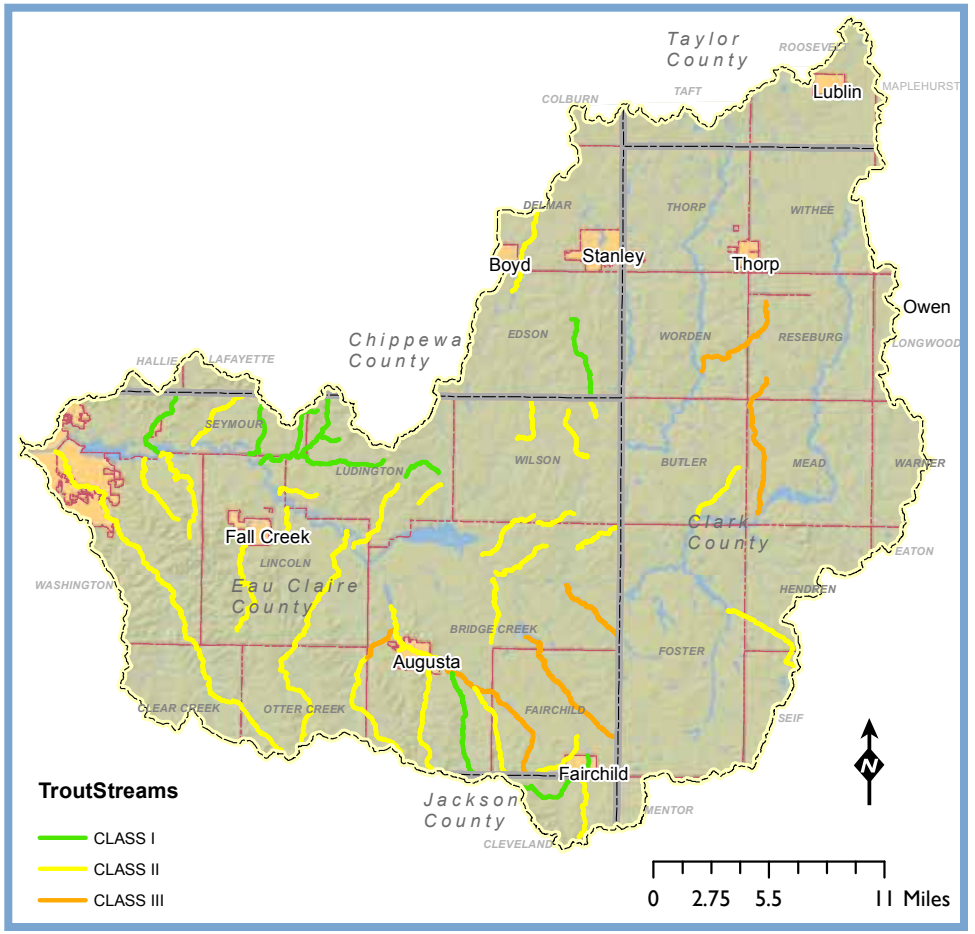


Figure 17: *Map of Class I-III Trout Streams in the Eau Claire River Watershed.*

Continuous un-dammed stretches of these rivers allow fish and other aquatic species to move freely between habitats used for spawning, foraging, and escape. Maintaining undeveloped shorelines and keeping corridors intact and vegetated with native species where possible will support native biota over the long-term and will help to maintain good water quality that will benefit aquatic (and other) organisms.

FLORA

Flora in the Eau Claire River Watershed include a diverse mix of rare plant species, northwestern endemics, northern "relicts," habitat specialists, disjuncts, and several important populations of native plants associated with pine and oak barrens habitats. Mesic hardwood forests also support a rich complement of native herbs along with important rare plant habitats which include northern white-cedar swamps, bedrock features, peatlands, and lakes.

The Wisconsin DNR's Natural Heritage Inventory program tracks vascular plant species occurrences across the state and within the Eau Claire River Watershed and includes a number of rare vascular plants that are either Wisconsin Endangered, Wisconsin Threatened, of Wisconsin Special Concnern.

While ecological connectivity is relatively high in the watershed, there is still a high degree of disturbance and fragmentation across the ecological landscapes. Fire suppression has altered flora community composition, structure, and function in prairies, savannas, and oak forests, all of which were adapted to periodic wildfire. Dam construction and widespread ditching also led to significant alteration to river and floodplain hydrology.

FAUNA

Many wildlife populations have changed dramatically since humans arrived on the landscape, but these changes were not well documented before the mid-1800s. Historically, the watershed region was important for many wildlife species including forest birds, large wide-ranging forest mammals, elk, American Bison, Wild Turkey, Passenger Pigeon, Sharp-Tailed Grouse, Greater Prairie-Chicken, Northern Bobwhite, Timber Rattlesnake, Eastern Massasuaga, Gray Wolf, and possibly, the Kirtland's Warbler.

Figure 18: *White Tailed Deer crossing a shallow river. U.S. Fish & Wildlife Service 2016.*

In the mid-19th century, the ecological landscape was settled by Euro-Americans, and wildlife populations changed dramatically as a result of settlement, logging, draining of many wetlands, and wildfire prevention and control.

Today this ecological landscape is important for several wildlife species such as White-Tailed Deer, American Black Bear, Gray Wolf, American Beaver, North American River Otter, Wild Turkey and a host of other forest, grassland, and wetland wildlife.

DRAGONFLIES IN THE WATERSHED

(contributed by Ryan Chrouser - watershed resident)

The Odonata, or dragonflies and damselflies, are an interesting and important group of insects. Not only do they prey on many pest species including mosquitoes and biting flies, but their aquatic nymphs provide excellent indicators of water quality in our river and lake ecosystems. Some species can thrive in polluted habitat, and others need pristine clear water to successfully make it to the adult stage.

Eau Claire County is home to 108 known species of dragonflies and damselflies. Currently it is the third highest total of any county in Wisconsin. The two counties higher up the list than Eau Claire are in the extreme north of the state where there is a bevy of lakes and swamps that provide habitat for these insects. Why does Eau Claire County, with few lakes and swamp areas rival the northern counties in dragonfly and damselfly species diversity? The simple answer is the Eau Claire River. The Eau Claire River has some pristine habitat for wildlife.

About twenty years ago, a species new to science, Ophiogomphus smithi, the Sioux Snaketail, was discovered in the Eau Claire River. This species continues to thrive in the Eau Claire River and some of its larger sub streams. The Ophiogomphus group is generally known to need good water quality to reproduce, and they are sometimes referred to as the trout of the dragonfly world due to this requirement. This species is currently listed as a species of special concern by the WDNR.

Three years ago, the state endangered species Somatochlora incurvata, the Warpaint Emerald, was discovered on one the backwaters of Coon Forks Lake. To the southwest of Coon Forks Lake, a suitable habitat for the nymphs of the Warpaint Emerald was discovered, and more adults have been observed at the fen over the last couple of years. Surveys of this fen have led to the discovery of four more species that had not previously been recorded in Eau Claire County. It is likely that there is more there to discover yet and that there are other similar habitats tied to the Eau Claire River system that are still waiting to be explored.

Dragonflies are just one example of the tremendous natural resource that the Eau Claire River is to our wildlife. To protect these wild places, we need to protect its life-blood. Water quality has an effect on wildlife throughout the food chain. From the tiny aquatic invertebrates that are near the bottom of the food web, through the dragonflies, trout, and all the way up to the eagles and osprey that call the Eau Claire river home. Protect the water, and we protect all of these creatures, safeguarded for humanities recreation and enjoyment for generations to come.

Figure 19: *Sioux Snaketail (Ophiogomphus smithi) from Otter Creek.*

Figure 20: *Zebra Clubtail (Stylurus scudderi) from Bridge Creek.*

Figure 21: *Warpaint Emerald (Somatochlora incurvata) from Coon Forks Lake.*

INVASIVES

Invasive non-native plants and animals can have devastating impacts on native plant communities, fish and wildlife habitat and populations, agricultural yields, recreational, cultural, and subsistence opportunities, and ultimately, local economies. Chapter NR 40 is Wisconsin's Invasive Species Identification, Classification and Control Rule, which became effective on 9/1/09. The rule classifies invasive species into 2 categories: "Prohibited" and "Restricted". With certain exceptions, the transport, possession, transfer, and introduction of Prohibited species is banned.

Due to the levels of development and disturbance in many parts of the watershed, there are nonnative invasive species that are established and already causing problems here. This landscape is vulnerable to additional invasions and to the spread of already established invasive species to other lands and waters. Human travel is a major vector for transport and dispersal of a variety of invasive species. Tourism, recreation, other types of economic activity, well-developed networks of roads and other infrastructure, and further development make this area ideal for initial introductions.

Several native plant species in this area have become (or are perceived to have become) aggressive due to the alteration of disturbance regimes (e.g., hydrological modifications such as attempted drainage, the introduction of livestock into relatively confined areas, and suppression of fire). These include Prickly Ash, Red-Osier Dogwood, Smooth and Staghorn Sumacs, Poison Ivy, River Grapevine, Virginia Creeper, and Wild Cucumber. In some cases these plants may outcompete other native plants and result in ecosystem simplification. In at least some, if not most, instances, such problems result from a prior disruption (such as heavy grazing, drainage, fire suppression), which needs attention if the unwanted situation is to be corrected.

In aquatic and wetland ecosystems, Eurasian Water-Milfoil, Curly Pondweed, Rusty Crayfish, Common Carp, Common Reed, Purple Loosestrife, and Reed Canary Grass are among the primary problem species. Reed Canary Grass has been especially problematic along streams and wetlands, in some logged stands of lowland hardwood forest, and where marsh, sedge meadow, or prairie vegetation has been artificially drained and/or subjected to prolonged periods of grazing.

Figure 22: *Curly-leaf Pondweed. Photo by Wisconsin DNR.*

Along with a host of other water quality projects, the lake districts and associations in the watershed also work to prevent and/or minimize the transport or spread of invasive species.

ii. Water Demands by Communities, Businesses & Working Lands

The Eau Claire River Watershed is mostly rural and includes 5 cities, 36 towns, and 5 villages. With the exception of the cities of Eau Claire and Altoona, the population and housing density is typical of rural Wisconsin counties. Housing density in Eau Claire is around 878 units per square mile. In Altoona there are 707 units per square mile, and in the rest of the watershed, housing density is around 9.6 units per square mile.

Each day, millions of gallons of ground and surface water are withdrawn for use or consumption in the Eau Claire River Watershed (Figure 23). In Clark and Eau Claire counties, which comprise 85 percent of the total watershed area, about 92 percent of the withdrawals are from groundwater resources. Of the 48,937 people that reside in the watershed, roughly 60 percent are served by public water sources and 40 percent are served by private wells (WCWRPC, 2016).

Aside from public and domestic use which constitute the highest withdrawals in the watershed (at least 58 percent), water for agriculture and irrigation is also high in Eau Claire River Watershed counties. Major agricultural uses of water include the production of corn, hay, alfalfa, soybeans and oats, as well as water for cattle and milk cows which are an important source of revenue for rural areas. While there are some industrial uses of water, including nonmetallic mining operations, these facilities do not represent a significant portion of water withdrawals in the watershed at this time.

Appendix A includes a list and map of the 13 facilities and point sources that currently have Wisconsin Pollutant Discharge Elimination System (WPDES) permits within the watershed. This includes 5 municipal, 2 confined animal feedlot operations, 2 industrial permits, and 1 lake district.

WATER USE (*millions of gallons/day*) IN CLARK & EAU CLAIRE COUNTIES

County	Ground-water	Surface water	Public supply	Domestic[1]	Agriculture[2]	Irrigation	Industrial	Mining	Total
Clark	5.36	0.69	1.36	0.80	3.26	0.21	0.04	0.38	6.05
Eau Claire	13.11	0.83	8.28	1.22	0.70	2.71	0.91	0.12	13.94
Total	**18.47**	**1.52**	**9.64**	**2.02**	**3.96**	**2.92**	**0.95**	**0.50**	**19.99**
Percent of total	**92%**	**8%**	**48%**	**10%**	**20%**	**15%**	**5%**	**3%**	

Figure 23: *Based on 2010 data from the U.S. Geological Survey on water uses in Wisconsin Counties (USGS, 2016).*
[1]*Domestic self-supply wells.*
[2]*Includes aquaculture and water for livestock.*

iii. Flood Control & Stormwater Management

Our rivers, lakes, and streams are part of, and are impacted by, our stormwater management and flood control systems. Stormwater management, shoreland regulations, and best practices are primarily intended to protect our surface waters from sediment and other pollutant loading. On the other hand, floodplain regulations and flood controls are primarily for public safety and to avoid or mitigate flood damage.

Stormwater management is often associated with urban areas and development, where practices (e.g., detention basins, rain gardens/bio-swales, porous pavement, ditches, storm sewer) are installed to accommodate runoff or mimic natural drainage systems that have been lost due to development. Stormwater management also includes those best practices used by farmers and timber managers to prevent run-off, such as filter strips, grass swales, settling basins, and soil stabilization on slopes.

In Wisconsin, stormwater runoff from construction sites, industrial facilities, and municipal systems is regulated by permit through WDNR. Stormwater management is not without its weaknesses. Few systems will catch 100% of the run-off. Some systems can transport pollutants more quickly to surface waters without treatment or filtering. Detention basins require land and can lead to other problems, such as undesired wildlife, mosquitoes, or even the creation of phosphorus. And design standards are based on data and technical information that is now 40 to 50 years old. It is worth noting that Minnesota has introduced minimal impact design standards (MIDS) for stormwater systems based on low-impact development to offer new modelling methods and a credit system to achieve higher clean water performance goals.

Appendix A includes more information on stormwater and erosion control rules, including the four watershed municipalities required to maintain a Municipal Separate Storm Sewer System (MS4) permit.

Figure 24: *Flooding of County HWY M in the South Fork of the Eau Claire River Watershed.*

Historically, riverine flooding within the watershed has been most serious nearest to the confluence of the Eau Claire River with the Chippewa River. But the June 1993 flooding increased awareness of riverine and overland/stormwater flooding potential along the Eau Claire River and throughout the watershed. Floodplain zoning and wetlands protections do offer some regulatory protection of flood storage areas. The levees, dikes, and dams within the watershed also provide some flood control, though many of these structures are primarily maintained for recreational or conservation purposes.

As discussed previously, increases in winter and spring precipitation will likely cause increases in large stormwater runoff and flooding events, leading to soil and bank erosion and habitat degradation. The increasing number of flooding events on smaller streams within the past twenty years supports this finding. In some instances, streams that respond quickly to incoming and outgoing flows have a drier period between high flow periods, resulting in a "first flush" effect containing higher concentrations of sediment and phosphorus. Action is needed to reduce the number and/or velocity of these "first flush" and peak-flow events.

iv. Water Demands for Recreation & Quality of Life

In the Eau Claire River Watershed, there are several lakes, rivers and streams that provide a diverse number of water-based recreational activities such as canoeing, kayaking, rafting, tubing, boating, sailing, swimming, beach access and year round fishing opportunities. While there are no specific studies of participation rates for water-based activities in the Eau Claire River Watershed, water-related recreation ranked among the most popular activities in the Wisconsin Statewide Comprehensive Outdoor Recreation Plan 2011-2016.

Many of these activities, especially those associated with lakes and impoundments, are extremely dependent on water quality for providing safe and continued use of these facilities. The health of upstream waters is critical to keeping algal blooms under control, and also from preventing sedimentation of rivers and lakes that degrade the fishery habitat and dam up lakes over time. To help mitigate the negative effects of pollution and sedimentation of lake tributaries, many of the larger lakes in the watershed have organized districts or associations that work to improve water quality and protect this resource for residents and visitors.

Much of the Eau Claire River Watershed is made up of lakes, rivers and streams that attract visitors and recreation users due in large part to their natural and aesthetic beauty. Residents and visitors enjoy recreating in healthy aquatic and terrestrial ecosystems that depend on clean water to support the fisheries, flora and fauna that support the large number or water-based tourism and recreation opportunities in the watershed.

PERCENT WISCONSIN RESIDENTS PARTICIPATING IN WATER ACTIVITIES (AGE 16+)

Activity	Percent Participating	Estimated Number of Participants (1,000s)
Boating (any type)	47.3	2,129
Visit a Beach	42.3	1,904
Swimming in lakes, streams, etc.	41.7	1,877
Freshwater fishing	37.4	1,683
Motorboating	36.0	1,620
Swimming in an outdoor pool	34.5	1,553
Warmwater fishing	33.2	1,494
Visit other waterside (besides beach)	22.6	1,017
Canoeing	17.9	806
Waterskiing	13.0	585
Coldwater fishing	12.8	576
Rafting	9.2	414
Kayaking	7.3	329
Rowing	7.2	324
Use personal watercraft	6.5	293
Snorkeling	6.2	279
Sailing	3.9	176
Scuba diving	1.1	50
Windsurfing	1.1	50
Surfing	1.0	45

Figure 25: *Participation rates from the Wisconsin Statewide Comprehensive Outdoor Recreation Plan 2011-2016.*

RECREATION EXPENDITURES IN THE EAU CLAIRE RIVER WATERSHED

	Spending Potential Index	Average Amount Spent	Total
Entertainment/Recreation Fees and Admissions	71	$460.35	$9,177,459
Admission to Movies, Theater, Opera, Ballet	71	$117.62	$2,344,956
Admission to Sporting Events, excl. Trips	77	$51.25	$1,021,712
Fees for Participant Sports, excl. Trips	71	$85.14	$1,697,444
Fees for Recreational Lessons	68	$83.52	$1,665,048
Membership Fees for Social/Recreation/Civic Clubs	71	$122.29	$2,438,069
Rental of Video Cassettes and DVDs	79	$18.55	$369,845
Toys & Games	80	$98.03	$1,954,294
Toys and Playground Equipment	80	$92.37	$1,841,559
Play Arcade Pinball/Video Games	77	$2.37	$47,257
Online Entertainment and Games	81	$3.28	$65,478
Recreational Vehicles and Fees	82	$178.85	$3,565,625
Docking and Landing Fees for Boats and Planes	77	$7.54	$150,243
Camp Fees	61	$20.23	$403,321
Purchase of RVs or Boats	87	$145.56	$2,901,859
Rental of RVs or Boats	73	$5.53	$110,201
Sports, Recreation and Exercise Equipment	79	$150.01	$2,990,573
Exercise Equipment and Gear, Game Tables	77	$59.40	$1,184,137
Bicycles	71	$21.28	$424,281
Camping Equipment	65	$10.95	$218,321
Hunting and Fishing Equipment	92	$38.68	$771,120
Winter Sports Equipment	83	$4.97	$98,987
Water Sports Equipment	80	$5.18	$103,176
Other Sports Equipment	88	$7.03	$140,132
Photographic Equipment and Supplies	74	$60.25	$1,201,134
Film Processing	84	$10.31	$205,639
Photographic Equipment	71	$27.94	$556,955
Photographer Fees/Other Supplies & Equip Rental/Repair	75	$21.15	$421,669
Reading	78	$119.20	$2,376,423
Magazine/Newspaper Subscriptions	81	$43.99	$877,046
Magazine/Newspaper Single Copies	78	$12.18	$242,765
Books	77	$49.28	$982,359
Digital Book Readers	76	$13.76	$274,254

Figure 26: *Photo of Lake Altoona Beach and Boat Dock.*

Figure 27: *Photo of ATV riders in Clark County.*

Figure 28: *The table shows recreation expenditures of Eau Claire River Watershed residents. The Spending Potential Index (SPI) is household-based, and represents the amount spent for a product or service relative to a national average of 100. Consumer Spending data are derived from the 2011 and 2012 Consumer Expenditure Surveys, Bureau of Labor Statistics.*

THE VALUE OF CLEAN WATER

Clean water is a precious resource. During community survey efforts from across west-central Wisconsin, area residents have consistently identified groundwater and surface water as the top local resources deserving of the highest levels of protection.

Residents, businesses, and communities of the Eau Claire River Watershed rely upon our surface waters for agriculture, industry, utilities, flood control, fire protection, outdoor recreation, tourism, aesthetic beauty, and wildlife habitat. And, as discussed previously, our surface waters are inexorably linked with our groundwater and drinking water systems. A healthy water cycle is critical to life and our ecosystem.

So, what is the real cost of pollutant loading, erosion, and the loss of clean water on our streams, rivers, and lakes? To date, no such studies have been performed for the Eau Claire River Watershed, making it difficult to quantify such impacts. We know that degraded water quality (e.g., algae blooms, poor fishing, aesthetics) can make our surface waters unappealing for homeowners and for recreation. Blue-Green Algae and E. Coli have the potential to cause serious illness or even death.

Some of the real costs of erosion and poor water quality include...

- **Increased Runoff, Pollutant Loading and Lower Agricultural Yields -** *Healthy soils means healthy waters. Land management practices that contribute to soil health improves the infiltration of precipitation and reduces run-off, thereby keeping the top soil in place, decreasing pollutant loading and increasing agricultural yields over the long term.*

- **Lower Property Values (and Tax Base) -** *Our lakes and larger rivers, in particular, are popular for residential development. But, a shoreland property has less value to potential homebuyers if algae blooms (or other pollutants) prevent fishing and swimming during a large part of the summer or if sediment loading is limiting where you can boat.*

- **Decreased Tourism -** *Tourism and spending by seasonal homeowners are a significant part of the economy within the watershed. Tourists are attracted by clean water for fishing, paddlesports, boating, swimming/tubing, and aesthetic beauty. This is reflected by the fact that the most of the county parks within the watershed are located along the rivers and lakes.*

- **Taxpayer and Opportunity Costs -** *As a society, we are spending millions each year in "clean-up costs" due to pollutant loading. These costs range from education, monitoring, and enforcement to algae removal, aeration systems, and dredging. Greater emphasis is needed to address the root causes of water quality pollution.*

D. WATER QUALITY PLANS, STANDARDS & PROGRAMS

The Eau Claire River Watershed does not exist in a vacuum. This Watershed Strategy must consider and coordinate with the existing plans and programs from communities and sub-areas within the watershed, as well as the larger geographic areas of which it is part.

Appendix A includes a synopsis of the key plans and standards that could potentially impact, improve, and protect the rivers, lakes, and streams of the watershed. The creation and implementation of this Watershed Strategy can be assisted by the programs, funding sources, agencies, and other partners summarized in Appendix B.

The Coalition agreed that while standards and traditional enforcement is still important, new approaches are needed. A decision was made that this Watershed Strategy should primarily focus on changing attitudes and behaviors by helping landowners meet their personal goals, **not through rules and regulations**, but through education, civic leadership, voluntary incentives, capacity building, and partnerships.

A NEW APPROACH IS NEEDED

We've tried traditional enforcement and incentives. We need to do it differently.

Throughout the development of this Watershed Strategy, residents and stakeholders have had a spirited discussion over the effectiveness of regulations to address our water quality goals. Appendix A and B shows that there are many standards and incentive programs available. Most of these have been place for years, and most farmers are aware of them. So why haven't we been successful? And why do so many non-compliant sites still exist?

Coalition members had the following opinions on this topic:

- Changes in agricultural practices and the surge in corn and bean prices have increased NPS pollution.
- There is a lack of political will to enforce the existing rules, and there is limited staff time and funding for enforcement.
- The general public and many local officials do not understand these rules, what to do about non-compliance, and what is a good or bad practice. They could assist with reporting non-compliance.
- There are increasing numbers of landowners who lease their land to farmers that may not know how to integrate conservation into lease agreements.
- More collaboration and partnerships are needed between varying interests.
- Past planning efforts and strategies were "top down" and did not engage the community to change mindsets, build public capacity, or foster leadership.
- We have nearly "maxxed out" participation in current incentive programs, unless more efforts are made to change minds on why conservation is important.
- Our strategy needs to help farmers meet their personal business goals with a long-term commitment to practices that benefit both their business and conservation.
- We do not need more rules; regulations should not be the focus of this Watershed Strategy.

E. CHARACTERISTICS OF THE FIVE HUC-10 SUBWATERSHEDS

Appendix C summarizes the characteristics of each HUC-10 subwatersheds within the larger Eau Claire River Watershed:

i. North Fork - Eau Claire River (LC 17)

ii. South Fork - Eau Claire River (LC 16) *includes the Mead Lake District and Rock Dam Lake Association*

iii. Black & Hay Creeks (LC 15) *includes the Lake Eau Claire P&R District and Lake Eau Claire Association*

iv. Lower Eau Claire River (LC 14) *includes the Lake Altoona District*

v. Otter Creek (LC 25)

Each subwatershed summary includes the following:

- overview of key watershed features
- population and land description
- water quality characteristics for key streams and lakes
- recent plans, studies, activities, and projects within the subshed
- lake district and association summaries

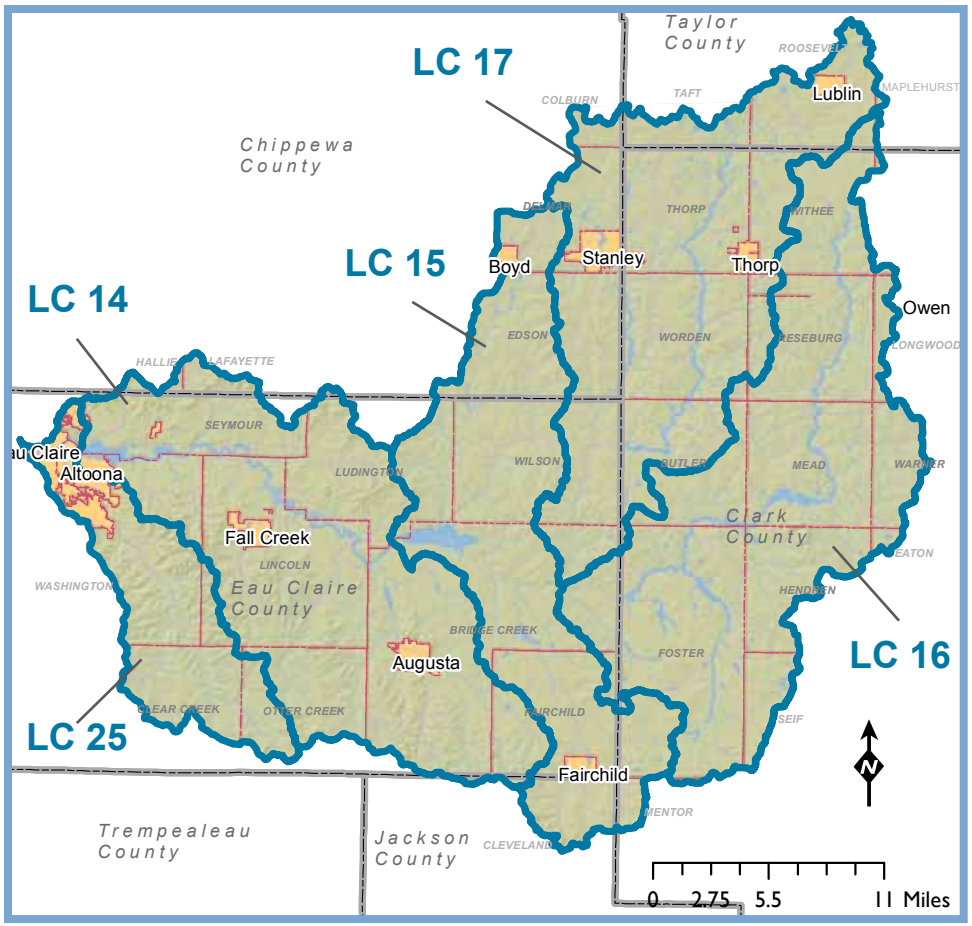


Figure 29: *Map of the Eau Claire River Watershed and the five LC subwatersheds.*

SECTION III: STATE OF OUR SURFACE WATERS

IMPAIRED WATERS IN THE EAU CLAIRE RIVER WATERSHED

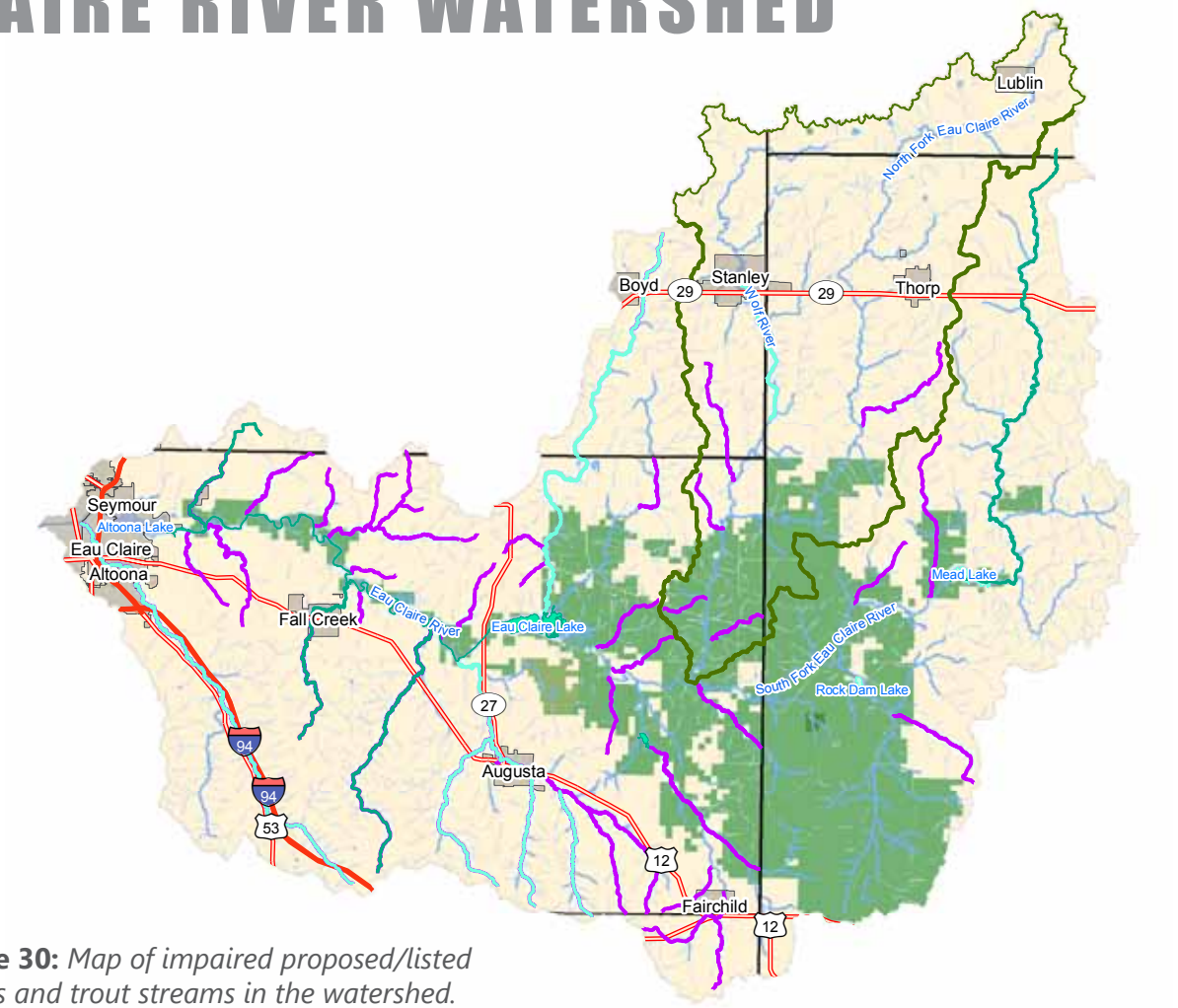


Figure 30: *Map of impaired proposed/listed waters and trout streams in the watershed.*

Legend

- North Fork Eau Claire River HUC10
- Impared Waters Proposed 2016 (DNR)
- Impared Waters Proposed 2016 (DNR)
- Impared Waters Listed 2014 (DNR)
- Impared Waters Listed 2014 (DNR)
- Trout Streams (DNR)
- Interstates
- Highways
- Ramps
- County Boundaries (ESRI)
- Hydro
- Open Water
- Intermittent
- Perennial
- DNR Parcels (DNR)
- County Forests (DNR)
- HUC8 (USGS)

N

0 4 8 Miles

DISCLAIMER: The information shown on this map has been obtained from various sources and are of varying age, reliability, and resolution. This map is not intended to be used for navigation. This map is not an authoritative source of information about legal land ownership or public access. No

SECTION III. STATE OF OUR SURFACE WATERS

The quality of our surface waters is impacted by the land use, economic, and climate characteristics of the Eau Claire River Watershed (described in Section II.B.) as well as by how our streams, rivers, and lakes are currently used (described in Section II.C.). Areas which are mostly forested and have limited development tend to have better water quality.

Parts of our landscape where agriculture is predominant are frequently characterized by excess nutrient and sediment runoff that degrade water quality. The way communities, residents, and farmers use the land can also reduce soil health (e.g., compaction, mono-cultures, excessive tillage) and disrupt natural drainage systems (e.g., roads, culverts, drain tile, ditches). Additional challenges to maintaining the health of our surface waters and aquatic ecosystems include urban stormwater management, shoreland development, the introduction and spread of exotic species, and climate trends.

The Eau Claire River Watershed is not unique in its water quality challenges. The National Rivers and Streams Assessment 2008-2009 prepared by the U.S. EPA found that 46 percent of our nation's river and stream miles do not support healthy populations of aquatic life largely due to phosphorus and nitrogen pollution and poor habitat conditions.

In short, soil health and water quality vary greatly across the watershed. Some of our surface waters have excellent water quality, which should be preserved, while far more of our waters have become degraded and impaired, which needs to be remedied. And every watershed has opportunities to improve the health of its water bodies.

A. SURFACE WATERS TO PRESERVE

Outstanding Resource Waters (ORW) receive the state's highest protection standards, with Exceptional Resource Waters (ERW) a close second. While they share many of the same environmental and ecological characteristics, they differ in the types of discharges each receives, and the level of protection established for the waterway after it is designated.

In the Eau Claire River Watershed there are no ORWs and there are 32.3 miles of ERW designated streams shown in Figure 31.

> **ERW's:** *If a waterbody has existing point sources at the time of designation, it is more likely to be designated as an ERW. Like ORWs, dischargers to ERW waters are required to maintain background water quality levels; however, exceptions can be made for certain situations when an increase of pollutant loading to an ERW is warranted because human health would otherwise be compromised.*

Other designated areas of special importance in the watershed include the Areas of Special Natural Resource Interest (ASNRI). These areas include designated state natural areas, designated trout streams, waters or portions of waters inhabited by any endangered, threatened, special concern species or unique ecological communities. This includes wild rice waters, federal or state waters designated as wild or scenic rivers, waters in areas identified in a special area management plan (SAMP), or special wetland inventory study (SWIS). Throughout the watershed there are several ASNRI lakes, rivers, and streams that provide important habitat for species, provide recreation opportunities, and contribute to the overall health of aquatic ecosystems.

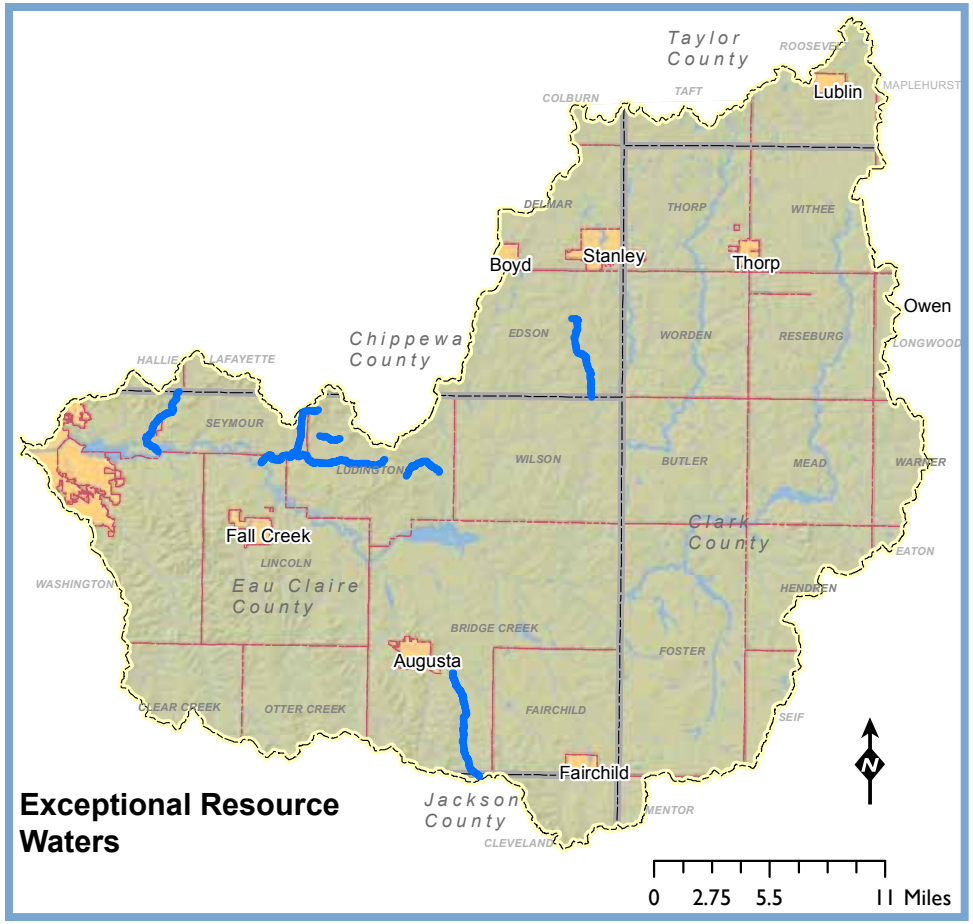


Figure 31: *Map of Exceptional Resource Waters in the Eau Claire River Watershed.*

B. CAUSES & SOURCES OF SURFACE WATER POLLUTION

This sub-section identifies the primary causes and sources of surface water pollutants within the Eau Claire River Watershed, while the next sub-section identifies which surface waters are experiencing these impairments and are 303(d) listed waters.

Surface water pollution comes from point sources and nonpoint sources. **Point-source pollution** originates from a specific entry point, such as a wastewater treatment plant, industrial discharge, stormwater pipe, or hazardous materials spill. Since these sources can be traced to a specific location, they are easier to monitor and regulate. Many regulated point sources are spending millions of dollars to come into compliance with phosphorus or other water quality standards, even though they often represent a relatively low percentage of the pollutant-loading problem. Point sources requiring permits within the Eau Claire River Watershed include the six municipal wastewater treatment facilities, five private industries, and two confined animal feedlot operations (CAFOs) that are identified and mapped as part of The Phosphorus Rule discussion in **Appendix A.**

Nonpoint-source (NPS) pollution, largely polluted runoff, is the biggest cause of surface water pollution in Wisconsin, degrading or threatening an estimated 90% of inland lakes. Runoff occurs when water cannot infiltrate the soil; rain or snow melt washes sediment, nutrients, and other pollutants off the landscape, threatening downstream surface water resources. While nonpoint-source pollution can also come from other sources (e.g., groundwater, atmospheric), polluted runoff and erosion (overland and bank) are the principal focus of this watershed plan.

Polluted runoff comes from both rural and urban sources. In an urban or developed setting, this is largely due to runoff from the hardscape (e.g., roof tops, parking areas, compacted soils). Many city and village residents do not realize that stormwater drains bypass wastewater treatment facilities and empty directly into our rivers, lakes, and streams. In a rural setting, runoff is the result of compacted soils, soil erosion, and other attributes of poor soil health from agricultural, forestry, and recreational uses. Runoff also increases flooding, peak flow events, and shoreland/bank erosion, thereby exacerbating pollutant loading into our rivers, lakes, and streams.

Nonpoint **phosphorus- and sediment**-loading from runoff and erosion are our greatest sources of pollution to the streams, rivers, and lakes of the Eau Claire River Watershed and **are the primary pollutant focus** of this Watershed Strategy.

The following are the primary surface water quality pollutants threatening the surface waters of the Eau Claire River Watershed:

Phosphorus

Phosphorus is essential to plant life, and some level of phosphorus is naturally occurring. Farmers add fertilizers and animal manure that are rich in nitrogen and phosphorus to fields to increase yields. Landowners who use lawn fertilizer have similar goals. Phosphorus is also added to our surface waters from organic sources and effluent, such as from livestock and municipal wastewater treatment plants. When runoff and soil erosion containing nutrients such as phosphorus washes into our water bodies, the result is excess nutrient loading.

These nutrients fertilize algae and boost their growth, resulting in unsightly and unhealthy algae blooms, particularly in lakes, ponds, and wetlands. Under such conditions, water quality can be further impaired as the bacteria consume the dead algae and use up the dissolved oxygen, which suffocates fish and other aquatic life; this process is known as eutrophication.

Sediment

Sediment loading is the act or transfer of this sand, silt, and dirt from shoreland and upland areas into the surface waters, or the transport of sediment downstream. **Sedimentation** is the accumulation of sand, silt, and dirt that settles in the bottom of the lakes, rivers, and streams. For purposes of this plan, it is a pollutant that degrades surface water quality and habitat health directly—through sedimentation—and indirectly—by carrying phosphorus, nitrates, and other pollutants.

Many of the soils of the watershed are glacial sands that are highly erodible. The Erosion Vulnerability Assessment (EVAAL) in Section IV.B. of the Watershed Strategy identifies those upland areas that are most vulnerable to erosion. In addition, shorelands areas and stream/river banks are especially at risk of erosion and contributing to the sedimentation of our lakes and rivers. Land use and poor soil health practices can exacerbate sediment loading, especially in areas that are most vulnerable to erosion. And, as discussed previously, the frequency of heavy rainfall events is projected to increase. Unless efforts are made to mitigate the related impacts, these storm events will result in large amounts of water moving through the system at high velocities, thereby increasing run-off, pollutant loading, flooding, and bank erosion.

Sedimentation fills our lakes, rivers, and streams. It destroys critical habitat and fish nurseries. It stifles aquatic diversity. It reduces the size, depth, and navigability of our lakes and rivers. As water depth on our lakes and ponds decreases, the water temperature rises, thereby increasing the growth of bacteria and algae. And, as mentioned previously, sedimentation, phosphorus, and other pollutant loading to our rivers, streams, and lakes are not mutually exclusive. These pollutants will "travel together" and are often in the same eroded soils. A best practice aimed at reducing sediment loading will typically reduce phosphorus loading as well.

As discussed in the *Lake Altoona Sedimentation Study Project Report*[1], not all sediment is equal. For purposes of this Watershed Strategy, there are two, very general types of sedimentation:

- **Bed Load –** This is usually the larger size particles (e.g., sands, gravel) that move along the bottom of the stream bed, involving frequent or constant contact with the bottom. These sediments will collect at the bottom as the river slows, such as a sediment trap or the delta on the east end of Lake Altoona. Bank erosion is the major contributor to new bed load. WDNR does not have a process or sufficient data for setting quantifiable bed load target objectives, but efforts such as the Lake Altoona study are providing the foundation upon which

[1] Zika, Rod G. and Neil Trombly of G.O. Environmental Services. *Lake Altoona Sedimentation Study Project Report*. Prepared for the Lake Altoona Rehabilitation and Protection District, 2015.

such objectives may be established in the future.

- **Suspended Load/Wash Load (or Suspended Solids) –** This is the smaller sediments (silts/clays and fine sands) that are light enough that they remain suspended in flowing water due to the turbulence. Some suspended load is naturally occurring and some may be dissolved. Most of the wash-load sediment comes from upland sources as a result of erosion and runoff due to human activities. Being lighter, the wash-load sediment travels (is suspended) farther than bed-load sediment, but may accumulate at impoundments or when water slows.

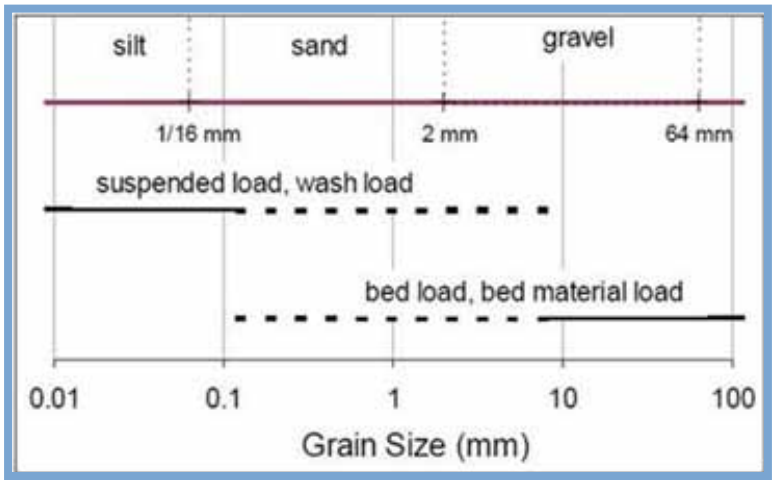


Figure 32: *This graphic shows grain sizes associated bed load, bed-material load, suspended load, and wash load. (Wilcock, 2009)*

The lake districts and associations have been on the front line of the battle against sedimentation on the lakes and navigable channels of our watershed. They have spent millions in dredging, sediment traps, planning, studies, and other activities to address this issue. They understand that sedimentation negatively impacts property values and the local recreation/tourist economy.

Section IV.A. summarizes prior and recent studies regarding sedimentation within the watershed, including the implications at Lake Altoona if this issue is not addressed.

Nitrates

Like phosphorus, nitrogen is naturally occurring, though excessive amounts can be introduced from livestock manure and from fertilizers for agriculture and lawns. Nitrates, nitrites, and nitrogen have a variety of human health risks, but is receiving the greatest attention within the watershed due to the levels exceeding the safe drinking water standard for some private wells. High nitrate levels in drinking water can be especially hazardous for pregnant women and young children by creating a condition in which blood lacks the ability to carry sufficient oxygen (i.e., methemoglobinemia or blue baby syndrome). Best practices that will reduce phosphorus, such as good soil health and nutrient management planning, should also help reduce nitrates in groundwater. No water bodies in the watershed are 303(d) listed due to nitrates.

Bacteria

Bacteria, E. Coli, fecal coliform, and other disease-causing microorganisms in rivers and lakes are a threat to human health (e.g., gastroenteritis, salmonellosis/food poisoning, cholera, digestive problems). Sources of bacteria include sewage overflows, failing septic systems, animal waste, and other polluted runoff. Beach closures related to high bacteria are not uncommon within the watershed, especially during the summer months for a number of days following heavy rains and runoff events. Data on recent beach closures is provided later in this section.

Mercury

Many of the waters within the watershed have consumption advisories (or safe-eating guidelines) due to the presence of

mercury. No rivers or lakes in the Eau Claire River Watershed have concentrations of mercury that warrant additional local action, though Rock Dam Lake is impaired, in part, due to mercury. The mercury in our waters is primarily introduced from the atmosphere from sources outside the watershed, such as industry and coal-burning power plants. For this reason, the Coalition decided not to include target objectives and recommended actions regarding mercury in this plan. No water bodies within the watershed have been designated (current or proposed) due to PCBs, metals, or hazardous man-made chemical.

Thermal

Thermal pollution is the degradation of water quality or habitat by any process that changes the ambient temperature of our rivers, lakes, and streams. Changes in water levels/depth, disruption of natural springs, changes in shoreland habitat, and water discharges from industry, utilities, and runoff can all impact water temperature. Many water-based animal and plant species, such as trout, are especially sensitive to thermal changes. Elevated water temperature (and degraded habitat) is specifically listed as a cause of 303(d) impairment for three waterbodies in the watershed—Diamond Valley Creek, Hay Creek, and Thompson Valley Creek.

Water Quantity and Flow

Though not a pollutant, changes in water depth, velocity, peak flows, and flooding can result in increased erosion/sedimentation, destroy habitat, and change the chemical composition of our surface waters.

C. IMPAIRMENTS TO REMEDY

Waters designated as 303(d) impaired under the Clean Water Act exhibit various water quality problems including phosphorus, PCBs in fish, sediments contaminated with industrial metals, mercury from atmospheric deposition, bacteria, thermal pollution, and habitat degradation. These water bodies are too polluted or degraded to meet state or federal water quality standards for pollutants or aquatic biological health. Since the 303(d) designation is based on the numeric water quality criteria included in chapters NR 102–105, Wisconsin Administrative Code, Wisconsin DNR technical documents, narrative standards, and federal guidance, a waterbody could be listed as a 303(d) water as well as an ORW or ERW.

Throughout the entire Eau Claire River Watershed, there are a total of 141 miles of 303d listed and proposed streams, along with 535 acres of impaired lake or impoundment waters. On the following pages are all of the listed and proposed impaired waters in the watershed organized by county. Following the impaired waters list is recent beach closure data for the primary public beaches in the watershed.

As will be shown in Figure 34, 21 of the 22 records (or 95%) on the existing and proposed the 303(d) impaired water body list for the Eau Claire River Watershed included total phosphorus as at least one of the primary pollutants. An additional six entries (or 27%) were related to degraded habitat, often due to sedimentation.

79% of the 303(d) water quality impairment records for water bodies in our watershed were due to **phosphorus**.

An additional **21%** were related to degraded habitat, often due to **sedimentation**.

SECTION III. STATE OF OUR SURFACE WATERS

Reducing phosphorus and sedimentation loading into our streams, rivers, and lakes is driving this Watershed Strategy. These pollutants from uplands, and others, travel together as runoff. As such, the action plan recommendations to address our phosphorus loading goals and target objectives will be addressing sedimentation and other pollutants as well. To address phosphorus, we must improve soil health and reduce sediment runoff. For example, actions that improve buffers and shoreline health will not only reduce phosphorus loading, but will also reduce bank erosion, peak flow events, and the warming of our waters.

The HUC-10 summaries in Appendix C of this Watershed Strategy provide maps and further describe the water quality and pollutant concerns specific to each HUC-10.

Phosphorus and sediment from upland areas travel together in runoff.

We cannot address one without addressing the other. And activities to reduce phosphorus loading will also have other soil health, water quality, and habitat benefits.

Address phosphorus and the other inherent benefits will "come along for the ride."

Current as of Fall 2015

IMPAIRED WATERS IN THE EAU CLAIRE RIVER WATERSHED

SITE NAME	COUNTY	WATER TYPE	POLLUTANT	IMPAIRMENT	303 STATUS
Hay Creek	Chippewa	River	Total Phosphorus	Impairment Unknown	303d Listed
Sevenmile Creek	Chippewa	River	Total Phosphorus	Water Quality Use Restrictions	Proposed for List
Mead Lake	Clark	Impoundment	Sediment/Total Suspended Solids/ Total Phosphorus	Degraded Habitat, Low Dissolved Oxygen	TMDL Approved
Rock Dam Lake	Clark	Impoundment	Total Phosphorus/Mercury	Impairment Unknown/Contaminated Fish Tissue	303d Listed
South Fork Eau Claire River	Clark	River	Total Phosphorus	Water Quality Use Restrictions	Proposed for List
Bears Grass Creek	Eau Claire	River	Total Phosphorus	Water Quality Use Restrictions	Proposed for List
Bears Grass Creek	Eau Claire	River	Total Phosphorus	Water Quality Use Restrictions	Proposed for List
Bridge Creek	Eau Claire	River	Total Phosphorus	Impairment Unknown	303d Listed
Bridge Creek	Eau Claire	River	Total Phosphorus	Impairment Unknown	303d Listed
Coon Fork Flowage	Eau Claire	Lake	Total Phosphorus	Impairment Unknown, Excess Algal Growth	Proposed for List
Diamond Valley Creek	Eau Claire	River	Sedimentation/Poor Habitat/Total Phosphorus	Degraded Habitat	303d Listed

Figure 33: *This table shows all listed and proposed 303d waters in the Eau Claire River Watershed.*

Current as of Fall 2015

IMPAIRED WATERS IN THE EAU CLAIRE RIVER WATERSHED

SITE NAME	COUNTY	WATER TYPE	POLLUTANT	IMPAIRMENT	303 STATUS
Diamond Valley Creek	Eau Claire	River	Thermal/Sedimentation/Poor Habitat/ Total Phosphorus	Elevated Water Temperature, Degraded Habitat	303d Listed
Lake Eau Claire	Eau Claire	Lake	Total Phosphorus	Excess Algal Growth	Proposed for List
Fall Creek	Eau Claire	River	Total Phosphorus	Water Quality Use Restrictions	Proposed for List
Fall Creek	Eau Claire	River	Total Phosphorus	Water Quality Use Restrictions	Proposed for List
Hay Creek	Eau Claire	River	Thermal/Sedimentation/Poor Habitat	Degraded Biological Community, Elevated Water Temperature, Degraded Habitat	303d Listed
Hay Creek	Eau Claire	River	Total Phosphorus	Impairment Unknown	303d Listed
Otter Creek	Eau Claire	River	Total Phosphorus	Water Quality Use Restrictions	303d Listed
Sevenmile Creek	Eau Claire	River	Total Phosphorus	Water Quality Use Restrictions	Proposed for List
Thompson Valley Creek	Eau Claire	River	Sedimentation/Poor Habitat/Total Phosphorus	Degraded Habitat	303d Listed
Thompson Valley Creek	Eau Claire	River	Thermal/Sedimentation/Poor Habitat/ Total Phosphorus	Elevated Water Temperature, Degraded Habitat	303d Listed

Figure 34: *(table continued) listed and proposed 303d waters in the Eau Claire River Watershed.*

BEACH CLOSURES

County Health Departments regularly monitors water quality at public beaches during summer months (May through August). The following graphs show the number of days or occurrences that each of the primary Eau Claire County public beaches in the watershed were closed for water quality or safety concerns in recent years.

Nearly all of the closures are related to high levels of E. coli bacteria. Generally, all public beaches shall be posted as closed when beach water samples for E. coli exceed 1,000 cfu/100ml. Beach advisories due to increased risk of illness are posted at lower thresholds, typically if a sample exceeds 235 cfu/100ml. Other less frequent closures include high water level or flooding and blue-green algae.

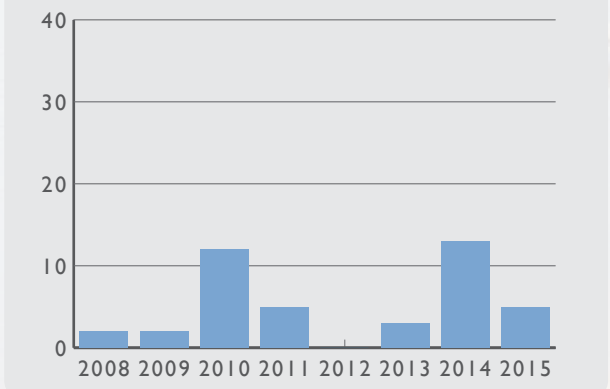


Figure 35: *Total number of days Coon Fork Beach was closed from 2008-2015.*

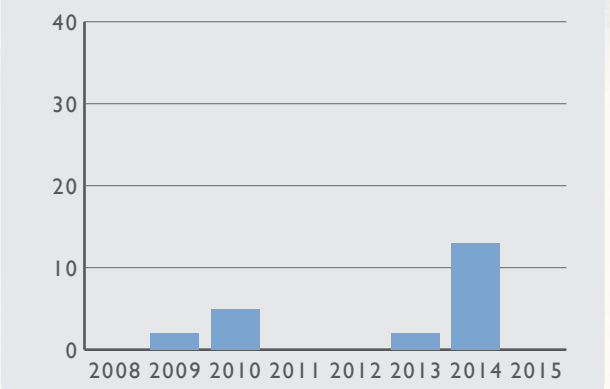


Figure 36: *Total number of days Coon Fork Campground Beach was closed from 2008-2015.*

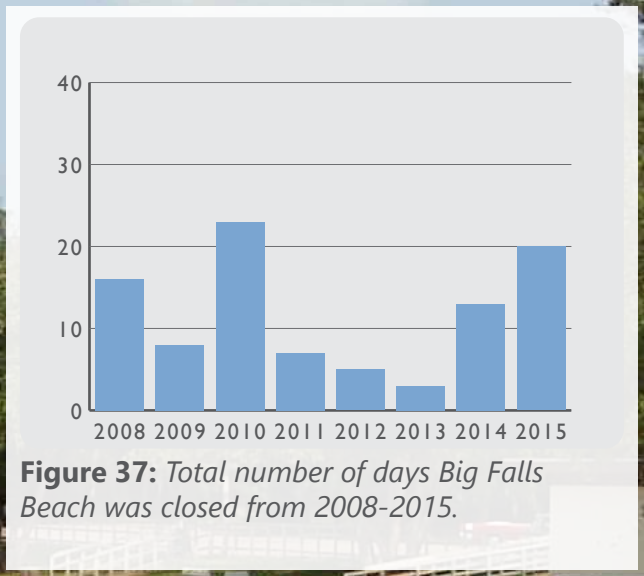


Figure 37: *Total number of days Big Falls Beach was closed from 2008-2015.*

Clark County monitors water quality at two public beaches within the Eau Claire River Watershed (Mead Lake & Rock Dam), but the County does not track total number of days closed.

Between 2009 to 2015, the following are the dates on which E-coli counts exceeded the 1,000 cfu/100mL threshold, thus necessitating a beach closure:

Mead Lake - 6/20/11, 6/22/11
Rock Dam Lake - 6/28/10, 6/22/11

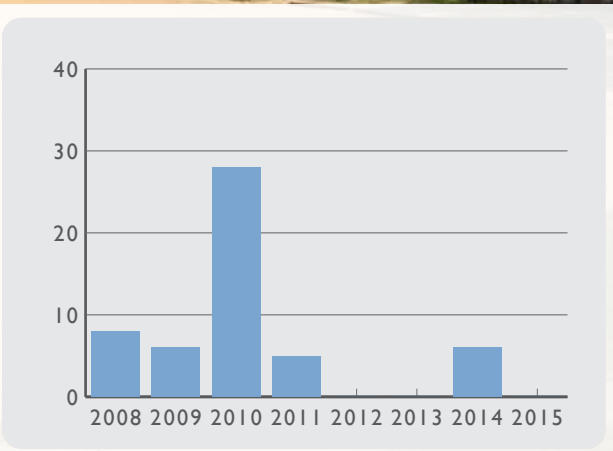


Figure 38: *Total number of days Lake Altoona Beach was closed from 2008-2015.*

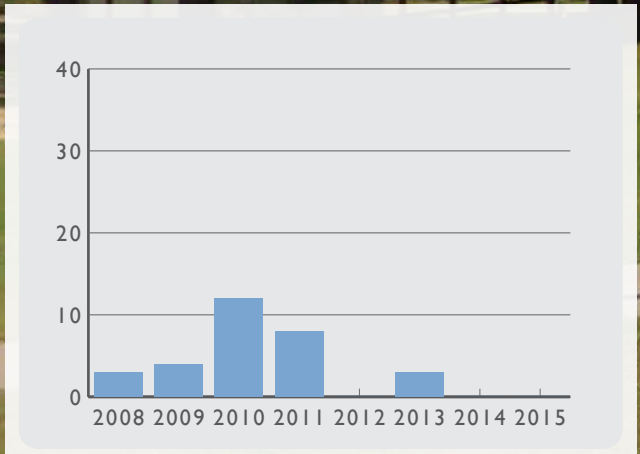


Figure 39: *Total number of days Lake Eau Claire Beach was closed from 2008-2015.*

SECTION IV: PHOSPHORUS & SEDIMENTATION LOADING ESTIMATES

SECTION IV. PHOSPHORUS & SEDIMENTATION LOADING ESTIMATES

This section of the Eau Claire River Watershed Strategy is necessarily more technical than the others. As discussed in the introduction, 9-key element plans must include quantifiable estimates of pollutant loading and the expected load reductions. To develop these current and expected (target) estimates, scientific monitoring, analysis, and modelling is required. This section summarizes past recent phosphorus and sedimentation estimates, as well as uses three tools (i.e., EVAAL, STEPL, SWAT) to analyze and create updated estimates for the entire watershed.

Phosphorus (P) and Total Phosphorus (TP) are often used interchangeably within this report and other materials meant for public review. For example, the WDNR webpages on Wisconsin's Phosphorus Rule makes no such distinction, though the rule is actually based on TP. TP consists of both dissolved and particulate phosphorus. Because phosphorus can change form, most scientists measure and model total phosphorus (TP) for water quality purposes rather than any single form of phosphorus to determine the amount of nutrient that can feed the growth of aquatic plants such as algae. However, for crop nutrient management planning and soil testing, standards are based on phosphorus (P).

ABOUT WATER QUALITY MODELLING

Water quality models are tools that help us understand what is going on. Models help us set target objectives, prioritize our action plan strategies, and best use limited resources. While water quality modelling is a science, no model is perfect. Accuracy is dependent on available data inputs and may not reflect changing trends or unusual events.

The Coalition identified the following questions or data needs related to water quality modelling:

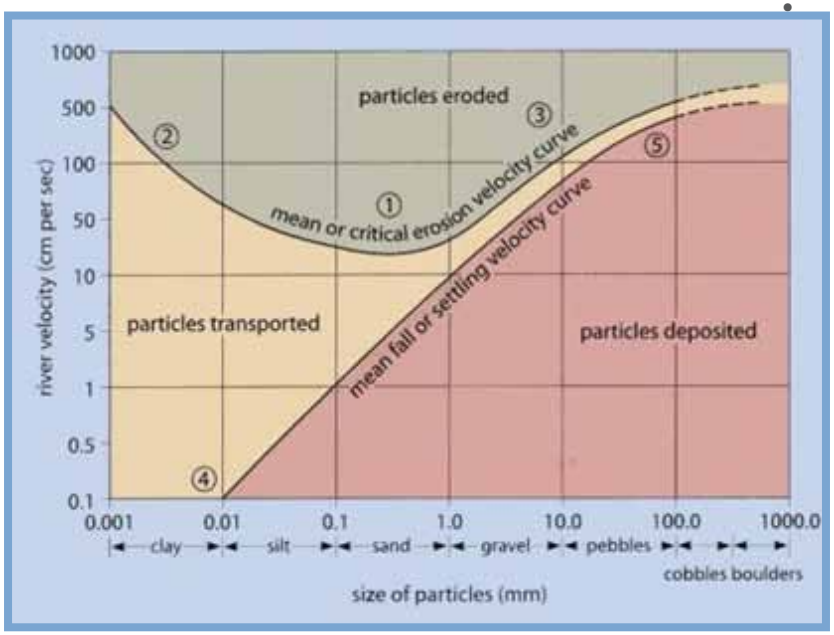
- What did our riparian areas and river beds look like prior to European influence?
- A firm understanding of the exact mix, characteristics, and sources of sediment-loading into our lakes (e.g., bedload vs. wash load, riparian vs. upland). There are significant differences in current models, especially wash-load estimates.
- What is the natural, background phosphorus loading of our forests, wetlands, etc. and how much "legacy phosphorus" is stored in the bed loads and wetland areas?
- Predictions for different types of sediment loading into our lakes.
- Regular bathymetric mapping to track river/lake bed changes and identify/quantify deposition areas.
- Lack of continuous flow monitoring at key locations throughout the watershed.
- Impacts and benefits of opening and reconnecting backwater floodplains and wetland areas.
- Shoreline and bank erosion hotspots and trends.
- Do practices, such as sand traps, have the potential to create new problems up or down stream?
- Long-term impacts of weather and climate trends on our surface waters, sediment loading, and water quality.

SECTION IV. PHOSPHORUS & SEDIMENTATION LOADING ESTIMATES

A. SUMMARY OF RECENT POLLUTANT-LOADING STUDIES

Appendix D provides a summary of the following recent pollutant-loading studies with potential watershed-wide implications:

- Coon Fork Flowage SWAT Analysis (2002), Panuska Study (1997)
- Phosphorus Loading Model for Lake Eau Claire and Lake Altoona (2009)
- Lake Eau Claire Management Plan (2012)
- Lake Altoona Sedimentation Study Project Report (2015)
- Phosphorus and Sediment Total Maximum Daily Load (TMDL) for Mead Lake (2008)



NOT ALL SEDIMENT IS THE SAME

The Hjulstrom Curve explains the sediment transport/deposition relationship between sediment size and flow velocity. Faster-flowing water and flood events can transport larger sediment, while slow-moving water can only support the smaller, finer sediment, some of which would drop out when water slows further as it enters a lake or impoundment. Different parts of the watershed are experiencing issues with different types of these sediments.

For purposes of this plan, the Coalition decided to use the following definitions:

Wash load – This is the "small stuff." Often referred to as suspended sediment, wash load is the fine clays and silts that primarily comes from our upland areas and conveys most of the phosphorus from urban and agricultural lands.

Bed load – This is the "larger stuff" consisting of the larger sands and gravel that travels downstream along the bottom of our rivers. Bank erosion, gullying, and river bed scouring during heavy rain, flooding, or peak flow events is the primary source of bed load.

Riparian areas – These are the shorelands, riverbanks, hydraulically connected wetlands, floodplains, and lands nearest and adjacent to the surface waters. In the smallest streams, the riparian areas can be quite small.

Uplands – Uplands are located outside the riparian areas.

B. EROSION VULNERABILITY ASSESSMENT (2015 EVAAL MODEL)

The Erosion Vulnerability Assessment for Agricultural Lands (EVAAL) toolset was developed by the Wisconsin Department of Natural Resources to identify areas that are potentially more vulnerable to erosion, and, thus, more likely to transport sedimentation and phosphorus to surface waters.

This information can then be used to help prioritization management efforts. As part of the development of this Watershed Strategy, Olson Environmental Research, LLC applied the EVAAL toolset to the Eau Claire River Watershed.

The EVAAL GIS model uses the following factors to determine vulnerability:

1. Risk of Sheet and Rill Erosion (overland, top soil erosion)
2. Risk of Gully Erosion (channel erosion)
3. Areas not hydrologically connected to surface waters (internally drained) are de-prioritized.

Data inputs considered include topography, soil type, rainfall, land cover, cropland types, and, for gully erosion, stream power. The EVAAL model provides a relative ranking of erosion risk (High to Low), but does not estimate the real value of sediment or nutrient runoff. While erosion and pollutant loading are related, a direct, one-to-one relationship between erosion and pollutant loading cannot be assumed.

Figure 40 on the next page shows the EVAAL results for the entire Eau Claire River Watershed. This map is considered a "worse-case scenario"; it is only an assessment of potential erosion risk and does not reflect actual practices and existing conservation measures.

Land and cover crop management (or lack thereof) can increase erosion, resulting in a high C factor (erosion rate) in the Universal Soil Loss Equation (USLE). A high C factor was assumed for the worse-case scenario. Likewise, good soil health and land management will reduce the C factor. The best-case scenario would have a low C factor with typical, appropriate soil health and best management practices assumed based on the soil, topography, and other local conditions.

Figure 41 shows those areas with the highest potential for improving erosion vulnerability. Those areas rated high (orange and red) had the largest C factor difference between the worse-case scenario (Figure 40) and the best-case scenario (not shown). This can be useful for landowners, farmers, conservation agencies, and communities who are interested in achieving the greatest load reductions with least amount of resources. However, keep in mind that some of these areas may already be managed better than the model predicts.

Please note that each HUC-12 was analyzed individually in the following two maps, so the colors are only comparable within each individual HUC-12; comparisons between HUC-12 may not be valid. As such, these maps are most useful in helping to target actions within a HUC-12.

Figure 40: *Erosion Vulnerability in the Eau Claire River Watershed*

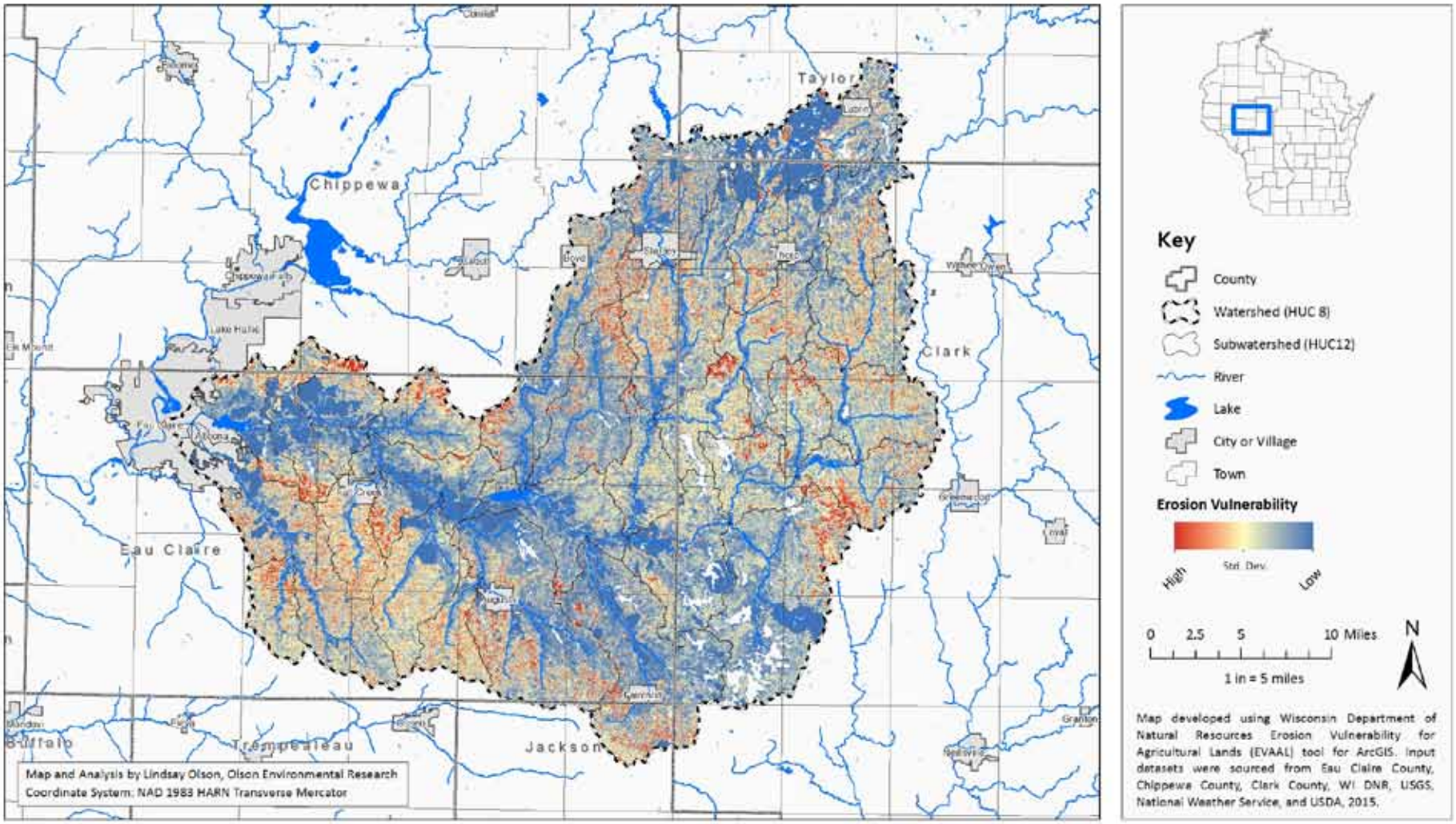
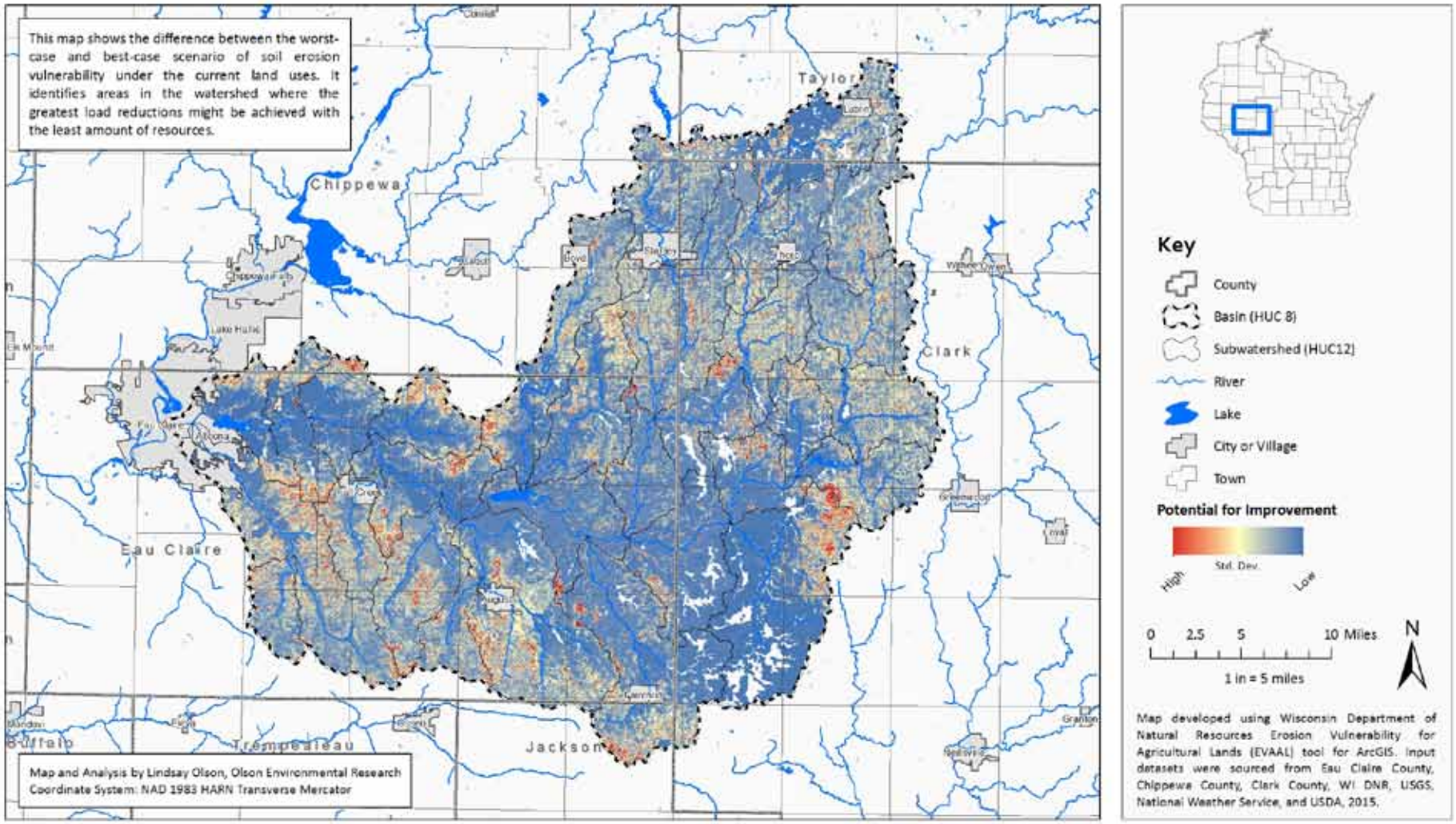


Figure 41: *Potential for the Improvement of Erosion Vulnerability in the Eau Claire River Watershed*



C. STEPL POLLUTANT LOADING ESTIMATES

To help us better understand phosphorus and sediment loading in the watershed, Olson Environmental Research, LLC, also developed a STEPL-based pollutant loading model for the Eau Claire River Watershed. The Spreadsheet Tool for Estimating Pollutant Load (STEPL) is an EPA-accepted approach to estimating nutrient and sediment loads from different land uses and the load reductions that would result from the implementation of various best management practices (BMPs).

Using the STEPL tool results, the maps on the next two pages were created:

- The potential total annual phosphorus load for all land uses by HUC-12 as a ratio of phosphorus load to acreage.
- The total annual sediment load for all land uses by HUC-12 as a ratio of phosphorus load to acreage.

Given that these maps do not account for current best management practices, the relative differences between HUC-12s are more important rather than the specific estimates. These maps can be very helpful in targeting potential HUC-12s for BMPs and other strategies. A quick comparison between total phosphorus load map and the total sediment load map shows the close relationship between the phosphorus and sedimentation. Both travel together in runoff and we cannot address one without addressing the other. However, the STEPL tool primarily focuses on upland areas, which is primary source of finer, suspended sediments. Bank erosion and bedload sedimentation are largely not included in the STEPL model or reflected in these maps.

The STEPL tool was also used to help develop the 10-year phosphorus reduction "goals" (10-year indicators) in Section VIII. To develop these interim 10-year "goals", the Land Conservation Departments (LCDs) from each of the 5-counties in the watershed estimated the acreages of current, commonly used best management practices (BMPs) for each HUC-12. The LCDs were also asked to estimate realistic and feasible potential BMP acreages in 10-years, if resources were available. The table with the results of the County LCD efforts is included in Section XIII.C. and will be used to help guide BMP implementation.

The County LCD estimates were further modified by WCWRPC and County LCDs to create a potential scenario that would account for multiple cropland BMPs on the same cropland acreage; this step was needed to avoid counting the same acreage (and phosphorus reductions) twice. Based on this scenario, it was estimated that, on average across the watershed, 36% of current cropland acreage have two or more BMPs and 51% of future (10-year) cropland acreage could have more than one BMP.

The cropland BMP acreage scenario results were then provided to WDNR to use as inputs into the STEPL model to estimate potential 10-year phosphorus reductions. The results of the scenario are reflected in the 10-year reductions by HUC-12 in the first table in Section VIII.C. This scenario was used to help establish the watershed-wide 10-year phosphorus reduction "goal," though the individual 10-year results by HUC-12 are less useful since the scenario results did not include all potential BMPs (e.g., stream fencing, replacing failing septic systems, rotational grazing, barnyard practices, urban practice) and this plan will later recommend that BMPs target certain geographic areas. For more details regarding the STEPL modeling, WCWRPC and WDNR has prepared a technical memorandum as a supplement to this Watershed Strategy.

Figure 42: *Estimated Annual Phosphorus Load Yield As a Ratio to HUC-12 Acreage.*

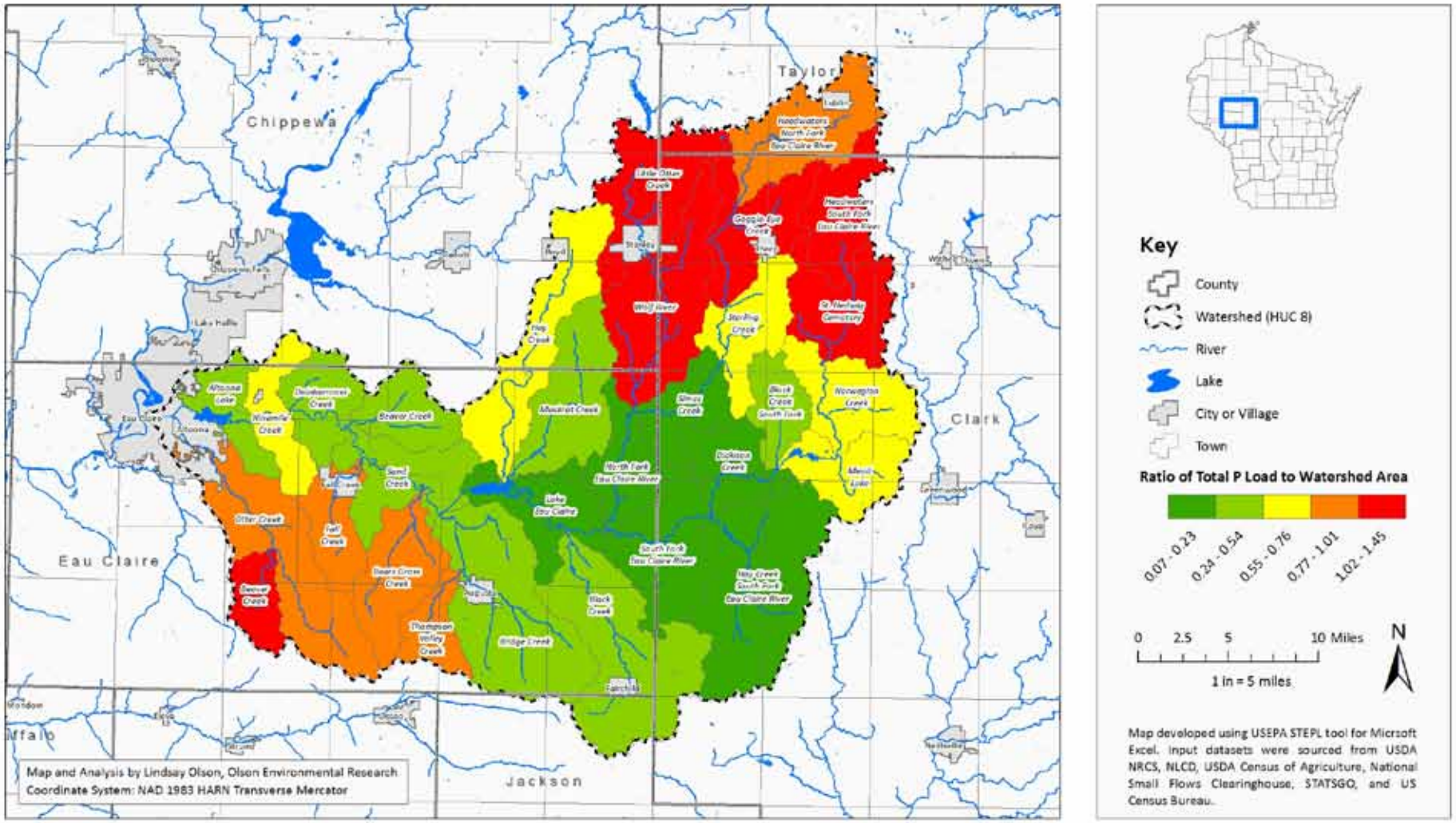
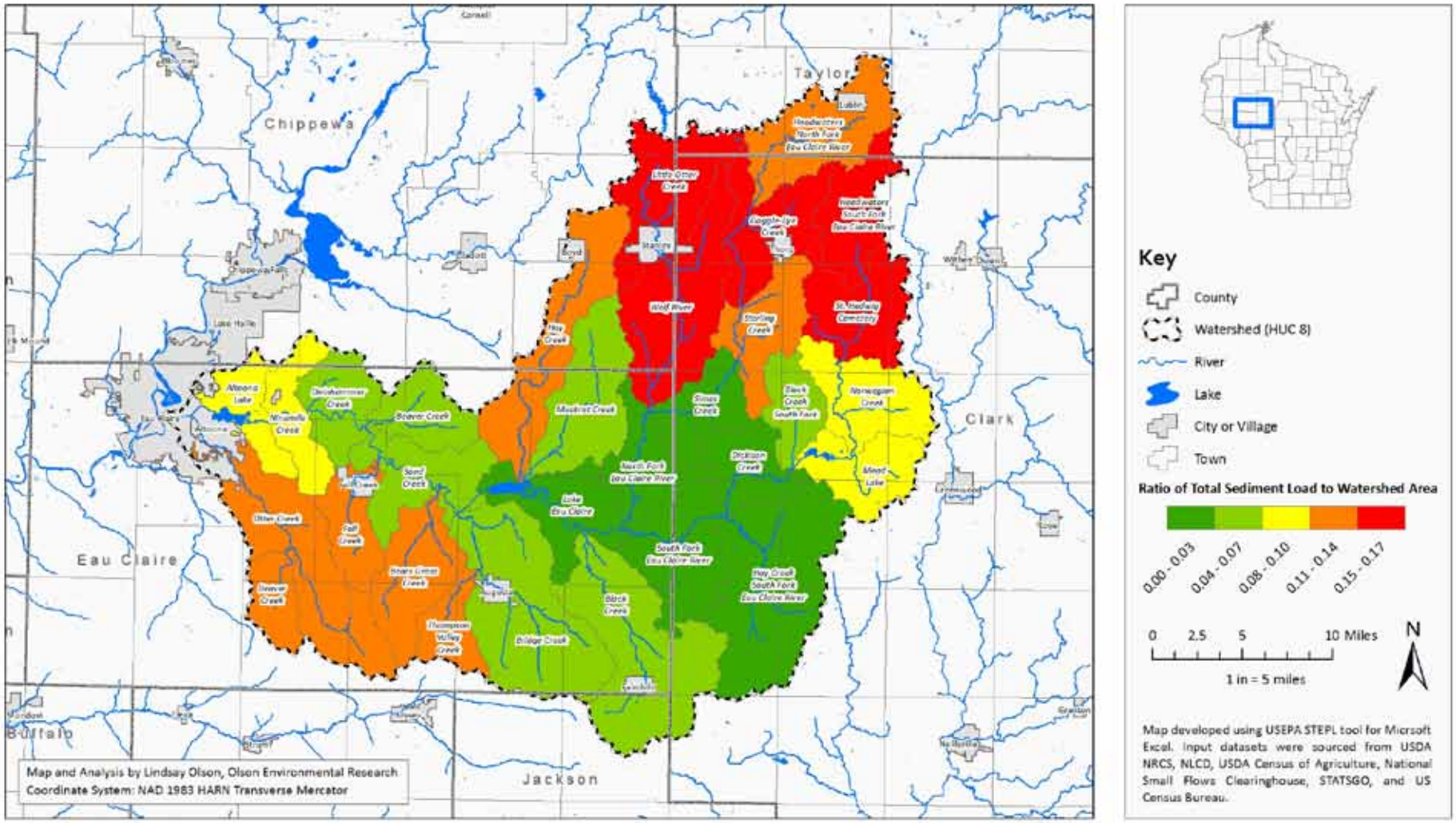


Figure 43: *Estimated Annual Sediment Load Yield As a Ratio to HUC-12 Acreage.*



D. WDNR SWAT PHOSPHORUS-LOADING MODEL

The Soil and Water Assessment Tool (SWAT) model previously developed for the Eau Claire River Watershed (Freihoefer et al. 2009) was used to determine how much phosphorus-loading reduction is needed in each HUC 12 in order to meet Wisconsin's maximum allowable phosphorus concentration standards. The results were used to develop the HUC-12 and overall phosphorous reduction target objectives in Section VIII.C.

The SWAT model is a physically based model that simulates stream flow, sediment loss, and nutrient exports (Neitsch et al. 2002). The SWAT model incorporates the effects of weather, surface runoff, evapotranspiration, crop growth, irrigation, groundwater flow, nutrient loading, and water routing for varying land uses. SWAT divides a large watershed into subwatersheds, which are further subdivided into hydrologic response units (HRUs) which are defined as unique combinations of soil, land cover type, and management practices in a subwatershed. The SWAT model has successfully been used to evaluate agriculturally dominant watersheds for sediment and nutrient TMDLs (Cadmus, 2012; Cadmus 2011; USEPA 2004).

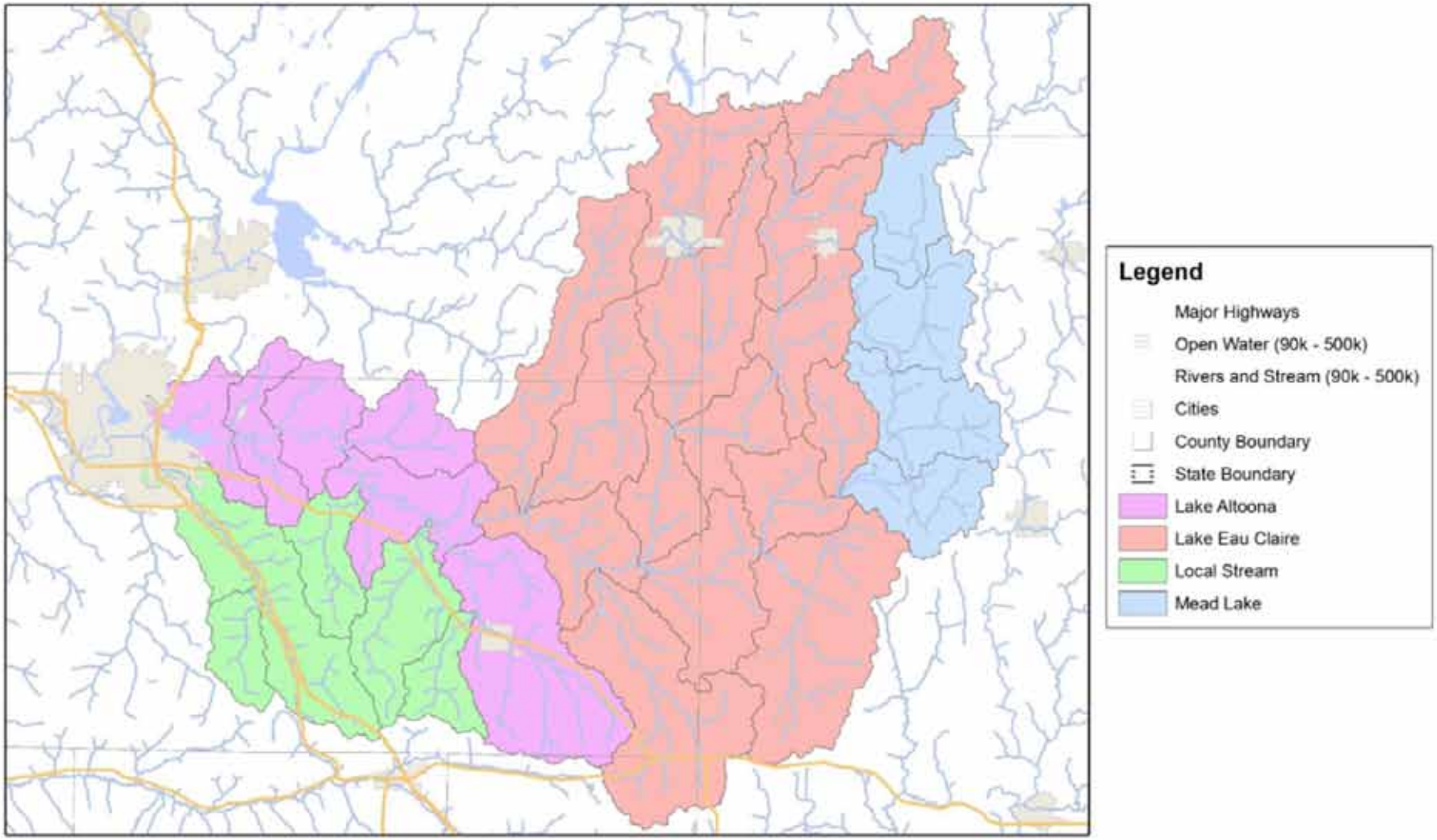
Two different tools were used to determine the relationship between watershed phosphorus loading and resultant lake and stream water quality:

- For the streams, the goals (or targets) were initially based on meeting the local stream criteria for phosphorus which is a May – October median of 75 µg/L. Many streams in the basin currently exceeded the criteria; however there are a number of streams that are well below the criteria, primarily in subsheds dominated by forest lands.
- For the lakes or impoundments in the watershed, the goals (or targets) are largely based on summer algal bloom frequencies as measures by chlorophyll-a. The goal is to attain the recreational use expectation (WisCALM) by limiting "nuisance algae blooms" (i.e., >20 ug/L chlorophyll-a) to less than of 30% of days during the sampling season.

The water quality of rivers and lakes in the upper parts of the watershed flow to and impact the rivers and lakes in the lower parts. Setting the phosphorus reduction target objectives in Section VIII for the watershed was done in a sequential fashion to first ensure that local water quality target were met and then determine if additional reductions were needed to meet downstream water quality targets. Where reductions are needed in order to meet the water quality targets, anthropogenic (i.e. urban and agricultural) sources of phosphorus loading were reduced until load targets are met. Urban phosphorus yields were reduced from 0.6 to 0.4 lbs/ac. Cropland yields were reduced by variable amounts depending on the waterbody needs within the lowest yield being 0.18 lbs/ac. This process required calibration to ensure phosphorus reduction objectives for all lakes and streams are compatible and work together as a watershed.

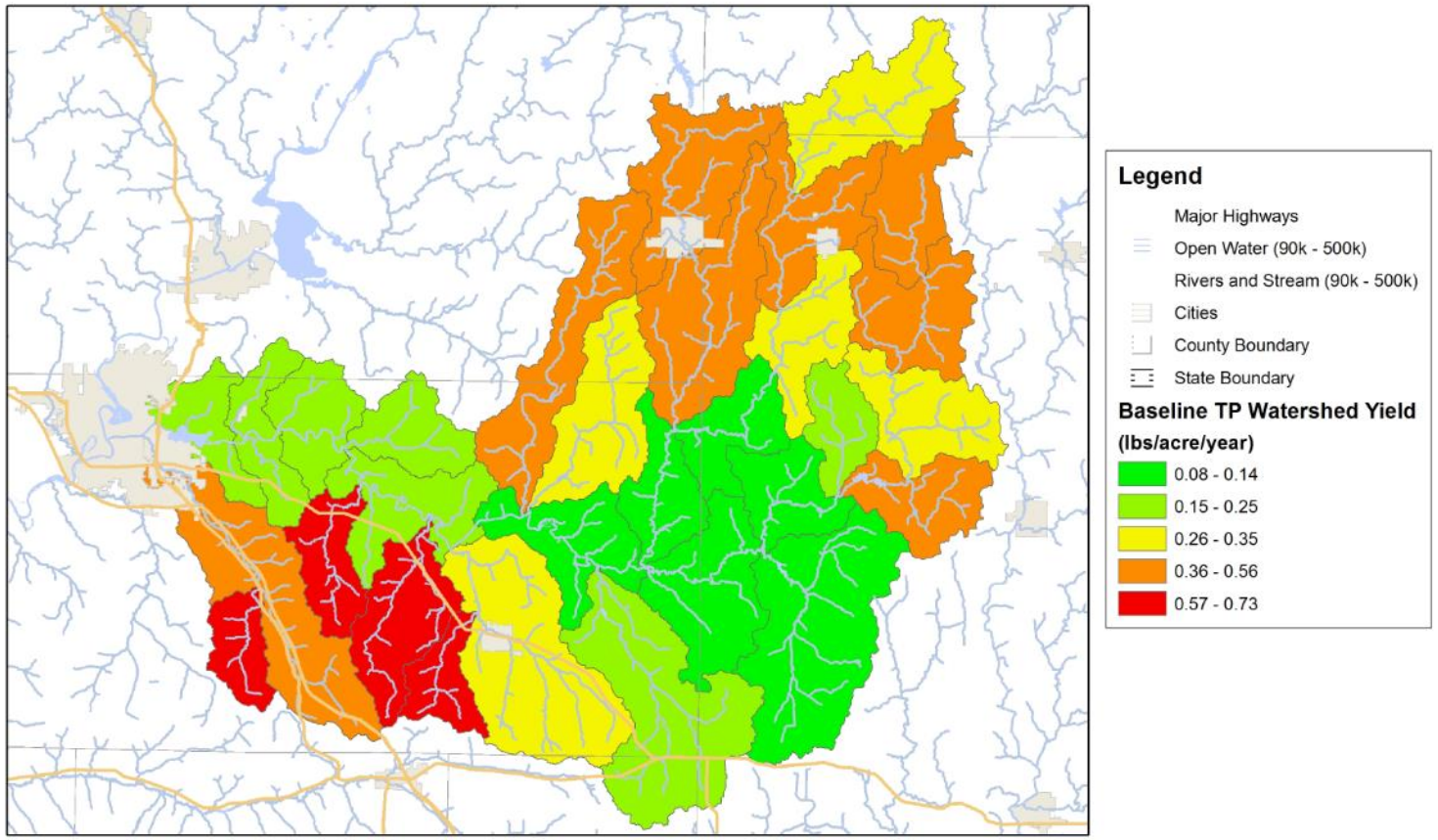
The results of this exercise indicate that for most of the HUC12s in the watershed, the needs of the downstream impoundments drive the load reductions as shown in Figure 44. This is not surprising given that lakes and impoundments generally are more sensitive to phosphorus than streams. The exception to this is the western portion of the watershed where local streams drive the load reduction needs. The analysis also demonstrates that significant load reductions will be needed in the watershed to meet water quality targets. Meeting the water quality targets for Mead Lake and Lake Eau Claire could be particularly challenging.

Figure 44: *Waterbody Driving Reduction Goals in the Eau Claire River Watershed.*



Once the recreational use expectations are attained, additional evaluation of phosphorus concentrations, as compared to water quality criteria, should be conducted. Modeling suggests some waterbodies will be candidates for site-specific phosphorus criteria once uses are attained as measured by chlorophyll-a levels. The results of this SWAT analysis are reflected in Figure 45, as well as the phosphorus reduction target objectives, table, charts, and maps in Section VIII.C.

Figure 45: *SWAT Estimated Annual Phosphorus Yields in the Eau Claire River Watershed.*



E. THE CHALLENGES OF MODELING A DYNAMIC WORLD

The purpose of this modelling is to help us understand how our watershed works, the sources of water quality impairments and how to prioritize our strategies. This modeling was also used to create the phosphorus reduction target objectives in Section VIII and will assist us in evaluating the success of our water quality strategies over time.

As discussed, there have been past modeling efforts within the Eau Claire River Watershed and past management actions to improve water quality do have positive effects. So, why has water quality continued to get worse? Why have previous goals not been met?

The University of Wisconsin-Madison completed research in 2015 on the Yahara Watershed in Dane County to help answer these questions. Their study[1] found that long-term changes in land use, agriculture, and climate, which are often unaccounted for in models and management practices, are undermining the positive efforts being made. These detrimental changes include:

- Due to development, there is less land available for manure spreading, thus concentrating manure on less land and increasing the risk of nutrient runoff.
- Increased impervious surfaces (e.g., parking lots, construction sites) are increasing runoff and erosion.
- Pastures and small grains (e.g., oats) are replaced by row crops, which expose more nutrient-laden soil that is more prone to erosion.
- Wetland loss and degradation has decreased the ecosystem's capacity to capture nutrients.
- Agricultural operations have intensified in an effort to increase production resulting in more phosphorus in the soil. For example, while the number of dairy farms have decreased, average herd size and per-cow milk production (and thus per-cow manure production) have increased.
- Annual precipitation and the frequency of heavy rainstorms have been on the rise, which leads to more erosion and runoff.

It can be very difficult to incorporate such changes into models and water quality goals, but changing trends do need to be considered when identify water quality strategies and evaluating success. It is not accurate to simply state that past efforts have been ineffectual when goals are not attained.

As suggested in the Yahara study, we need to address the underlying drivers of water quality impairments, and not solely rely on the standard toolkit of best management practices. And, as such trends change, our water quality models and goals need to be re-evaluated and updated to better reflect our dynamic world.

[1] The Water Sustainability and Climate Project at the University of Wisconsin-Madison. *Research Brief: Unaccounted-for changes in land use, climate, and agriculture undermine efforts to improve water quality.* The Board of Regents of the University of Wisconsin System. 2015.

SECTION V: EAU CLAIRE RIVER WATERSHED ISSUES & OPPORTUNITIES

SECTION V. EAU CLAIRE RIVER WATERSHED ISSUES & OPPORTUNITIES

During February and April 2015, Coalition members identified and prioritized the issues and opportunities to be addressed as part of the Eau Claire River Watershed Strategy, which are listed in priority order in subsections A & B below. This information is supplemented by subsection C, which contains highlights from a Fall 2015 goal-setting survey. The following provided important direction for the Watershed Strategy, but did not limit the scope, goals, and recommendations.

A. WATER QUALITY ISSUES & OPPORTUNITIES

1	Identify water quality strategies for smaller streams; not all of the Watershed Strategy's focus should be on the Eau Claire River and the lakes.
2	Sedimentation and the need to reduce or eliminate dredging.
3	Phosphorus in wetlands and "sponge areas,", as well as the impacts of the loss of wetlands on river quality.
4	Control of Phosphorus and limit unnecessary applications (or over application).
5	Stabilize concentrated flow channels, riverbank erosion, and strategies to address cut banks.
5	Changing farming practices.
7	Re-connectivity of where water enters Lake Eau Claire.
8	Educating public and governments in urbanizing areas, such as within Otter Creek subshed.
8	Opportunity costs for lake associations and districts. If we can address phosphorus & sediment, then they can use their resources and energy on other issues (e.g., improving habitat and access).
10	Strategies should be included for rented cropland.
10	Habitat protection and restoration.
10	Aesthetics and the recreational use of the watershed, especially along the riparian corridors.

B. IMPLEMENTATION ISSUES & OPPORTUNITIES

1	Need to collaborate, create new partnerships, and learn from each other.
1	Public education on why water quality is important, what are good BMPs, and what are bad practices.
1	Need strategies to get all landowners to implement BMPs, including those who may be resistant or even adversarial today.
1	Need measurable, prioritized strategies that can be monitored and evaluated to determine success (metrics).
5	Public dollars and resources are limited; stakeholders need to collaborate and expectations/goals must be realistic.
6	Need new/different approaches and strategies to address why we have not reached our goals.

6	Develop capacity of stakeholders to address water quality problems.
6	Look for opportunities to achieve multiple benefits from a single strategy.
9	Need to show success early and build momentum by accomplishing low-hanging fruit. Then demand will increase for other types of activities and support.
9	There is little political will for enforcement and accountability of the rules that are already in place.

C. WATERSHED COALITION GOAL-SETTING SURVEY

In Fall 2015, Coalition members participated in a web-based survey that was used to develop the Watershed Strategy's vision, goals, and action plan. The following are some highlights from the survey results:

- 94% of respondents agreed that the water quality strategies and resources should primarily focus on phosphorus and sedimentation.
- 94% agreed that the Watershed Strategy should include measurable target objectives for algae blooms on the major lakes.
- 75% agreed that run-off from farming and forestry are a higher priority concern than run-off from residential, industry, and urban properties.
- 94% agreed that the control of invasive species is a water quality issue.
- 93% agreed that the Coalition should have an active role in monitoring progress on implementation of the Watershed Strategy.
- 93% agreed that the Watershed Strategy should incorporate, reference, and support existing lake management and subshed plans, but not repeat them.
- 100% agreed that the Watershed Strategy should focus on preventing and reducing the sources of pollutants and sedimentation, while the lake management and subshed plans are better suited to identify specific strategies to manage the impacts of the pollutant loading.

The top eight general strategy approaches as prioritized by the Coalition during the survey were:

- Tangible, "boots-on-the-ground" projects and conservation measures that reduce runoff and pollutant loading are the most important Watershed Strategy recommendations.
- All residents in the watershed should understand why healthy soils are important to water quality.
- The Watershed Strategy should emphasize education and voluntary efforts, instead of regulations and enforcement.
- Educating elected officials so the water quality is priority is critical to reaching our Watershed Strategy goals.
- An annual Eau Claire River Watershed event should be established, similar to the Red Cedar Conference, to provide networking, educational, and outreach opportunities.
- The Watershed Strategy should recommend forming one or more farmer-led councils that can work with landowners to help prioritize water quality projects and get them completed on private properties.
- A formal, comprehensive streambank erosion inventory of the watershed is needed so that projects and resources can be better prioritized.
- Demonstrations and pilot projects are needed within the watershed to show the economic and environmental value of good practices.

The survey also suggests that the Watershed Strategy should address water quality threats in the following order of priority (top 3 responses only):

1. Subsheds and areas with high pollutant loading, high potential for improvement, and where landowners/ communities are most willing to implement BMPs.
2. The primary sources of phosphorus and sedimentation, including runoff from agricultural lands, shorelands, and unstable streambanks.
3. Subsheds and areas with the highest potential for improvement.

The Coalition also identified the following stakeholders as the top five priorities for education, outreach, and as potential future Coalition partners:

1. Farmers, Agricultural Agencies, Agri-Businesses, and Forestry Businesses
2. Local, State, & Federal Elected Officials and Decision Makers
3. Residents in Rural Towns and Villages
4. Non-Farmer Landowners with Leased Cropland and Managed Forest
5. Shoreland Owners

SECTION VI: FARMER SOCIAL SCIENCE ASSESSMENT

SECTION VI. FARMER SOCIAL SCIENCE ASSESSMENT

A social science assessment is used to better understand the stakeholders responsible for and impacted by the decisions that will be made as part of this planning process. The results provide a clear picture of the priorities of stakeholders, an understanding of factors influencing behaviors related to water quality, and information on factors that influence stakeholder engagement in efforts to preserve or enhance the watershed.

From February to April 2016, Aaron Thompson of the UW-Extension Center for Land Use Education (CLUE) sampled 310 agricultural landowners in Eau Claire, Chippewa, Taylor, and Clark counties using an 8-page survey and a five-contact process. Surveys were sent to individuals who own 60 or more contiguous acres of agricultural land. Due to funding limitations, the survey focused on four HUC-12 subwatersheds that have considerable agricultural acreage—Bear Grass Creek, Fall Creek, Wolf River, and the Headwaters North Fork of the Eau Claire. The overall survey response rate was 44.5 percent. Of the respondents, 28.5 reported being non-farming households (landlords only).

The full assessment report can be found in Appendix F. The following are some key findings:

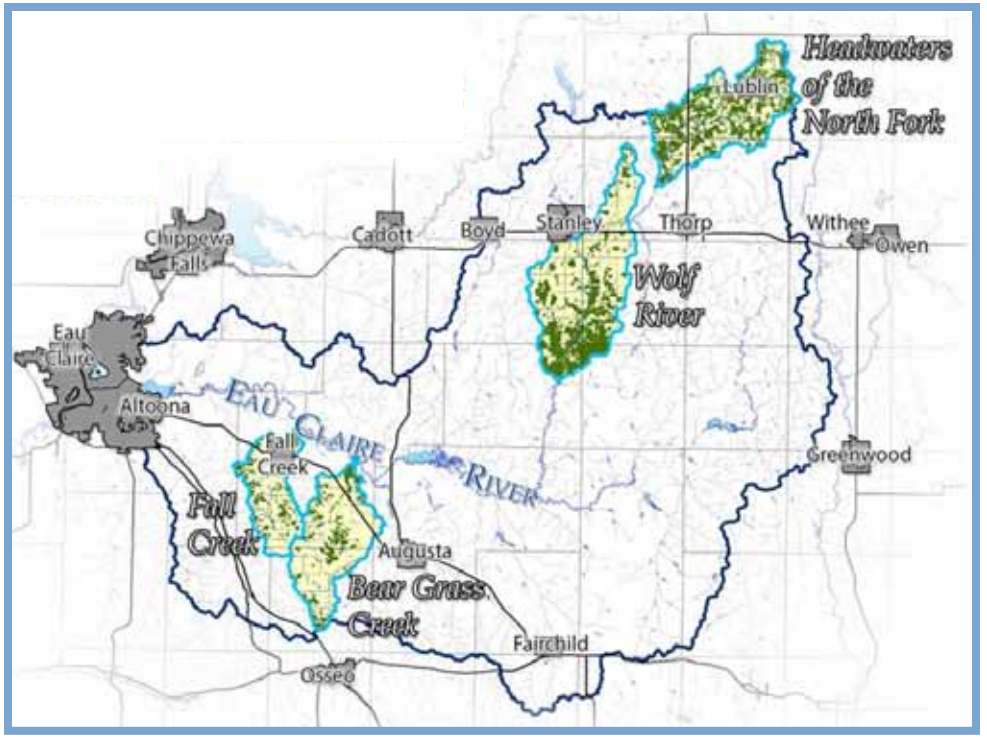


Figure 46: *Map of survey areas in the Eau Claire River Watershed.*

Key Finding #1: There is a consensus on important messages and watershed goals

More than 93% of all respondents (all three attitude groups) agreed that enhancing SOIL HEALTH, REDUCING SOIL EROSION, and preventing PHOSPHORUS LOADING in the rivers are clear goals for this landscape.

Key Finding #2: Respect differences in attitude groups

While no two persons are exactly alike it is helpful to understand the dominant belief systems, or shared attitudes, that guide individual and household behaviors. To help us understand what motivates conservation behaviors in our watershed the social science assessment differentiates landowners into three representative stakeholder groups based on how individuals responded to a series of questions measuring farmers' views of the environment. The following descriptions of the three groups below provides a snapshot of the characteristics of members' farms and an overview of the shared attitudes that influence their goals for the landscape, willingness to work with various partners to solve water quality challenges, and how they'd like to be involved in decisions regarding efforts to improve water quality in the watershed.

GROUP	ACREAGE OWNED	ACREAGE RENTED	CONSERVATION ACREAGE	SUSBHED DISTRIBUTION OF RESPONDENTS
#1 Farm is a Business	7,483	2,911	325	Group #1 makes up about 30% in 3 of the subsheds, with 0% in Headwaters North Fork.

- As a whole, members are less likely to report being a landlord only, while this group also had slightly higher percentages of row crop, dairy, and other livestock operations compared to other groups.
- Members of this group strongly disagree that "to protect the rural landscape, farmers must move away from conventional agricultural practices to approaches that more closely mimic natural process."
- Members of this group strongly agree that "good farming requires using all available acreage as efficiently as possible to maximize yields."
- Very distrustful of WDNR and local conservation organizations, but most willing to work with UWEX and County LCDs.
- Strong concerns about funding availability and partnering with agencies whose land management goals may differ from their own; generally not supportive of the initial mission of the Watershed Coalition.

#2 Balancing Competing Demands	10,250	2,491	101	#2 is over 54% of Bear Grass and Headwaters North Fork

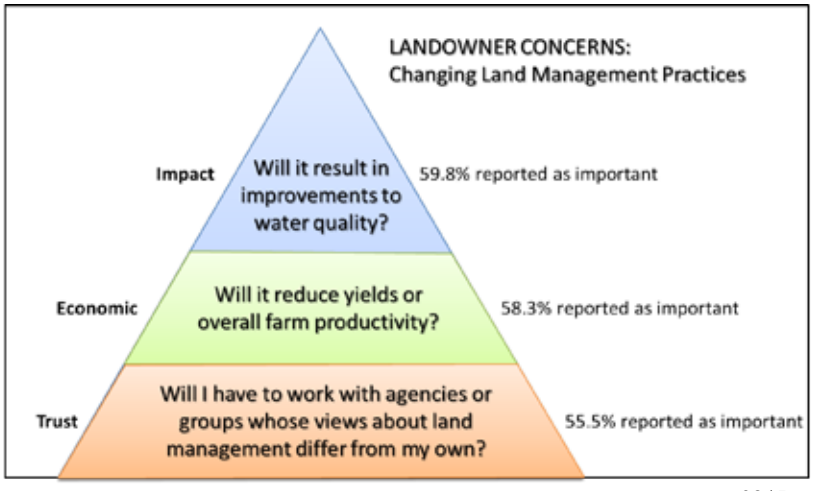
- Well represented in all types of production, although have a slightly smaller percentage in row crop and other livestock compared with members of the other groups.
- Members of this group strongly agree that "good farming results from placing equal importance on the management of both the agricultural and natural areas of my farm."
- Members of this group strongly agree that "good farming requires using all available acreage as efficiently as possible to maximize yields."
- This group seeks input and is willing to work with a wider array of partners, but their preference is County LCDs or NRCS.
- Generally supportive of the initial mission of the Watershed Coalition, but least likely to support a farmer-led council.

#3 Conservation Partners	9,371	861	1,466	#3 is over 33% of Wolf River and 45% of Headwaters N.F.

- Well represented in all types of production with a strong presence in the row crop, dairy, and other livestock categories.
- This group as a whole currently sets aside more acreage for conservation purposes than members of the other groups.
- Members of this group strongly agree that "good farming results from placing equal importance on the management of both the agricultural and natural areas of my farm."
- Members of this group strongly disagree that "modifications to my farm that increase production, such as the removal of grasslands, fence rows, or grass field buffers have little impact on the environment."
- This group is willing to work with everyone with County LCDs or UWEX at the top of their list.
- The most supportive of the initial mission of the Watershed Coalition and are the most likely to support a farmer-led council.

Key Finding #3: Landowners must believe that a practice will have positive impacts

The chart below identifies the most important factors that influence interest in conservation practice adoption among the respondents.



Key Finding #4: We need "boots on the ground" led by County Land Conservation Departments

Most respondents were open to considering conservation practices. Seventy percent want additional educational materials to explain conservation options. About 50 percent would like someone with expertise to come out to their farm and discuss practices in person. And more than half (52.5%) would like some form of community support to manage water quality issues and access to available funding for conservation practices was important to all three attitude groups. The ***County Land Conservation Departments were the most trusted entity among all three groups*** for such outreach, perhaps with the support UW-Extension agricultural agents and local NRCS offices.

Key Finding #5: There is interest in farmer-led councils, but interest varies

Farmer-led councils are a relatively new approach to addressing water quality and the overall results of this survey confirmed that strong opinions have yet to be formed by landowners in the Eau Claire River Watershed toward these efforts. Across all attitude groups the support for farmer-led councils is near neutral with Group 2 reporting that they were the least likely to participate and Group 3 reporting that they were the most likely to participate. It is important, especially due to the evidence that perception of conservation practice impact strongly influences adoption (see Finding #3), that farmers be engaged in conservation efforts more directly. This need for direct involvement is what has created the interest in farmer-led initiatives; however, for this watershed, it may be important if this strategy initially targets the Fall Creek subshed where respondents reported the highest level of willingness and there is a diverse representation of the attitude groups.

Key Finding #6: Actions that target community priorities have strongest support

Respondents were also asked their opinions on how best to support efforts to address water quality problems in the watershed. The majority of respondents believed that resources should target priority areas, such as land near streams or rivers. However, respondents also believed that resources should be spread among all landowners who are interested in some funding. A very positive finding is that all three attitude groups value spending resources to protect our surface waters.

SECTION VII: EAU CLAIRE RIVER WATERSHED VISION & OVERALL GOALS

SECTION VII. EAU CLAIRE RIVER WATERSHED VISION & OVERALL GOALS

After much discussion and a web-based survey (see Section V.C.), the Eau Claire River Watershed Coalition developed the following vision statement and overall goals to serve as the foundation for the more measurable objectives and recommendations of the action plans. The vision and goals provide a shared image of what the Coalition is ultimately working to accomplish through the creation and implementation of this Watershed Strategy. The vision and goals are intended to be more aspirational and motivational by reflecting the values of the Coalition, while providing direction and focus for the Watershed Strategy's scope.

Throughout the planning process, Coalition members made it very clear that the goals and messaging of this Watershed Strategy needs to speak to the values and motivations of watershed residents in order to be effective. For this reason, the Coalition determined that the overall Watershed Strategy scope should not be limited to non-point source (NPS) pollutant loading, as is the focus of most 9-key element water quality plans.

A. WHY ARE OUR RIVERS, LAKES, AND STREAMS IMPORTANT?

During the Summer 2015 community discussions meetings, attendees were asked why they personally valued our rivers, lakes, and streams. The results were used to create the following "word cloud" with the size of each word reflecting the frequency of response.

SECTION VII. EAU CLAIRE RIVER WATERSHED VISION & OVERALL GOALS

B. VISION STATEMENT

The rivers, lakes, streams, and waterways of the Eau Claire River Watershed are valued resources worthy of long-term management to improve water quality and to maintain healthy fisheries, wildlife habitat, and soil health.

This vision will be achieved by watershed residents working together to promote good land use practices, the economic benefits of good land and water management, and our shared responsibility for the problems facing our water resources.

C. OVERALL WATERSHED GOALS

The following overall goals expand upon the direction provided in the vision statement. As a bottom-up Watershed Strategy, these overall goals have many similarities with the goals of the different lake management plans within the watershed.

Due to the complex, inter-connected nature of surface waters, one single action, best practice, or educational effort can address multiple goals. As such, it was not the Coalition's intent to structure the target objectives and action plans under individual goals.

Soil Health & Water Quality (Phosphorus & Sedimentation) Goal

Protect and restore water quality through good soil health and by reducing sediment, nutrient delivery, and other pollutant loading from point and non-point sources to the rivers, lakes, streams, and waterways of the Eau Claire River Watershed.

Soil Health & Water Quality Sub-Goals

- Reduce phosphorus loading, as well as the occurrence and intensity of blue-green algae blooms.
- Reduce erosion and sediment loading from both shoreline and upland sources.
- Encourage land management practices that promote good soil health and decrease the speed and velocity of heavy stormwater runoff and flooding events that greatly contribute to sedimentation and bank erosion.
- Reducing phosphorus and sediment loading are entwined, are equally important, and are the surface water quality priorities for the watershed.
- By emphasizing sedimentation and phosphorus reduction and good soil health within this Watershed Strategy, there is an expectation that other facets of water quality (e.g., habitat, recreation, bacteria, flooding) will also be improved, though the target objectives for these other facets may be less measurable within the Watershed Strategy.

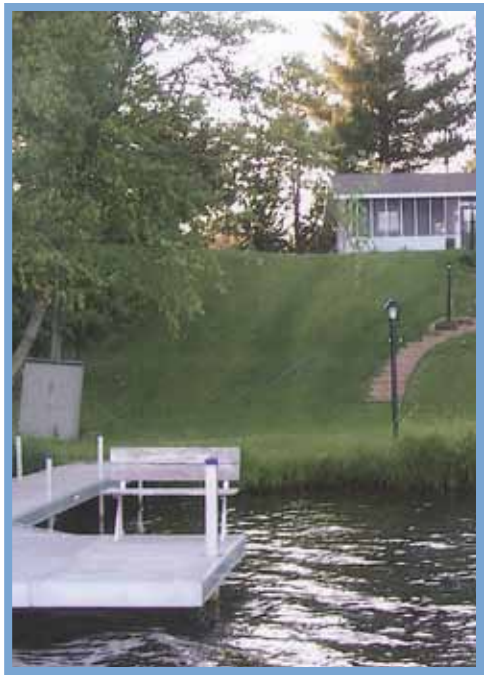
Fisheries & Habitat Goal

Maintain healthy surface waters and adjacent shoreland habitats that provide a visually appealing natural environment and support diverse, healthy, and resilient native communities of plants, fish, and other animals. Efforts will be made to prevent the introduction or expansion of invasive and exotic species, and remove these species when possible.

Recreation Goal

The surface waters and shoreland areas within the watershed should provide safe, diverse recreational opportunities (e.g., fishing, swimming, boating, paddle sports, birdwatching) that are healthy, safe, attractive, and accessible for everyone. Improve and maintain the connectivity of waterways and channels when feasible and ecologically appropriate.

Note: *Clean water, good fisheries, and healthy habitat are essential to our recreation goal. For purposes of this Watershed Strategy, the action plan recommendations related to this Recreational Goal are principally water quality, fisheries, and habitat related. Other recreational issues, such as access, use conflicts, and amenities, are better addressed through individual lake management plans, park master plans, and municipal/county outdoor recreation plans.*



SECTION VII. EAU CLAIRE RIVER WATERSHED VISION & OVERALL GOALS

Education, Civic Engagement & Capacity Building Goal

Increase the awareness of the public and elected officials of the economic and ecological importance of good soil health and surface water quality and how good land and water practices benefit everyone.

Actively engage the citizens of the watershed and develop sustainable, meaningful relationships between residents and stakeholders to restore and protect soil health and water quality. Build community capacity for collaborative decision-making and civic governance to advance the vision and goals of this Watershed Strategy.

Collaboration & Shared Responsibility Goal

Promote and nurture collaborative relationships between watershed stakeholder groups, municipalities, counties, and other units of government to educate elected officials and create an atmosphere of shared responsibility that will ensure the availability of resources and political support to achieve the vision and goals of this Watershed Strategy.

Plan & Policy Coordination Goal

Recognize and support the recommendations, plans, and activities of lake districts, lake associations, county land and water conservation offices, and other organizations advocating for water quality improvement within the watershed. This Watershed Strategy should complement, not duplicate, these other planning efforts, while encouraging local and state policies that support the vision and goals of this effort.

SECTION VIII: SOIL HEALTH & WATER QUALITY TARGET OBJECTIVES & 10-YEAR ACTION PLAN

SECTION VIII. SOIL HEALTH & WATER QUALITY TARGET OBJECTIVES & 10-YEAR ACTION PLAN

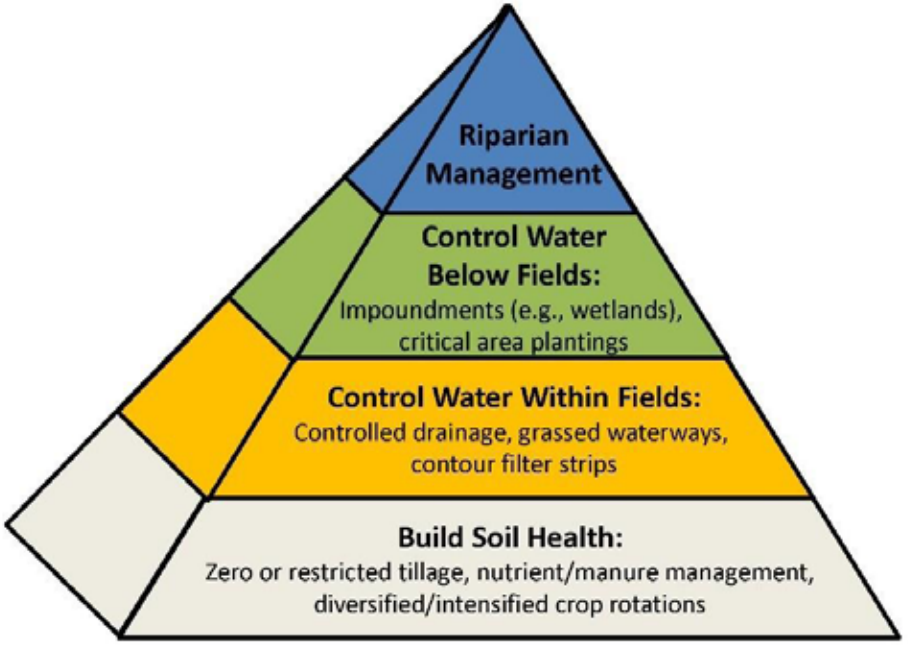
A. THE CRITICAL RELATIONSHIP BETWEEN SOIL HEALTH AND ENVIRONMENTAL CONDITIONS

NRCS defines soil health as the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals and humans. These beneficial effects extend beyond the individual farm field to include the entire downstream watershed ecosystem and even the air above it.

While providing economical and sustainable agricultural products, good soil health:

1. captures and infiltrates rain instead of it running off,
2. captures and reuses atmospheric carbon,
3. generates and retains plant nutrients reducing the need for applied fertilizer and loss to surface and groundwater.

Due to the potential for soil health principles to both improve agricultural sustainability and profitability on large and small farms and improve environmental conditions, it is identified as a critical component to attaining multiple goals of this Watershed Strategy pertaining to both water quality and aquatic habitat improvement. More than any other agricultural practice, it has the potential to both improve farm profitability and environmental conditions. It shows more potential for improvement on both fronts than other alternatives currently available. In this plan we link an advocacy for soil health with a means of empowering citizens as a preferred mechanism for agronomic and ecosystem improvement. Overall, landowners and citizens want to show that they can make such changes without being forced to—everyone has a stake and we don't need regulating agencies to tell us we have to do something about our waters. This Watershed Strategy shows we are taking ownership of our shared resources in our communities.



For farmers and agri-business, numerous research studies have demonstrated the economic benefits of soil health best practices for farm operations. For example, in No-Tillage Seeding in Conservation Agriculture (Baker & Saxton, 2007), the documented benefits of no-tillage farming included improved crop production economics, improved soil quality, and increased moisture, nutrients, and organic matter, while reducing labor, machinery costs, and fuel inputs. A variety of studies, including one from Iowa, have shown that alternative crop rotations can increase cash crop yields, fix nitrogen, increase soil moisture and water stability, decrease erosion, suppress weeds, and reduce chemical inputs (Jordahl & Karlen, 1993; Blackshaw, 2008; Blanco-Canqui, 2012 & 2013; Davis 2012).

Some BMPs are more effective than others. As an example, a 2010 study found that the use of agroforestry and grass buffers improved physical soil properties as compared to pasture rotation and continuous grazing (Kumar, 2010). However, integrating and combining BMPs will often have the best results. For instance, the use of cover crops in the rotation can have the greatest effect on physical soil properties (Villamil, 2006). Integrated crop-livestock systems also have the potential to enhance profitability for farms (Franzluebbers & Stuedemann, 2006; Russelle, 2007).

Time is required for many of these cropland BMPs to take full effect. A Wisconsin study (Jokela, 2009) found that it may take more than four years for some soil quality indicators to fully respond to cover/companion crop treatments. Other BMPs, such as reduced tillage, may require more time before benefits are fully realized. Characteristics unique to the local climate, land, and soils will also influence what combination of BMPs will be most effective at a specific location and how soil health will change over time.

An excellent summary of soil health literature is available here: http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/health/mgnt/?cid=stelprdb1257753

Two recent speakers at the nearby Red Cedar Watershed Conference on the relationship between soil health, farm profitability, and water quality are rancher Gabe Brown and agronomist Ray Archuleta. We encourage you to check out their videos on YouTube; search on each of their names and “soil health.” For additional information on soil health best practices, contact your local County Land Conservation Office, FSA/NRCS office, or UW-Extension Agricultural Agent.

B. THE INHERENT BENEFITS OF ADDRESSING PHOSPHORUS

As a 9-Key Element Plan, the Eau Claire River Watershed Strategy was developed, foremost, to address non-point source (NPS) pollutant loading. Within our watershed, more surface waters are impaired due to phosphorus than any other type of pollutant. The reduction of phosphorus is the primary objective targeted by this plan.

Sediment loading from a variety of upland, riparian, and river bed sources is equally important. Sedimentation can degrade habitat, while filling our lakes and impoundments. However, for the moment, we do not have enough understanding of sediment loading throughout our watershed to enable us to establish measurable target objectives and interim indicators that are realistic and achievable.

Further, unlike phosphorus, there are no State water quality standards for sediment. In comparison, we have sufficient data and standards to establish measurable phosphorus target objectives and 10-year indicators. And there is better news. The soil health practices, best management practices (BMPs), and other actions that we take to reduce phosphorus loading will also reduce sediment loading. Phosphorus travels with the soil; from a management perspective, the two are inseparable. If we manage phosphorus, we are also managing sediment. Further, the actions we take to reduce phosphorus will have other inherent benefits for agricultural, fisheries, and habitat.

SECTION VIII. SOIL HEALTH & WATER QUALITY TARGET OBJECTIVES & 10-YEAR ACTION PLAN

The objectives, indicators, and milestones within Sections VIII and IX are generally organized as follows, though some overlap occurs:

Objectives: *The ultimate, long-term "goal" or outcome. This is where we ultimately want to get to. Phosphorus is the only objective with measurable targets at this time.*

Indicators: *The 10-year progress towards an objective in 10-years. While the phosphorus 10-year indicator is measurable, many indicators are less numerical and more narrative.*

Milestones: *For each recommendation or best practice, this is how much "stuff" do we plan to do in the next 10-years to achieve the indicators. For example, installing twenty BMPs is a milestone and not an indicator.*

The soil health practices and BMPs to reduce phosphorus loading should have the following additional **inherent benefits...**

…benefit farmers by increasing yields, reducing costs, saving time, and making their operation more resilient to severe weather.

...decrease soil erosion and run-off of other pollutants into surface waters, while reducing nitrates in groundwater.

…improve wildlife habitat and the health of our fisheries.

…reduce algae blooms, low oxygen conditions, bacteria, E. coli, and beach closures.

…reduce the speed, energy, and peak flows of flood waters, as well as the potential for bank erosion.

C. WATER QUALITY & SEDIMENTATION OBJECTIVES

As previously discussed, the key, measurable, target objective for this plan is phosphorus. There is insufficient data and resources to establish measurable targets and 10-year indicators for the other objectives in this Watershed Strategy at this time.

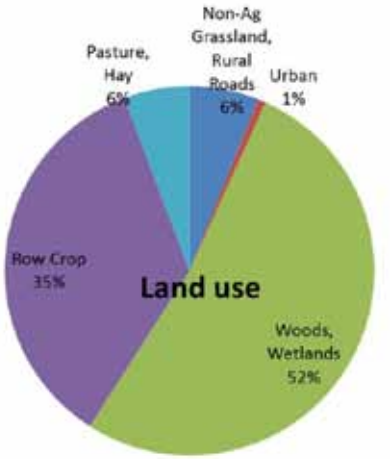
Objectives	10-Year Indicators
PHOSPHORUS - Wis. NR 217 provided maximum allowable phosphorus concentrations for streams, rivers, and lakes (see Section II.H.). **An estimated 54% reduction in phosphorus-loading must occur within the watershed** to achieve the NR 217 standards for the entire watershed. The charts and tables later in this subsection further explains this reduction target and establishes P-loading reduction target objectives by HUC-12.	Achieve a 24% reduction in phosphorus-loading within the watershed by implementing those future, recommended BMPs identified in the table later in this subsection. It is recommended that the Plan Implementation Team establish a "Clean Water Days" standard in order to convey these concepts to the general public. Additional study and monitoring recommended later in this plan.
SUSPENDED SEDIMENTS – Reduce the suspended sediment carried by streams and associated deposition in lakes.	Significant downward trend in monitored suspended sediment levels over time. Can also be measured, indirectly, by the acres of cropland with increased infiltration and edge-of-field monitoring. Additional study and monitoring recommended.
BANK EROSION AND BEDLOAD SEDIMENTATION – Reduce watershed stream bank erosion and the associated need for dredging of lakes, lake deltas, and channels through streambank protection and reduced intensity of runoff events.	Flow monitoring and reductions in the infilling rate of lake sediment traps over time. Can also be measured by the miles of streambank protected. Additional study and monitoring recommended.
NITRATES/NITROGEN-d – Reduce the amount of nitrogen in groundwater to the safe drinking water standard of 10 mg/l.	Decreases in nitrate levels in wells in areas where BMPs are implemented. This will not be monitored or evaluated as part of this plan; additional groundwater study needed. It is difficult to project and evaluate impacts of recommended BMPs on groundwater nitrates due to the complexity of the hydrological cycle. There would likely be significant delays between BMP implementation and detection of change in monitoring wells.
BACTERIA/E. coli – Eliminate the closures of public beaches due to bacterial contamination. Based on U.S. EPA studies and recommendations, WDNR has adopted beach advisory and closure standards using E. coli as the primary indicator.	Reductions in the number of Beach Closing Days downstream of areas where BMPs are implemented. Beach closure trend data from County health departments should be monitored, but more in-depth study on the impacts of BMPs on beach closures may not be a top priority within ten years.

Phosphorus Load Reduction Targets and 10-Year Indicators by HUC-12

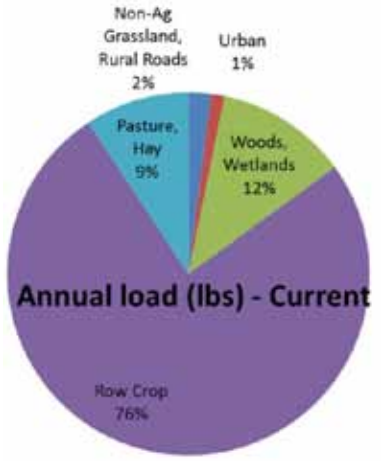
The table on the following page identifies the needed reductions in phosphorus as a percentage of each HUC-12 subshed and as a percentage of the agricultural lands in each subshed in order to meet our total, watershed-wide (HUC-8) phosphorus reduction target objective of 54%. The percentage of phosphorus reduction needed in each HUC-12 is also represented in Figure 47 following the table. These reduction targets (and charts in this section) were developed using the SWAT model as discussed in Section IV.D. The table also includes the current, estimated phosphorus load for each HUC-12, along with a 10-year estimated phosphorus load (or 10-year indicators for each HUC-12). The phosphorus load estimates were developed using the STEPL tool as discussed in Section IV.C. The 10-year reduction estimates also assume that existing BMPs will continue; it is important to support and recognize existing BMP efforts so that they continue.

The first two charts to the right show that while row crops is about one-third of our landscape, it accounts for the far majority of our phosphorus loading. The third chart shows that significant reductions from phosphorus loading from row crops will be needed in order to meet the reduction target objectives for the watershed. The third chart is also 54% smaller than the current annual load, thus representing the decreased phosphorus loading at the target objectives.

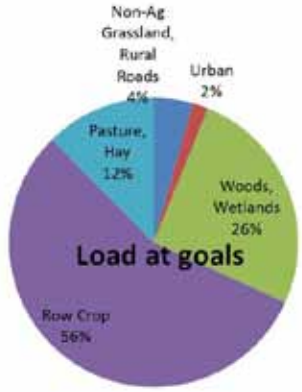
Current Distribution of Land Use by Acreage in the Watershed



Current Estimate of Phosphorus Loads by Land Use in the Watershed



Estimated Phosphorus Load Reductions by Land Use to Meet the Target Objectives (-54% total load; -64% agricultural load)



Estimated Needed Phosphorus lbs Reduction:	10-Year Indicators (as modeled by STEPL)	Long-Term Target Objectives (as modeled by SWAT)	
HUC-12 Subwatershed	**% based on Cropland BMPs**	**% Water-shed**	**% Ag lands**
Headwaters North Fork E.C. River	21%	53%	63%
Goggle-Eye Creek-North Fork E.C. River	40%	66%	70%
Sterling Creek-North Fork E.C. River	30%	61%	69%
Little Otter Creek-Wolf River	21%	68%	73%
Wolf River	22%	72%	76%
Simes Creek-North Fork E.C. River	21%	27%	70%
North Fork E.C. River	46%	11%	70%
Headwaters South Fork E.C. River	28%	65%	68%
St. Hedwig Cemetery-South Fork E.C. R.	25%	69%	72%
Norwegian Creek-South Fork E.C. River	30%	61%	73%
Black Creek-South Fork E.C. River	22%	44%	69%
Mead Lake-South Fork E.C. River	22%	66%	78%
Hay Creek-South Fork E.C. River	22%	37%	69%
Dickison Creek-South Fork E.C. River	20%	31%	70%
South Fork E.C. River	21%	2%	70%
Black Creek-E.C. River	21%	46%	70%
Muskrat Creek	21%	60%	77%
Hay Creek-E.C. River	22%	70%	78%
Lake E.C.-E.C. River	22%	12%	70%
Beaver Creek-Otter Creek	17%	62%	63%
Otter Creek	17%	52%	55%
Thompson Valley Creek	23%	58%	60%
Bridge Creek	21%	24%	29%
Bears Grass Creek	32%	54%	55%
Fall Creek	11%	64%	66%
Beaver Creek-E.C. River	18%	28%	36%
Sand Creek-E.C. River	25%	21%	30%
Deinhammer Creek-E.C. River	17%	25%	32%
Ninemile Creek-E.C. River	19%	26%	31%
Altoona Lake-E.C. River	15%	23%	31%
Watershed Totals	**24%**	**54%**	**64%**

Figure 47: *STEPL & SWAT targets and indicators by HUC-12.*

This table shows two primary things:

1. **The estimated long-term phosphorus reduction targets needed to achieve our ultimate watershed-wide phosphorus objective** based on the maximum allowable phosphorus concentrations for our streams, rivers, and lakes. These SWAT-based percentages show that the long-term target objectives vary by HUC-12 and a significantly larger percent of reductions will be needed on agricultural lands to achieve the long-term targets.
2. **The estimated, potential 10-Year Indicators or interim phosphorus-reduction targets,** which reflect our expected progress towards the long-term targets in #1 above once the BMP recommendations in this action plan are implemented. As explained in Section IV.C., while the long-term target objectives are based on SWAT modelling for all land uses in the watershed, the interim 10-year targets were derived from a STEPL-based scenario using the current and 10-year cropland BMP acreage estimates provided by the County Land Conservation Departments and summarized in the table later in this section.

The 10-Year Indicators are based on those cropland BMPs that the County LCDs believed were reasonable and achievable in 10-years should resources be available. It must be kept in mind:

- Only the most typical cropland BMPs and cropland BMP combinations were included. The adoption of additional BMPs will increase the total percent reductions. Example BMP types not included in the 10-year targets, but recommended in this plan are: urban, septic system replacement, pastureland, barnyard runoff control, forest management, shoreland residential projects, and streambank stabilization and fencing, though these other BMPs are still very important to meet our long-term target objectives.
- As additional data is gathered and models updated, the target objectives may change. This potentially includes the effects of projects that reduce algae blooms on lakes, such as aeration systems.

Based on this table, a 10-year phosphorus reduction target (or indicator) of 24% was set for the entire watershed. This 24% interim target is more important than each individual HUC-12 10-year target. As will be discussed later, BMP implementation should be targeted to certain geographic areas to "get the most bang for our buck" and make it easier to meet our ultimate watershed P reduction goals. Such targeting is not reflected in this table. Due to differences between the STEPL and SWAT modeling and scenarios, direct comparisons between the long-term target objective and 10-year indicator percentages in this table should be used with caution. The 24% reduction as a 10-year indicator was deemed acceptable given that it only reflects cropland BMPs and many additional BMPs are recommended in this Watershed Strategy that will also result in phosphorus reduction.

Figure 48: *Percent of Phosphorus Reduction Required by HUC-12 Subshed to Meet the Watershed-Wide Target Objective (WDNR, based on 2009 SWAT Analysis, with Otter Creek watershed added)*

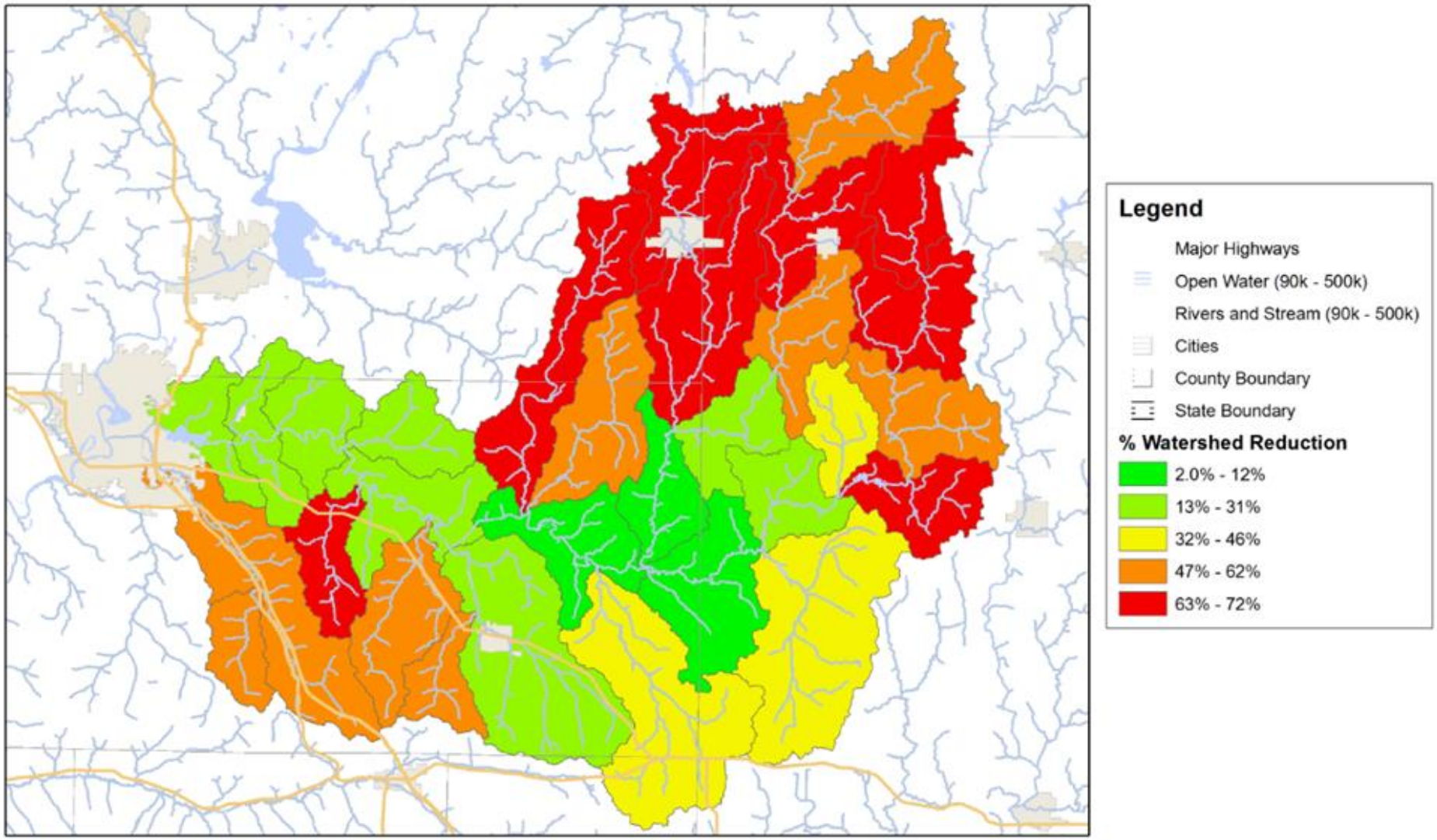
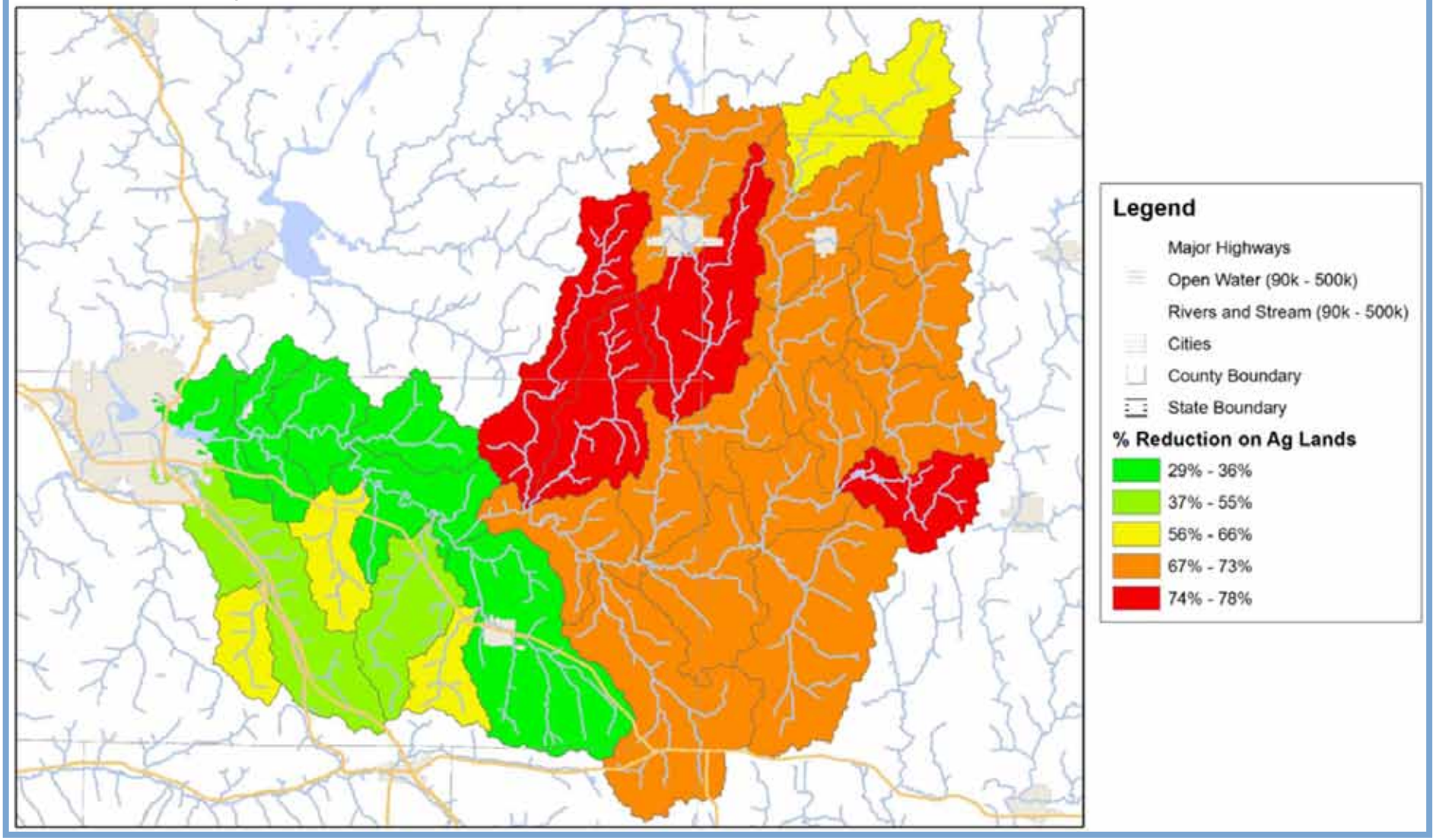


Figure 49: *Percent of Phosphorus Reduction Required from Agricultural Lands by HUC-12 Subshed to Meet the Watershed-Wide Target Objective (WDNR, based on 2009 SWAT Analysis, with Otter Creek watershed added)*

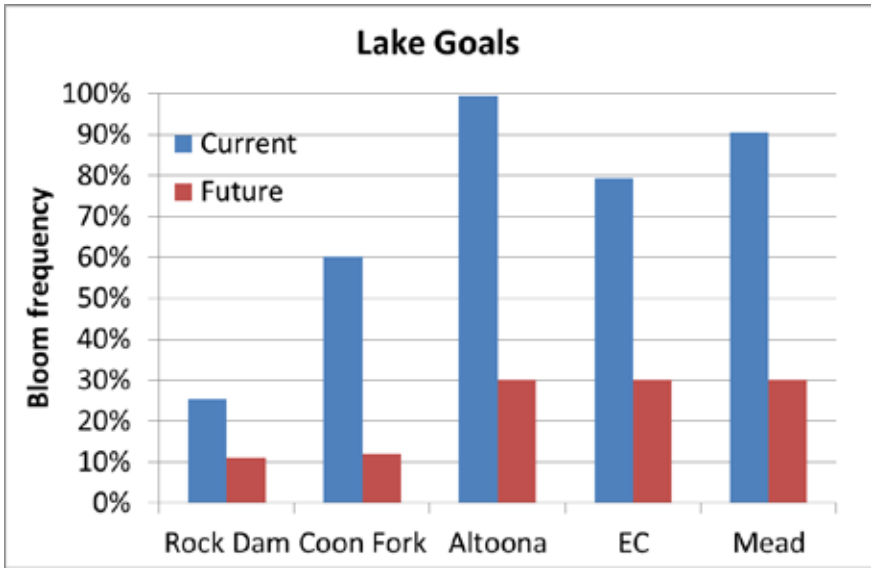


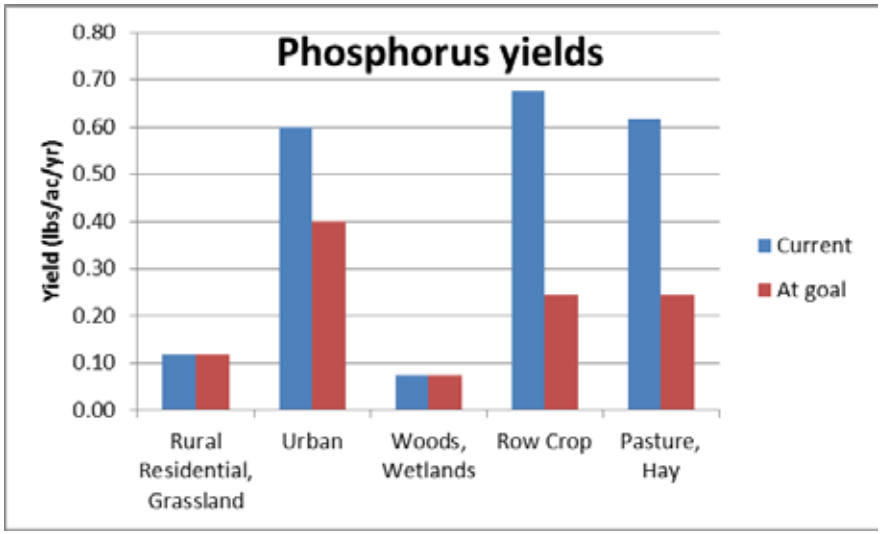
SECTION VIII. SOIL HEALTH & WATER QUALITY TARGET OBJECTIVES & 10-YEAR ACTION PLAN

Significant decreases in algae bloom frequency must also be realized at our lakes in order to meet the overall watershed target objective as represented by this chart. These lake goals are built into the HUC-12 reduction goals in the previous maps and table.

During the SWAT modeling and setting these goals, WDNR did attempt to consider current conditions and activities at these lakes. Over the time, the implications of actions at the lakes, such as the aeration system at Lake Eau Claire, will need to be evaluated and may influence these targets.

Another way to consider what will be required to meet the target objectives is the average phosphorus yield per acre by land use as represented in the second chart. Significant decreases in per acre phosphorus loading will be required in urban (developed areas), row crop, and pasture lands in order to meet the watershed-wide objectives. However, it must also be kept in mind that about 41 percent of the acreage in the watershed is row crop and pasture, while only about 1 percent is urban. So, there is far greater opportunity to the significantly reduce total phosphorus loading from our agricultural lands.





charts based on 2009 SWAT Analysis, with Otter Creek watershed added

SECTION VIII. SOIL HEALTH & WATER QUALITY TARGET OBJECTIVES & 10-YEAR ACTION PLAN

Current and 10-Year Best Management Practice (BMP) Acreage Estimates by HUC-12

The following table provides current and 10-year acreage estimates for some of the most common agricultural and forestry BMPs for each HUC-12 within the Eau Claire River Watershed. These numbers were provided by the County Land Conservation Departments based on their knowledge of farm practices, review of aerial photos, and experiences working with local farmers. The BMP acreages in this table are "overlapping" and a single property may be the site of multiple BMPs.

Name	Area (acres)	Crop-land (acres)	Estimated BMP Acreages by HUC12 watershed														Pasture-land (acres)	Estimated BMP Acreages		Forest (acres)	Estimated BMP Acreages		
			Current - Contour Farming	*10-YR - Contour Farming*	Current - Diversion	*10-YR - Diversion*	Current - Filter Strip or Grassed Waterway	*10-YR - Filter Strip or Grassed Waterway*	Current - Reduced Tillage	*10-YR - Reduced Tillage*	Current - Streambank Stabilization and Fencing	*10-YR - Streambank Stabilization and Fencing*	Current - Cover Crops	*Future - Cover Crops*	Current - NMP	*10-YR - NMP*		Current - Managed Rotational w/Livestock Exclusion)	*10-YR - Managed Rotational w/Livestock Exclusion)*		Current - Forest Dry Seeding	*10-YR - Forest Dry Seeding*	Other (pastured forest- cattle fenced out)
Headwaters N. Fork E.C. River	22,172	**11,704**	400	*1,000*			250	*350*	1,260	*5,010*	34	*34*	585	*1,170*	174	*500*	**56**			**7,655**			
Goggle-Eye Creek-N. Fork E.C. River	18,129	**13,141**	250	*1,000*			1,000	*1,250*	9,000	*12,000*			657	*1,314*	3,598	*7,000*	**634**			**2,391**			
Sterling Creek-N. Fork E.C. River	15,058	**7,545**	250	*1,000*			250	*450*	2,000	*4,000*			377	*755*	4,047	*8,000*	**314**			**6,186**			
Little Otter Creek-Wolf River	23,166	**14,737**	0	*500*					2,000	*3,500*			737	*1,474*	1,541	*2,791*	**81**			**5,684**			
Wolf River	28,874	**17,986**	0	*2,000*			0	*100*	8,899	*11,899*			899	*1,799*	3,200	*6,028*	**733**			**8,172**	163	*163*	
Simes Creek-N. Fork E.C. River	12,607	**693**	0	*200*			100	*150*	114	*214*			0	*35*	135	*217*	**185**			**9,696**	582	*582*	
North Fork Eau Claire River	12,004	**211**	32	*32*	11	*11*	106	*220*	42	*42*	106	*106*	21	*42*	32	*53*	**59**			**10,368**	9,331	*9,331*	
Headwaters S. Fork E.C. River	14,429	**10,318**	1,000	*2,500*			150	*350*	5,000	*7,000*			1,032	*2,064*	3,207	*5,000*	**359**			**2,313**			
St. Hedwig Cemetary-S. Fork E.C. River	18,192	**13,431**	300	*3,000*			1,000	*1,500*					1,343	*2,686*	5,152	*8,000*	**1,046**			**2,568**			
Norwegian Creek-S. Fork E.C. River	17,761	**6,663**	200	*1,000*					1,000	*4,000*			666	*1,333*	2,682	*3,500*	**686**			**9,307**			
Black Creek-S. Fork E.C. River	9,771	**1,626**	0	*250*	49	*49*	181	*324*			0	*49*	0	*81*	503	*744*	**173**			**7,337**	2,641	*2,641*	
Mead Lake-S. Fork Eau Claire River	14,276	**6,110**	200	*1,000*			200	*300*	1,000	*2,500*			611	*1,222*	1,544	*2,500*	**353**			**6,522**			
Hay Creek-S. Fork E.C. River	39,227	**4,296**	0	*500*			200	*400*	300	*500*			430	*859*	252	*600*	**362**			**27,893**			
Dickison Creek-S. Fork E.C. River	12,352	**888**	0	*100*			100	*250*	400	*500*			89	*178*	159	*200*	**228**			**9,734**			
South Fork Eau Claire River	21,459	**66**											3	*7*	0	*0*	**8**			**16,857**	5,394	*5,394*	
Black Creek-Eau Claire River	37,672	**6,348**	330	*580*	16	*16*	150	*266*	500	*750*			635	*1,270*	1,249	*1,462*	**991**			**21,736**	6,521	*6,521*	
Muskrat Creek	21,655	**5,657**					110	*170*	0	*170*	679	*679*	283	*566*	789	*1,129*	**104**			**14,109**	4,233	*4,233*	
Hay Creek-Eau Claire River	26,105	**12,507**	750	*750*	375	*375*	1,501	*1,501*	1,501	*1,501*	3,002	*3,002*	0	*1,251*	3,021	*3,771*	**80**			**11,152**	2,676	*2,676*	
Lake Eau Claire-Eau Claire River	16,917	**369**															**98**			**12,702**			
Beaver Creek-Otter Creek	8,288	**4,710**	942	*942*			942	*942*	1,178	*2,120*	1,884	*1,884*	236	*471*	707	*1,178*	**1,620**	81	*162*	**1,317**			
Otter Creek	34,185	**13,338**	2,668	*2,668*			2,668	*2,668*	3,335	*6,002*	5,335	*5,335*	667	*1,334*	2,001	*3,335*	**6,040**	302	*604*	**7,415**			
Thompson Valley Creek	8,378	**4,058**	203	*406*	812	*812*	3,246	*3,246*	1,826	*1,826*	1,623	*2,029*	812	*1,217*	609	*1,015*	**2,544**			**1,064**			
Bridge Creek	37,725	**9,029**					1,354	*1,806*	3,160	*3,160*	451	*903*	903	*1,354*	1,354	*2,257*	**7,118**			**13,577**	1,806	*1,806*	
Bears Grass Creek	17,665	**9,406**	2,822	*3,762*			1881.2	*2351.5*	4,703	*5,644*	3,762	*4,703*	2,822	*4,703*	1,411	*2,352*	**4,111**	411	*822*	**2,749**			550
Fall Creek	11,213	**5,259**	263	*1,052*			1,578	*1,841*	2,367	*2,892*	3,155	*3,418*	2,367	*3,418*	2,210	*2,210*	**2,753**	413	*551*	**1,998**			
Beaver Creek-Eau Claire River	11,588	**3,512**	176	*176*			527	*527*	1,405	*1,580*	2,458	*2,458*	702	*878*	527	*878*	**83**			**7,050**	2,115	*2,115*	
Sand Creek-Eau Claire River	17,709	**4,948**	0	*494.8*			247	*495*	1,979	*2,474*	247	*495*	990	*1,979*	742	*1,237*	**818**			**9,156**	4,578	*6,409*	
Deinhammer Creek-Eau Claire River	12,460	**3,653**	0	*183*			365	*365*	1,461	*1,461*	1,827	*1,827*	365	*365*	548	*913*	**123**			**6,821**	2,728	*3,411*	
Ninemile Creek-Eau Claire River	11,319	**3,602**	0	*360*			540	*540*	1,441	*1,441*	2,161	*2,161*	180	*360*	540	*901*	**508**			**5,537**	1,661	*1,661*	
Altoona Lake-Eau Claire River	13,272	**3,135**					627	*627*	1,254	*1,254*	157	*157*	1,254	*1,411*	470	*784*	**237**	47	*47*	**4,962**	496	*992*	
TOTALS:	565,629	**198,946**	10,785	*25,455*	1,262	*1,262*	19,274	*22,988*	57,124	*83,440*	26,882	*29,239*	19,665	*35,595*	42,404	*68,553*	**32,505**	1,254	*2,186*	**254,028**	44,926	*47,936*	550

The above 10-year estimates represent what each County LCD believed could be possible over the next decade if resources were available. As such, the above BMPs estimates very are important for three reasons:

1. They provide a measurable "goal" for each HUC-12 that we can strive towards and were used to develop the 10-year indicators or interim goals in the table earlier in this section as discussed in Section IV.C.
2. The above BMPs can be used to help guide and target BMP implementation as part of the action plan.
3. The table above shows that while we can target or prioritize certain geographic areas, there are opportunities for soil health and water quality improvements throughout the Eau Claire River Watershed.

Example BMP Efficiencies Can Help Prioritize Practices

As shown below, each agricultural best management practice (BMP) has a potential efficiency factor in the STEPL tool for the removal or reduction of different non-point source pollutants. For example, the adoption of engineered filter strips will reduce phosphorus loading from a field, on average, by 75%. Some of these BMPs are measured in different ways based on acreages or linear feet served, so care must be taken when making comparisons.

Agricultural BMP	Phosphorus	Sediment	Nitrogen
Designed Filter Stripz	75%	65%	70%
Streambank Stabilization & Fencing	75%	75%	75%
NMP + Cover Crop + Reduced Tillage	73%	79%	79%
Contour Farming	55%	41%	49%
Reduced Tillage	45%	75%	55%
Rotational Grazing (pastureland only)	34%	13%	43%
Cover Crops	32%	15%	43%
Diversion	30%	35%	10%
Nutrient Management	28%	not. avail.	19%

The location of a BMP and proximity to other BMPs can influence efficiency and effectiveness. For example, cropland BMPs working in conjunction with stream/riparian BMPs would, in most cases, be more effective than a single BMP alone. And especially targeting BMPs to areas with a high delivery of phosphorus will make it easier to attain or exceed our goal of a 24% P-loading reduction in ten years. Definitions for different BMPs can be found in Appendix E.

"Getting the Most Bang for our Buck"

Many of the educational efforts and recommendations of this Watershed Strategy are not geography-specific and can be applied throughout the watershed. However, certain recommendations require "boots-on-the ground", changes to the landscape, and/or significant resources to implement, such as the best management practices, demonstration projects, and farmer-led councils. And while every positive action is valued, certain activities are more effective than others in meeting our plan goals.

The Coalition recommended that plan implementation should be targeted, at least initially, based on:

- Encourage BMPs that are the most efficient and cost-effective at reducing phosphorus loading (see table to left).
- Encourage the use of multiple BMPs on agricultural croplands that are nearest to surface waters.
- Target those geographic areas (e.g., HUC-12 subsheds) with the highest potential for phosphorus runoff, highest potential for improvement, and highest estimated phosphorus reduction needed as suggested by the modeling results in Section IV and the objectives, tables, and maps in this section.
- Considering the above, target landowners and communities who are most willing to adopt BMPs and take action. Such social science-based targeting will become clearer over time as Section X is implemented.

The above priorities should not deter efforts to make positive changes or adopting BMPS at any location in the watershed. Flexibility is encouraged to address emerging issues and to pursue opportunities as they arise.

D. SOIL HEALTH & WATER QUALITY 10-YEAR ACTION PLAN

As a HUC-8 watershed, the Eau Claire River Watershed covers 882 square miles and encompasses 143 miles of streams and 1,272 acres of lakes. Given the geographic scope of this Watershed Strategy, it is not feasible for the action plans sections to be overly prescriptive and detailed. These action plan sections should be used as an important guide to help focus, communicate, and coordinate projects, studies, and outreach. Implementation of these action plan sections must be flexible enough to allow for differences in local conditions, priorities of individual communities and stakeholder groups, available resources, etc. In short, this Watershed Strategy is about bringing stakeholders together to work cooperatively towards shared goals; it is intended to support, not limit, the activities of the many stakeholder groups already working hard to improve soil health and water quality.

The action plan recommendations throughout this Watershed Strategy can implemented and funded in a variety of ways and as new opportunities arise over time. As such, specific lead parties and funding resources are not identified for all recommendations. Many of the recommendations overlap and it may be most effective to combine multiple recommendations into a single project when pursuing grant funding. Other recommendations have the potential to be largely supported by existing staff or volunteer efforts. Appendix B provides a fairly comprehensive list of technical and funding resources that are available to assist with strategy implementation. The Plan Implementation Team will bring stakeholders together to determine how best to align these recommendations with available people, technical, and funding resources.

Recommendations highlighted in red are initial priorities that should be addressed within 1-3 years.

Timelines and Milestones may change subject to available resources, emerging opportunities, and the efforts of individual Coalition members.

Recommendations	10-Year Milestones	Lead Entity(s)	Resources
Projects & Best Practices			
1. Implement agricultural and forestry best management practices (BMPs) based on the 10-year BMP acreages as suggested in the tables in the previous subsection. The tables include the most popular BMPs, but should not prevent consideration of other BMPs such as those identified in Appendix E. Priority should be given to: (i) encouraging those BMPs with highest phosphorus-reduction efficiencies, (ii) farm fields closest to streams, (iii) areas with highest phosphorus loading potential or the highest potential for improvement, and (iv) landowners and communities that are willing to implement BMPs.	Strive to attain BMP acreage increases as summarized in the tables on the previous pages or BMPs with equivalent phosphorus-load reduction efficiencies.	Landowners and farmers; County LCDs, UW-Extension, NRCS	A variety of cost share resources exist, but incentives are often less important than once believed. Projects could be funded with Section 319 grants, Targeted Run-off Management (TRM) Grants, NRCS Miss. R. Healthy Watershed Initiative, and other grant programs identified in Appendix B.
2. Encourage the implementation of urban, residential, and other development best management practices (BMPs), such as: • permeable pavement and bio-swales • rain barrels, rain gardens, and green roofs • minimal impact design standards (MIDS) and NURP retention ponds for stormwater • conservation subdivision design techniques that promote infiltration • low-impact lawn care practices and zero-phosphorus fertilizes • composting and proper disposal of hazardous wastes • natural, vegetated shorelines and shoreland buffers • good septic system maintenance • construction site erosion controls Many of these BMPs and others are described in Appendix E.	Many related efforts are ongoing. If possible, establish a way to track these other BMPs throughout the watershed	Municipal and County Planning & Zoning offices and County Land Conservation offices. Rain-to-Rivers may also serve as a lead entity, especially for related education.	UW-Extension, WDNR, and Rain-to-Rivers have resources to assist with related education and implementation. Funding for projects can come from a wide variety of sources, many of which are identified in Appendix B.
3. Identify and more closely monitor private septic systems located near surface waters; address failing systems. Most systems require service every three years. There are approximately 1,377 private septic systems located near surface waters in the watershed, of which an estimated 20% (or 275) are failing. Annual phosphorus loading to surface waters is estimated 222 pounds total for all 275 failing septic systems.	Begin within 1-3 years	Lake groups in cooperation with County Health and/or POWTS offices	Monitoring may, in part, be volunteer supported. WI Fund Grant, if available, for replacement.

Recommendations	10-Year Milestones	Lead Entity(s)	Resources
Projects & Best Practices			
4. Encourage more innovative strategies to meet municipal and industrial phosphorus reduction requirements through programs that utilize nonpoint reduction strategies, such as adaptive management and water quality trading.	Begin targeted outreach within 1-3 years	Rain to Rivers; municipalities; County LCDs	WDNR AM & WQT webpages; see point-source alternatives in Appendix A for more information.
5. Support the efforts of Lake Districts and Associations in the implementation of activities in their lake plans that benefit all watershed residents. Lake group plans and activities are summarized in Appendix C. The lake groups have many activities they are working on, not all of which are detailed in this action plan. This Watershed Strategy references, but does not repeat, these individual lake plans. All watershed residents and communities have a responsibility to share the burden of costs associated with improving soil health and water quality in the watershed. Even though the results of degraded water quality are typically most visible and acute at our lakes, the burden of addressing these issues must be shared by everyone and not just those residing near our lakes.	ongoing; requires outreach and education of elected officials as recommended in Section X.	Lake groups (districts and associations); elected officials	WDNR Lake Grants will continue to be a primary sources of funding, along with the contributions of the groups themselves. Other funding and technical support for projects can come from a wide variety of sources, many of which are identified in Appendix B.
6. Increase awareness and provide technical support to municipalities, as needed, on road, trail, and public right-of-way issues related to water quality, such as: • Road and right-of-way maintenance (e.g., dust/gravel runoff, reseeding, forest & logging roads) • Culvert and related stormwater planning and installation • Off-road vehicle and ATV use (e.g., trail planning, illegal off-trail enforcement)	Conduct outreach as opportunities and need arise.	Municipalities	UW-Extension, WCWRPC, County Highway Depts, WDOT, WI Towns Association, WDNR (trails)
7. Identify potential opportunities for wetland mitigation banking within the watershed and explore opportunities to establish such banks. Potentially pilot in Eau Claire County.	Longer-term, but discussions should begin within 3-5 years.	County Highway, Planning, & LCDs	WDNR

Recommendations	10-Year Milestones	Lead Entity(s)	Resources
Research, Planning, & Other Strategies			
1. Install continuous monitoring gauges and calibrate for water flow, total phosphorus, and fine suspended solid loads. Reactivate the USGS gauge stations at the Highway K bridge north of Fall Creek and at the Highway G bridge north of Augusta. Explore additional flow monitoring at dams or other key sites. Begin trained volunteer monthly TP and/ or suspended solids sampling in areas targeted for BMPs. Support and coordinate with the monitoring efforts of Lake Districts.	Complete gauges in 1-3 years. BMP-related sampling will be implemented over time as BMPs are adopted.	WDNR	WDNR river grants, USGS, trained volunteer support for data collection
2. Engage the U.S. Army Corps of Engineers in a technical review and further development of the Lake Eau Claire floodplain/wetland re-connectivity strategy; implement the strategy if feasible and as resources allow. About 200 acres of floodplain, wetlands, and "cut off river channel" immediately upstream of Lake Eau Claire is being proposed for "reconnection" to the Eau Claire River.	Underway; complete review in 1-2 years; implement as feasible	Lake Eau Claire Assoc/District, WDNR, ECCo LCD	Army Corps of Engineers; WDNR lake/river grants; also see Appendix B for implementation grant options.
3. Conduct coring and survey sediment deposition (river transect surveys) to characterize lake and lake delta sediment and develop high quality bathymetric maps at Lake Altoona, Lake Eau Claire, and Mead Lake.	Complete in 1-3 years; related discussions underway in Eau Claire County	Lake groups	Lake groups, counties, WDNR lake grants
4. Establish an aerial record of changes along the river course and particularly in the lake delta sediment deposition zones above each lake; determine erosion hotspots. A low altitude (<400 feet) drone mosaic and/or LIDAR of strategic regions would be useful in determining active erosion hotspots that can be used to help prioritize bank stabilization projects. This mapping should be periodically performed to help determine progress of corrective measures over time.	Complete in 1-3 years.	County LCDs, lake groups, and WDNR	Lake groups, counties, WDNR lake grants May be a good candidate for a university-supported project.
5. Develop 2 to 4 edge-of-field monitoring projects in target subsheds to help measure run-off and pollutant loading while demonstrating the conservation impacts of BMPs.	3-5 years, depending on interest of a farmer-led group	farmer-led coalition or similar group, perhaps with student, intern, or volunteer support	County LCDs and NRCS

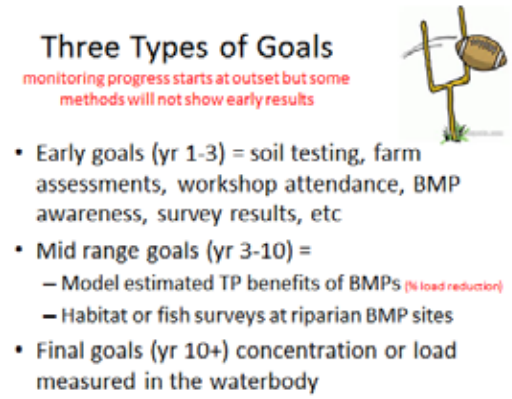
Recommendations	10-Year Milestones	Lead Entity(s)	Resources
Research, Planning, & Other Strategies			
6. Form a Citizen Water Quality and Habitat Monitoring Group. The Coalition shall encourage the formation of a group of active concerned citizens to take a lead coordinating role for citizen-led water quality, habitat, and AIS survey/ inventory and monitoring efforts within the watershed. This potentially includes: • Facilitating discussion on monitoring efforts and helping to find volunteers. • Evaluating progress on the inventorying and monitoring strategies recommended in this action plan and helping to identify monitoring needs. • Working with volunteers, lake groups, and paddle groups to coordinate canoe and kayak float trips to perform visual shoreland surveys. • Recommending to the Coalition strategies for the sharing of inventory and monitoring results with the public, communities, and elected officials. • Forming community relationships engage landowners who may be willing to implement habitat improvement projects and refer these landowners to County LCDs, WDNR, and/or NRCS offices.	By 2018 (1-3 years), form a strong, core citizen-led monitoring work group. Coalition desires to support, not supplant, existing volunteer efforts by helping to bring people together. Group activities would not replace scientific study and research.	Likely a Coalition sub-group, but could be led by another interested party. Monitoring activities can continue to be coordinated and carried out by various, existing organizations, as is currently done.	Coalition will work with Beaver Creek Reserve, lakes groups, Lower Chippewa Invasives Partnership, WDNR, and existing monitoring volunteers to form the work group (or support existing groups). Primarily volunteer supported, though some activities may be part of a WDNR or other agency program.
7. Correct the Mead Lake TMDL and implementation plan to reflect the more recent WDNR phosphorus standards.	3-5 years	WDNR, with consultation from Mead Lake Partnership	WDNR staff
8. Determine and establish the relationship for stream discharge rates versus sediment transport rates to better predict sediment and total phosphorus loading.	Complete in 3-5 years, if sufficient water monitoring data is available (see #1)	WDNR	WDNR stream/lake grants; ACOE technical assistance
9. Conduct necessary research to determine river-transported sediment type and size distribution.	Complete in 3-5 years	WDNR, lake groups	WDNR stream/lake grants; ACOE technical assistance

Recommendations	10-Year Milestones	Lead Entity(s)	Resources
Research, Planning, & Other Strategies			
10. Conduct a formal, comprehensive streambank erosion vulnerability study and identify critical areas in need of stabilization so that projects and resources can be better prioritized. Target areas that: (i) are known or believed to be most at risk, (ii) most likely are filling the delta areas of lakes, and (iii) adversely affect trout waters. Complete on-site inventories and use GPS/GIS to mark critical areas. Approach landowners of critical areas to determine interest in stabilization projects.	Complete in 3-5 years	County LCDs	WDNR river grant for study. Costs will vary by number of target and critical areas, in addition to the type of stabilization required.
11. Based on river flow monitoring and other data collection, target and prioritize key locations in the watershed for stream flow reduction, channel stabilization, and bank stabilization projects. Begin implementation of these projects as resources allow.	Complete in 3-8 years, if sufficient data is available	Coalition, LCDs, and lake groups	Resources for implementation will vary by project type. See potential grants in Appendix B.
12. Complete wetland mapping, landscape-level functional wetland assessment, and wetland change analysis to identify potential restorable candidate wetlands. This assessment may initially target subshed with the highest phosphorus loading and erosion potential; use the EVAAL and STEPL maps in Section IV as a guide to identifying target areas.	3-5 years, depending on interest of a farmer-led group	Pursue as a university class/ student project. County LCDs, WDNR, & Coalition partners to take initial lead.	$20,000, unless university supported. Potential EPA and USACOE financial support
13. Create accurate elevation maps of river bed, backwaters, and potential aggregation sites. Use LIDAR and aerial imagery to determine erosion hotspots and historical trends.	Complete in 5-10 years	LCDs, County GIS programs, WDNR	WDNR, ACOE technical assistance; potential university project
14. Support groundwater sampling, monitoring, and planning within the watershed, as well as efforts to better understand the relationships between soil health, surface waters, and groundwater.	This is a general policy statement. While the BMPs recommended in this plan will benefit our groundwater, additional study is needed. Specific recommendations regarding groundwater and nitrates are outside the scope of this Watershed Strategy.		
15. Implement the education, citizen engagement, community capacity building, and civic leaderships strategies recommended in Section X.	See Section X.		

E. SOIL HEALTH AND WATER QUALITY MONITORING AND EVALUATION PLAN

The water quality target objectives and 10-year indicators for phosphorus and lake algae blooms are the ultimate outcome (or impact) evaluation measures in this Watershed Strategy. Success of this plan eventually comes down to whether phosphorus loading and algae blooms have decreased. As discussed previously, there are many additional inherent benefits from the best practices and actions necessary to achieve the desired phosphorus reductions, but this plan does not include measurable objectives or indicators for these inherent benefits.

Monitoring and evaluation efforts should especially target those areas, streams, and lakes on which BMPs are being performed. A pre-BMP evaluation or inventory is often recommended to establish a baseline on which progress can be evaluated. Progress towards the Soil Health and Water Quality Target Objectives and 10-Year Indicators will be monitored and evaluated through activities such as those identified below:



Early Monitoring Activities (Years 1-3)

- Begin implementation of monitoring and evaluation recommendations as recommended previously in this action plan.
- Soil testing, farm assessments, and BMP tracking (also see Section XI). This activity includes farm BMP transect surveys by County Land Conservation Departments and coordination with agronomists on crop tissue testing.
- Attendance at events, BMP awareness, and social science surveys (also see Section X).
- Citizen Water Quality & Habitat Monitoring Group activities and other volunteer monitoring.
- At each small watershed selected for concentrated implementation efforts, conduct monthly total phosphorus sampling year round for the duration of the project. Sampling would be by volunteers with lab support from DNR.
- Any needed baseline data to later demonstrate change over time.

Mid-Range Monitoring Activities (Years 3-10)

- Field-edge monitoring as demonstration projects.
- Modeling via SNAP+, STEPL, Barny, etc. to document load reductions.
- Habitat and or fish surveys in select areas to document effects of work in riparian corridor (also see Section IX).
- Continue early monitoring activities as needed.
- Explore opportunities for “crowd hydrology” and innovative techniques to engage the public in monitoring for water quality, habitat health, invasive species, etc. (e.g., web-based tools, Google Mapping, Great Lakes Early Detection Network, Project RED).
- Beginning in 5-10 years, at each HUC-12 selected for concentrated implementation efforts, conduct total phosphorus (and possibly suspended solid) sampling monthly every

summer for the duration of the BMP projects. Sampling would be by volunteers with WDNR lab support.

- Additional monitoring activities, such as the installation of gauges on tributaries, may be considered as the project proceeds.

Long-Range Monitoring Activities (Years 8+)

- Outcome evaluation of progress towards phosphorus and algae bloom target objectives.
- Sampling of all major lakes every summer by volunteers with WDNR picking up lab support.
- At a frequency of once every 10-15 years, WDNR conducts a two-year total phosphorus load study at monitoring sites used to develop the Bathtub models for the major lakes.
- Periodic mapping of delta areas and sediment traps to document bedload transport over time.
- Continue early and mid-range monitoring as needed.

The above suggested timing of monitoring activities reflects the fact that the water quality benefits (outcomes) will not be measurable until local actions are taken. Monitoring should start at the outset, but some methods will not show early results and will require time before measurable benefits will be realized. Monitoring and evaluation efforts will be further guided and supported through:

- The Coalition's Plan Implementation Team and the Citizen Water Quality & Habitat Monitoring Group, including river, lake, and habitat monitoring through volunteer programs. WDNR often provides lab support for water quality monitoring efforts.
- The individual monitoring and evaluation activities of the lake districts and associations, County Land Conservation Departments, and local NRCS/FSA offices. These partners should have an active role in the Watershed Coalition and will be encouraged to attend Coalition meetings to discuss partnership and coordination opportunities regarding tracking, monitoring, and evaluation efforts.
- The overall monitoring plan described in Section XI.

As discussed in Section XI, critical to the monitoring and evaluation of this action plan is the acquisition and establishment of a tracking system (e.g., Transcedent. Flat Rock) for agricultural BMPs. If deemed feasible, the tracking system can also be used to track forest management BMPs, urban/shoreland BMPs, septic system inspections, and other permitting. Not only will the tracking system be used to monitor progress on plan implementation, the data will assist in estimating non-point source pollution loading estimates and updating watershed modelling, target subsheds, target objectives, and 10-year indicators in the future.

It is anticipated that Section 319 funding will be used to implement some of the plan recommendations; in such a case, BMPs installed with Section 319 are required to be tracked individually. It is important that the tracking system and report sharing throughout the watershed be consistent among those using the system—most notably the County Land Conservation Departments for rural agricultural lands, but could include other municipal, county, state, and federal agencies. This includes a shared consensus on what is being tracked, BMP definitions, reporting cycles, etc. For example, the Watershed Strategy has current and 10-year BMP acreages for "reduced till." In the future, it may be valuable to distinguish between "reduced till" and "no till", and track these BMPs separately.

SECTION IX: FISHERIES & HABITAT OBJECTIVES & 10-YEAR ACTION PLAN

SECTION IX. FISHERIES & HABITAT OBJECTIVES & 10-YEAR ACTION PLAN

As reflected by the word cloud, vision, and goals in Section VII, we love the rivers, lakes, streams, and adjacent riparian areas of the Eau Claire River Watershed due to their ecological, aesthetic, and recreational value. They provide places to fish and swim. They provide critical wildlife habitat. And they provide peaceful, scenic beauty that contributes to our quality of life.

Many of the soil health and water quality recommendations in Section VIII provide additional inherent benefits that will benefit our fisheries and habitat, but are not repeated in this section. While fisheries and habitat impact and are impacted by non-point source pollution, they are broader and distinctly different than the objectives in the previous section. For some of these attributes, such as habitat health and invasive species, we lack baseline data throughout the watershed. Further, the value of fisheries and habitat can also vary by community.

For the purposes of this plan, ***habitat*** is the place or environment in which a plant or animal naturally or normally lives and grows. In most cases, habitat is the natural environment, but can be influenced, degraded, or enhanced by human actions. ***Shoreland areas*** within this plan are the riparian corridors along rivers, lakes, and streams, including floodplains and hydrologically connected wetlands, and may extend beyond the State statutory definition of shorelands.

NOTE: *Most EPA 9-Key element plans focus solely on addressing one or a limited number of non-point source (NPS) pollutants, often related to a specific limit (TMDL) for a specific water body. Per Federal requirements, the objectives and strategies to address such NPS pollutants need to be very measurable, with specific targets, milestones, cost estimates, timelines, and monitoring strategies in order to qualify for Federal Section 319 Clean Water Act funds (see Appendix B) for implementation.*

However, unlike Section VIII, the fisheries and habitat objectives and recommendations in this section are not a required part of a 9-Key element plan. Accordingly, while this Watershed Strategy recognizes and supports practices used to meet watershed fisheries and habitat objectives, the recommendations in this section are not eligible for Federal 319 funding. However, many of these recommendations are eligible for other funding sources.

After discussion, the Coalition determined that it was important to include this section in our plan, but it was more feasible and efficient for this section to be less measurable and less detailed in terms of objectives, implementation, and monitoring compared to Section VIII.

F&H 1: River and Stream Habitat Objective

Improve or maintain the biotic integrity (health) of the watershed's rivers and streams through habitat improvements. Healthy riparian habitat will increase streambank stability, decreases erosion, and provide cover for aquatic life and other wildlife.

F&H 1: 10-Year Indicators (Where will we be in 10-Years?)

- Work with willing landowners to continue to restore, protect, and increase natural shoreland areas that benefit habitat and water quality. Increase healthy riparian buffers and restore disturbed areas. Improve instream and riparian habitat on habitat-limited trout streams.
- Complete an inventory of river and stream habitat conditions in the watershed and identify target areas for future projects.
- Improvement of shoreland habitat is expected to help contribute to decreases in phosphorus, sediment, and other pollutant loading to meet the target objectives in Section VIII.

Recommendations highlighted in red are initial priorities that should be addressed within 1-3 years.

Timelines and Milestones may change subject to available resources, emerging opportunities, and the efforts of individual Coalition members.

F&H 1: 10-Year Action Plan

Recommendations	10-Year Milestones	Lead Entity(s)	Resources
Research & Planning Strategies			
1.1 Complete a River/Stream Shoreland Habitat Inventory Conduct a comprehensive inventory and assessment of the uses, conditions, and quality of shoreland habitat on key river reaches within the watershed. Reach out directly to landowners to help identify landowners who may be interested in habitat and riparian improvement projects. Identify and prioritize potential shoreland areas for habitat improvement, restoration, and protection projects.	Complete an inventory and plan with priorities for action. Initial 1-on-1 or small group contacts to help identify landowners who may be interested in projects. Track the number of referrals.	Citizen-led activity promoted by the Citizen Water Quality & Habitat Monitoring Group (Discussed in Section VIII).	WDNR River Protection Grant; universities; WDNR, Beaver Creek Reserve

Recommendations	10-Year Milestones	Lead Entity(s)	Resources
Research & Planning Strategies			
1.2 Conduct In-Stream Health and Habitat Monitoring - Support the efforts of the WDNR citizen stream monitoring program and promote related volunteer programs. Identify and prioritize potential riparian areas for restoration, in-stream habitat improvement, and protection projects. Reach out directly to landowners to help identify landowners who may be interested in habitat protection and restoration projects (e.g., livestock fencing, physical improvements). Work with volunteers to perform in-stream habitat surveys before and after BMPs to document change. These pre-/post-BMP surveys may not begin within 1-3 years, unless such opportunities arise.	Identify, recognize, and support the efforts of citizen stream monitors as measured through increased volunteer hours. Identify and assist landowners who interested in habitat BMP projects, and perform pre-/post in-stream habitat surveys for these projects.	Monitoring is a citizen-led activity with WDNR support promoted by the Citizen Water Quality & Habitat Monitoring Group (Discussed in Section VIII).	WDNR River Protection Grant; universities; WDNR; Beaver Creek Reserve; Water Action Volunteers-Citizen Stream Monitoring
1.3 Collect fish and invertebrate community data (Index of Biological Integrity (IBI) Data) for streams in key HUC-12 watersheds targeted for BMP implementation.	Data is available by 2025 for a future watershed plan update so that fisheries/habitat priorities can be established.	WDNR	WDNR River/Lake Protection grants; universities
1.4 Stream Shoreland & Habitat Improvements Landowner Survey - Identify stream shoreland landowners interested or willing to consider habitat restoration, through a survey effort, community meetings, or other outreach efforts. This would be in addition to the one-on-one outreach recommended previously.	Identify potential landowners to enable WDNR contacts for habitat improvement projects	Citizen-led activity promoted by the Citizen Water Quality & Habitat Monitoring Group (Discussed in Section VIII).	$5,000 - $12,000; WDNR River Protection Grant
1.5 River-Bottom Mollusks Research - Support continued research of river-bottom mollusks.	Identify strategies to improve aquatic health.	UW-Eau Claire Biology Dept.	National Science Foundation - REU

Note: *The action plan recommendations throughout this Watershed Strategy can implemented and funded in a variety of ways and new opportunities will arise over time. As such, specific lead entities and funding resources are not identified for all recommendations. Many of these recommendations also have the potential to be supported by existing staff or volunteer efforts. Appendix B provides a fairly comprehensive list of technical and funding resources that are available to assist with implementation.*

Recommendations	10-Year Milestones	Lead Entity(s)	Resources
Projects & Best Practices			
1.6 Stream Shoreland and In-Stream Habitat Projects - The coalition will assist County LCDs and WDNR by locating willing landowners for stream/river shoreland and in-stream habitat improvements in DNR identified priority watersheds and the DNR will advise landowners of their habitat improvement options. The coalition will inform landowners about the DNR's Streambank Easement Program in DNR identified priority watersheds. Outreach should especially target HUC12s where upland BMPs are being implemented. Studies have shown that the greatest impacts are achieved when upland and shoreland habitat improvement project are implemented concurrently.	Engage 2-6 landowners per year to implement habitat improvement projects within the watershed. These projects may include water quality and soil health BMPs discussed in Section VIII.	WDNR, Watershed Coalition, County LCDs	WDNR River Protection Grants
Education & Outreach Strategies			
1.7 Other Wildlife Habitat Improvements for Rivers, Lakes, and Shoreland Areas - The Coalition will partner with Beaver Creek Reserve, the Wildlands School, and lake groups to: • Educate residents, lake, groups, and other organizations on the importance of habitat health and to implement how to improve riparian and lake habitat. • Organize volunteers to implement "boots-on-the-ground" conservation and habitat projects, including tree-planting, invasive species removal, prairie restoration, and habitat enhancement (e.g., bird/wood duck houses, eagle/osprey platforms, fish cribs).	conduct 1 event per year and develop/compile educational materials via website	Coalition, Beaver Creek Reserve, Wildlands School, The Prairie Enthusiasts	additional technical support and resources from County LCDs, UW-Extension, schools, and WDNR

F&H 1: Monitoring and Evaluation Plan

Progress towards Fisheries and Habitat (F&H) Objective 1 will be monitored and evaluated through:

- The activities of the Coalition's Citizen Water Quality & Habitat Monitoring Group (discussed in Section VIII) will be important to monitoring this objective, as well as the engagement of watershed residents.
- WDNR will collect fish and/or macroinvertebrate community IBI data and physical habitat data from streams in specific watersheds targeted for riparian BMP implementation.
- With assistance of citizens and the Coalition's Citizen Water Quality & Habitat Monitoring Group, WDNR will perform "signs of success" pre- and post- monitoring as riparian BMPs are installed. WDNR will train Coalition and Monitoring Group volunteers to conduct surveys to document improvements that result from riparian BMPs. The Coalition will encourage the compilation of photos and video as part of "signs of success" surveys.
- Implementation of strategies F&H 1.2, 1.3, and 1.5.
- The overall monitoring plan described in Section XI.

F&H 2: Lake Habitat Objective

Improve or maintain the biotic integrity (health) of watershed lakes through habitat improvement. Continue to restore, protect, and increase natural shoreland habitats that benefit water quality and lake biology. Increase gamefish abundance and size structure, while expanding fishing opportunities. Support the goals, objectives, and strategies to improve fisheries and habitat on lakes within the watershed as described in lake management plans.

F&H 2: 10-Year Indicators (Where will we be in 10-Years?)

- Achieve a more comprehensive understanding of the habitat health of the Watershed's lake shorelands. Attain a consensus on focal/priority areas for shoreland habitat improvement projects. Engage willing landowners, especially in these areas, to implement.
- Encourage the identification of target objectives and 10-year indicators for fisheries and habitat within lake management plans and support efforts to achieve these plans through coordination, leveraging resources, and cost sharing. Increase the coarse woody underwater habitat.
- Improvement of shoreland habitat is expected to help contribute to decreases in phosphorus, sediment, and other pollutant loading to meet the target objectives in Section VIII.

Recommendations highlighted in red are initial priorities that should be addressed within 1-3 years.

Timelines and Milestones may change subject to available resources, emerging opportunities, and the efforts of individual Coalition members.

F&H 2: 10-Year Action Plan

Recommendations	10-Year Milestones	Lead Entity(s)	Resources
Overall Recommendation - Support the research, planning, projects, and outreach strategies of lake districts or associations within the Eau Claire River Watershed that contribute to the fisheries and habitat health of the overall watershed.			

Recommendations	10-Year Milestones	Lead Entity(s)	Resources
Research & Planning Strategies			
2.1 Complete or Update the Lake Shoreland Habitat Assessments - Conduct a comprehensive inventory and assessment of the uses, conditions, and quality of shoreland habitat on all lakes within the watershed. The Lake Altoona assessment was recently completed, while the Lake Eau Claire assessment should be updated. Identify and prioritize potential shoreland habitat improvement, restoration, and protection projects.	Complete/update lake assessments with priorities and recommendations for action.	Lake Groups with support Citizen Water Quality & Habitat Monitoring Group (Discussed in Section VIII).	WDNR Lake Protection Grant; universities; WDNR; Beaver Creek Reserve; Citizen Lake Monitoring Network
Projects & Best Practices			
2.2 Lake Shoreland, Fisheries and Aquatic Habitat Projects - Support implementation of fish habitat projects on lakes (e.g. tree drops, fish cribs) as planned and proposed by lake districts, lake associations, and lake management plans within the watershed. Increase the course, woody underwater habitat.	Refer to lake association & district plans and other lake plans; discuss these projects annually (or as needed) with the Coalition	Lake Districts & Associations; County LCDs; WDNR	WDNR Lake Protection Grant; Lake groups; volunteers
Education & Outreach Strategies			
2.3 Educate landowners about the benefits of course woody habitat - Encourage landowners to keep trees that naturally fall into lakes.	Increased woody habitat in major lakes.	Lakes groups	WDNR and County LCDs for technical assistance
2.4 Other Wildlife Habitat Improvements for Rivers, Lakes, and Shoreland Areas - See F&H 1.9	See F&H 1.9	See F&H 1.9	See F&H 1.9

F&H 2: Monitoring and Evaluation Plan

Progress towards Fisheries and Habitat (F&H) Objective 2 will be monitored and evaluated through:

- The activities of the Coalition's Citizen Water Quality & Habitat Monitoring Group (discussed in Section VIII) will be important to monitoring this objective, as well as the engagement of watershed residents.
- Completion and periodic updates of the shoreland health habitat assessments described in F&H 2.1
- The individual monitoring and evaluation activities of the lake districts and associations. These lake groups should have an active role in the Watershed Coalition. Lake plans and proposed projects will be shared during Coalition meetings to discuss partnership and coordination opportunities. The Coalition will encourage the compilation of pre- and post-BMP photos and video.
- The overall monitoring plan described in Section XI.

F&H 3: Aquatic Invasive Species Objective

Maintain or decrease the number or type of aquatic invasive plant and animal species within and near surface waters.

F&H 3: 10-Year Indicators (Where will we be in 10-Years?)

- Achieve a more comprehensive understanding of the Aquatic Invasive Species (AIS) risks and establish baseline distribution levels within the watershed's lakes, rivers, streams, and shoreland areas.
- Achieve a consensus on specific AIS target objectives and strategies for future plan updates.
- Increase the knowledge of the public and local officials regarding AIS risks, baseline distribution, and recommended actions.

Recommendations highlighted in red are initial priorities that should be addressed within 1-3 years.

Timelines and Milestones may change subject to available resources, emerging opportunities, and the efforts of individual Coalition members.

F&H 3: 10-Year Action Plan

Recommendations	10-Year Milestones	Lead Entity(s)	Resources
Research & Planning Strategies			
3.1 AIS Survey and Plan - Conduct a baseline AIS field survey that increases our understanding of the types and distribution of Aquatic Invasive Species (AIS) within the watershed. Raise public and local official awareness of the results. Develop an AIS strategy based on these recommendations and incorporate into an AIS plan or future watershed plan update, including target species, locations, and more prescriptive strategies.	Complete the survey for a statistically significant and representative sub-sample of river reaches.	Citizen-led activity promoted by the Citizen Water Quality & Habitat Monitoring Group (Discussed in Section VIII).	Volunteers; Lower Chippewa Invasives Partnership & Upper Chippewa CWMA; WDNR Aquatic Invasive Species Grants; Explore potential use of a mobile app

Recommendations	10-Year Milestones	Lead Entity(s)	Resources
Projects & Best Practices			
3.2 Support AIS Efforts As Opportunities Allow - Support the efforts of lake groups, County LCDs, and area weed management groups to prevent or control aquatic and terrestrial invasive species within lakes, shoreland, and riparian areas.	See 3.1 and 3.2 above.	Lake groups, County LCDs, and Weed Management Areas	WNDR Aquatic Invasive Species Grants; Lower Chippewa Invasives Partnership & Upper Chippewa CWMA
Education & Outreach Strategies			
3.3 Promote Citizen-Science Tools and Monitoring Programs Increase awareness among watershed residents of available mobile apps and other tools available to help report and monitor invasive species. Encourage participation in Project Riverine Early Detectors (Project RED), Citizen Lake Monitoring Network, and Water Action Volunteers (WAV) Stream Monitoring programs.	See 3.1 and 3.2 above.	Coalition, as opportunities allow	WNDR Aquatic Invasive Species Grants; Lower Chippewa Invasives Partnership & Upper Chippewa CWMA

F&H 3: Monitoring and Evaluation Plan

Progress towards Fisheries and Habitat (F&H) Objective 3 will be monitored and evaluated through:

- The activities of the Coalition's Citizen Water Quality & Habitat Monitoring Group (discussed in Section VIII) will be important to monitoring this objective, as well as the engagement of watershed residents.
- The implementation of strategies F&H 3.1, as well as increased participation in programs listed in F&H 3.3.
- The overall monitoring plan described in Section XI.

F&H 4: Public Access Objective

Increase public access to our rivers, streams, and lakes for recreational, educational, and scenic viewing opportunities, as well as for water quality monitoring.

F&H 4: 10-Year Indicators (Where will we be in 10-Years?)

- Identify the location and current condition of public access to the primary surface waters of the watershed.
- Provide recommendations to WDNR and counties regarding public access.

Recommendations highlighted in red are initial priorities that should be addressed within 1-3 years.

Timelines and Milestones may change subject to available resources, emerging opportunities, and the efforts of individual Coalition members.

F&H 4: 10-Year Action Plan

Recommendations	10-Year Milestones	Lead Entity(s)	Resources
Research & Planning Strategies			
4.1 Public Access Inventory - Conduct an inventory of the location and condition of public access to the primary surface waters of the watershed. Provide recommendations to WDNR and counties regarding public access. Incorporate into outdoor recreation plans.	This is a lower priority and may not be completed by 2026.	Lake Groups and volunteers.	County Parks/ Rec departments and municipalities; WDNR River Protection grants
Education & Outreach Strategies			
4.2 Highlight Recreational Opportunities - In coordination with municipalities, economic development corporations, and other tourism efforts, highlight the recreational opportunities within the Eau Claire River Watershed and the economic value of our surface waters.	Work with the City of Eau Claire to coordinate with similar Chippewa River outreach/river "trail" efforts.	Advocacy by the Coalition and municipalities	EDCs and tourism organizations

Recommendations	10-Year Milestones	Lead Entity(s)	Resources
4.3 Encourage Public Access Opportunities - Encourage communities to consider, maintain, or require public access and water viewing opportunities as part of local planning efforts.	Ongoing, as part of comp. plan updates, site planning, outdoor rec planning, etc.	Municipalities	Potentially, WDNR Stewardship grant funds; exactions; private donations

F&H 4: Monitoring and Evaluation Plan

Progress towards Fisheries and Habitat (F&H) Objective 4 will be monitored and evaluated through:

- Implementation of strategy F&H 4.1.
- The overall monitoring plan described in Section XI.

SECTION X: EDUCATION, CITIZEN ENGAGEMENT, & CIVIC LEADERSHIP STRATEGIES

SECTION X. EDUCATION, CITIZEN ENGAGEMENT & CIVIC LEADERSHIP STRATEGIES

To attain our watershed vision and overall goals, the entire watershed community must become aware of the importance of soil health and surface water quality. We, as a watershed community, must also work collaboratively and share responsibility to restore and protect water quality. And, since resources are limited, our resources must target those areas, best practices, and strategies that are most feasible and will yield the greatest return on investment.

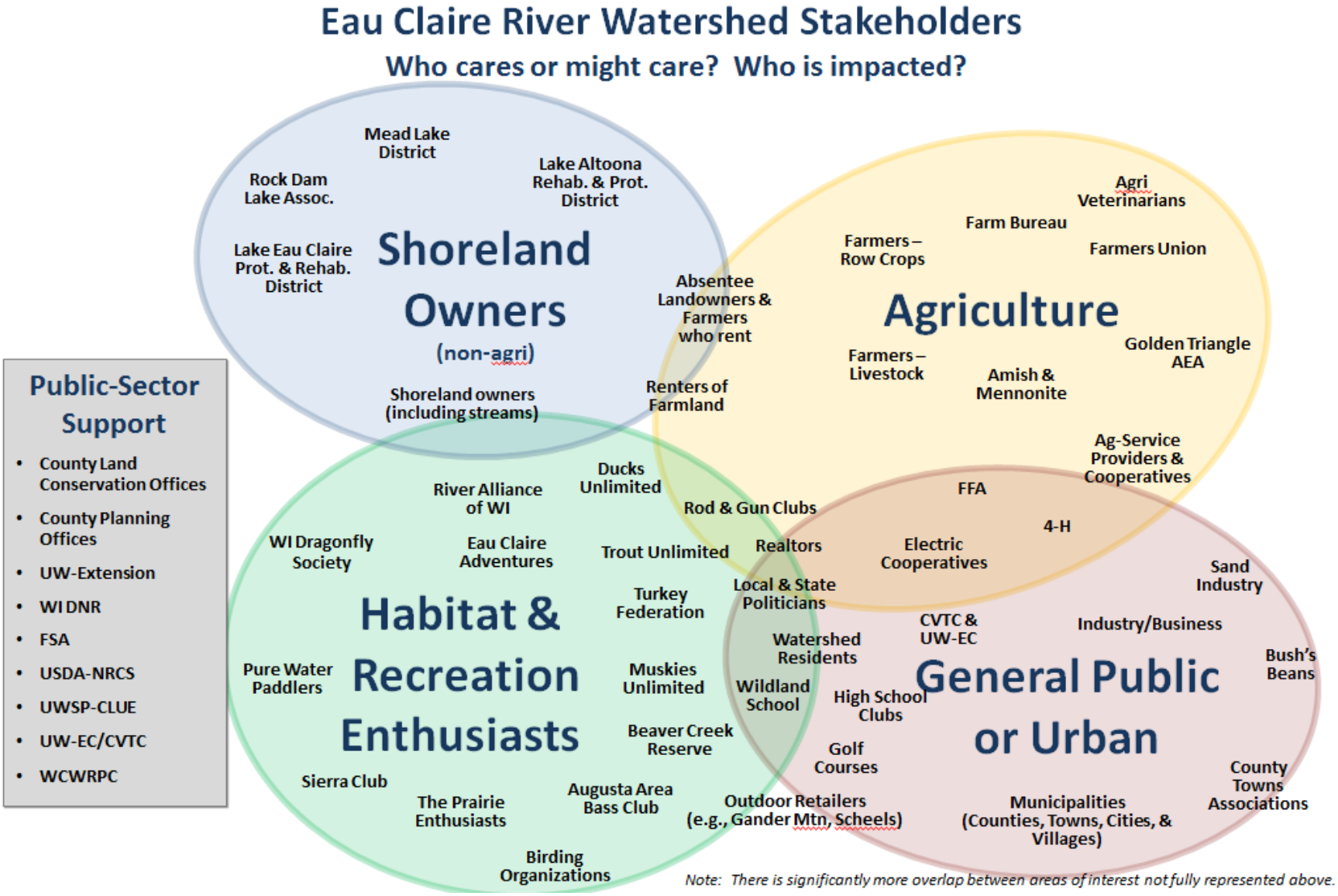
If land is managed based on current minimum standards for runoff, soil health, etc., we will never reach the numeric phosphorus reduction targets in Section VIII. Communities, governmental agencies, lake groups, and other stakeholders have been working for decades to address our nutrient-loading problems, but these problems continue to persist. We can't buy our way out of this problem. And if it was easy, we would have already fixed it. To achieve our goals, we must go beyond the minimum standards. Watershed residents and communities must want to make the needed changes. It is for this reason that this plan takes a new approach with greater emphasis on education, civic leadership, and capacity building, as discussed in Section II.E.

A. KEY STAKEHOLDERS AND PARTNERS

Early in the planning process, Coalition members conducted a stakeholder mapping exercise to identify key watershed stakeholders and partners that have one or more of the following characteristics:

- Cares or might care about the quality of our streams, rivers, and lakes.
- Are impacted by your water quality concerns.
- Should be invited to the Coalition meetings or public discussion meetings.
- May be important to the implementation of the Eau Claire River Watershed Strategy.

The figure on the following page reflects the results of this exercise. While stakeholders generally fell into one of five areas of interest, there is great overlap between these areas. For example, a farmer could also be a shoreland owner and love to fish. Efforts were made to reach out and involve representatives from nearly all of these stakeholders during the planning process. All of these stakeholder and partners can have an important role to play in addressing soil health and water quality in the Eau Claire River Watershed.


Eau Claire River Watershed Stakeholders
Who cares or might care? Who is impacted?
Shoreland Owners (non-agri)
Mead Lake District
Rock Dam Lake Assoc.
Lake Altoona Rehab. & Prot. District
Lake Eau Claire Prot. & Rehab. District
Shoreland owners (including streams)
Agriculture
Agri Veterinarians
Farm Bureau
Farmers – Row Crops
Farmers Union
Absentee Landowners & Farmers who rent
Golden Triangle AEA
Farmers – Livestock
Amish & Mennonite
Renters of Farmland
Ag-Service Providers & Cooperatives
FFA
4-H
Electric Cooperatives
Habitat & Recreation Enthusiasts
Ducks Unlimited
River Alliance of WI
Rod & Gun Clubs
WI Dragonfly Society
Eau Claire Adventures
Trout Unlimited
Realtors
Local & State Politicians
Turkey Federation
Pure Water Paddlers
Muskies Unlimited
Beaver Creek Reserve
Sierra Club
The Prairie Enthusiasts
Augusta Area Bass Club
Birding Organizations
General Public or Urban
Sand Industry
CVTC & UW-EC
Industry/Business
Watershed Residents
Bush's Beans
Wildland School
High School Clubs
Golf Courses
County Towns Associations
Outdoor Retailers (e.g., Gander Mtn, Scheels)
Municipalities (Counties, Towns, Cities, & Villages)
Public-Sector Support
County Land Conservation Offices
County Planning Offices
UW-Extension
WI DNR
FSA
USDA-NRCS
UWSP-CLUE
UW-EC/CVTC
WCWRPC
Note: There is significantly more overlap between areas of interest not fully represented above.

B. MESSAGING

Coalition members spent considerable time during their April 2015 meeting identifying public messages to address water quality and soil health within the watershed, as well as how these messages should be delivered and how to engage different stakeholder groups.

The following messaging approaches were recommended for each of the four general public areas of interest in the previous stakeholder map:

Agriculture – Continue to emphasize the financial and environmental benefits of good soil health practices and nutrient management. Prioritize best management practices and target areas to get the most "bang for your buck." Helping and empowering farmers to make positive change is more efficient than large, expensive physical projects. Use County Land Conservation Departments to deliver the message, along with The Country Today, electric cooperatives, agricultural cooperatives, UW-Extension, NRCS, 4-H, and FFA. Can also have a booth and/or do soil demonstrations at county fairs. One-on-one and small group likely most effective. Get conservation farmers of the year involved. Must include both owners and renters of farmland. Recognize conservation practices with signs and in the press. Also see results of Sociological Assessment in Section VI.

Shoreland Owners – The Watershed Strategy should reference the lake association/districts' websites and highlight what is being done to improve public uses and fishing for everyone. Stress the related economic benefits of these public uses and the return on investment for good water quality. Use statistics from WDNR and others on tourism and the relationship between business success and water quality. The target audiences for these messages should not be limited to shoreland owners, but should include elected officials and the general public.

MESSAGING: THE PROCESS OF CREATING A CONSISTENT STORY AROUND A PRODUCT, PERSON, COMPANY OR SERVICE. A FUNDAMENTAL TECHNIQUE USED IN PUBLIC RELATIONS IS TO IDENTIFY THE TARGET AUDIENCE AND TO TAILOR MESSAGES TO BE RELEVANT TO EACH AUDIENCE.

Habitat & Recreation Enthusiasts – People often need to see the problem, so the message needs to be conveyed visually (e.g., YouTube videos, pictures, demonstrations) and through stories so residents know how they fit into the big picture. Highlight the diversity of the river. The message can be delivered via boat landings, Wisconsin Outdoor News, events, social media, face-to-face contact, duck races, Wildlands School, Beaver Creek Reserve, community organizations, pontoon rides/float trips, and by involving representatives from these stakeholder groups.

General Public (and Elected Officials) – Messaging should stress: (1) Everyone has a role to play and everyone has a share responsibility for water quality and (2) the economic value of good, clean water and water-based recreation. Deliver the message through County Towns Association meetings, traditional media, social media, investigative journalism, summer festivals, church picnics, Beaver Creek Reserve, etc. It will take one-on-one and small group conversations over time to make large-scale change.

Elected officials should be encouraged to take a leadership role and make water quality a priority. Encourage private industry to take a similar role. Also need to involve and grab the attention of youth.

THE FOLLOWING GENERAL EDUCATION, OUTREACH, AND MESSAGING RECOMMENDATIONS ARE SUGGESTED:

Education, outreach, and messaging should be customized to the target audience when possible.

In particular, increase education and outreach to elected officials, shoreland owners, and the general public regarding:

- the economic importance of our rivers, lakes, and streams;
- everyone has a shared responsibility and a role to play; more financial and staff resources are needed;
- things landowners can do in their backyard to improve water quality and habitat diversity and the water quality consequences of individual decisions;
- available funding and technical resources for habitat and stream improvement projects;
- land development practices that can help or hurt water quality;
- the benefits of purchasing of food, goods, and services from local farmers and businesses;
- do a better job of recognizing and celebrating successes and good practices;
- existing water-related threats, rules, and regulations; and,
- creating a culture that understands and values the full importance of our lakes, rivers, and streams and become actively engaged in local and regional advocacy and project implementation.

Strive to make water quality and soil health a political priority for the watershed. Engage and educate elected officials at all levels.

In addition to the above, use social science (see Section VI) to guide education and outreach to farmers & landowners who lease farmland regarding:

- the long-term economic benefits of good soil health;
- nutrient management, soil testing/management, and alternative conservation practices;
- how agricultural land can be managed in a way that meets their financial goals and save time, while also having habitat and water quality benefits;
- how to include best management practices and monitoring as part of lease agreements;
- opportunities for civic governance (e.g., farmer-led councils) and,
- funding, incentives, and technical resources for BMP projects.

C. A SOCIAL SCIENCE-BASED CITIZEN ENGAGEMENT & CIVIC LEADERSHIP MODEL

In the past, the focus of watershed management outreach was on providing technical information and financial incentives to land users and stakeholders, particularly farmers, on how best to manage their land for water quality. This top-down, or "expert" model has limitations in two ways:

1) There is often a lack of buy-in from land managers in how they can best manage their land to reduce nonpoint source pollution runoff, and

2) Land owners were not often directly involved in the development of the nonpoint source pollution reduction strategies, often resulting in lower than needed participation rates.

To address these limitations, we must take a different approach, one which focuses on inspiring the civic imagination and developing the leadership skills of citizens within watersheds by directly including watershed residents in the development of nonpoint source pollution runoff control strategies.

Civic organizing, guided by civic governance principles, is a new approach for water quality improvement and encouraging greater citizen engagement. Working locally with residents of the watershed, we can build greater capacity to manage our waters. Active civic engagement develops trust, expands awareness, builds partnerships, establishes strategic relationships, and ultimately raises the level of involvement by citizens in the watershed. It also builds networks and provides the infrastructure to maintain sustainable solutions to water quality problems. While we characterize this as a "new" approach, it can also be thought of as a very old approach—one that has been used by many cultures and communities throughout human history, whereby a community comes together to work with each other to solve a problem that is shared by the community, with solutions that are also employed and shared by the community.

Progress towards these efforts is already underway in the Eau Claire River Watershed. The Coalition authoring this strategy was brought together with civic engagement principles in mind, and meetings are conducted in light of that process. The Coalition represents many different organizations including state and county government, non-governmental organizations (NGOs), private lake groups, the corporate sector, watershed residents, and other stakeholders groups. The Coalition has also recognized that engagement and messaging will vary by target audience and even geography, as reflected in the previous subsection. For this reason, this Watershed Strategy stresses the importance of soil health.

CITIZEN (CIVIC) ENGAGEMENT AND CIVIC GOVERNANCE

There are two main ways in which we envision education and outreach as participatory: citizen (or civic) engagement and civic governance. Civic engagement and governance are not the same, but are closely connected.

Citizen engagement creates an empowered, engaged, and accountable electorate. This entails regular discourse, coordination, and compromise across NGOs, private firms, and other watershed residents and stakeholders, solving problems in an iterative and sustainable manner. The University of Minnesota-Extension website has an excellent webpage to learn more about citizen engagement: http://www.extension.umn.edu/community/civic-engagement/

SECTION X. EDUCATION, CITIZEN ENGAGEMENT & CIVIC LEADERSHIP STRATEGIES

Civic governance means creating the infrastructure in which citizens govern for the common good; in this case focused on water quality and soil health concerns. Civic governance requires civic leadership. Civic governance is a citizen-centered (not program-centered) approach to promoting the active citizenship and organizing the capacity of citizens to participate, lead, and inspire. Furthermore, civic governance means incorporating feedback from stakeholders in measurable ways that are reported in open forums. This allows for further adjustments in sustainable policies to improve livelihoods and resources for current and future generations. Without a grounded focus on civic governance, any efforts at civic engagement are futile, so both must be in place, expanded upon, and assessed for true participatory education and outreach to occur.

The formation of groups organized to focus on water quality issues is an important element of this strategy. Such "civic organizing groups" seldom come together without initial assistance at the beginning, but often can become self-sustaining and operate with much less outside help once established for a period of time. Civic organizing groups can be farmer-led councils, coalitions of professionals, a local neighborhood group working to build rain gardens to control storm water, or can take any number of forms.

By organizing citizens to be more engaged and take ownership of the process of decision-making for the common good of improved water quality, it is expected that citizen participation in land management changes will occur at higher rates. It is also anticipated that the amount of money needed for cost-share government programs (that pay farmers and others to enlist best management practices on the land that lead to better water quality) will decline. The Partnership expects this because peer-to-peer learning will require less government assistance.

BUILDING COMMUNITY CAPACITY FOR CIVIC GOVERNANCE

A community, regardless of its size and geographic level, must have the capacity for civic governance. Building community capacity focused on better land management will create a prevailing attitude within these communities that moves them toward managing for the common good. And building community among the partners and the civic organizing groups leads to greater organizational and relational capacity within the community, and leads to more sustainable (long-lasting) watershed solutions.

Figure 50 is an overview of a multi-level community capacity building model grounded in the social sciences that provides a framework to understand, inventory, evaluate, and building community capacity for responding to water resource problems. The model includes the following four primary components:

Member (Individual) Capacity: Understanding decision-making at the property-owner or household level is central to watershed planning and management. Each member of the watershed has different factors or indicators (e.g., awareness, concerns, beliefs, skill sets, perceived control) that influence their actions to protect soil health and water quality. Changing underlying values of adults will not be possible in many cases, but we can: (i) empower those who are interested, (ii) eliminate barriers to be involved, and (iii) find and activate shared goals and values. We can use social science to understand how these individual values vary across the Eau Claire River Watershed. We also need to know what individuals will (or won't do), so we can be strategic in focusing our watershed strategies on opportunities that exist and on problems that we can solve. In a broader sense, members can potentially include individual businesses and non-governmental organizations as well.

And, in the end, individuals must be the primary agent for change within their communities through leadership, vision, and trust.

Relational Capacity: In addition to understanding the motivations of individual members of the watershed, we can also use social science to identify the relational capacity and social networks of the watershed. These relationships will vary by geography, size, function, formality, and partners. By identifying how knowledge is informally exchanged among members, we can better understand how to reach out and engage existing social networks and communities, and begin to create a collective sense of responsibility. Outreach and capacity building efforts can also be more strategic by focusing efforts on key individuals, entities, and opportunities that are shared by many individuals within a social network or are common to multiple networks.

Organizational Capacity: Once we have a better understanding of the variations in member and relational capacity across our watershed, we can begin to build organizational capacity. Organizational capacity is the meaningful engagement of members and formalizing the informal social networks. This capacity includes nurturing strong leadership, identifying a shared mission (i.e., what does success look like), and providing a framework for collaborative decision-making by the members. This is the heart of civic governance and, preferably, begins at the local level.

Programmatic Capacity: Once an organization is

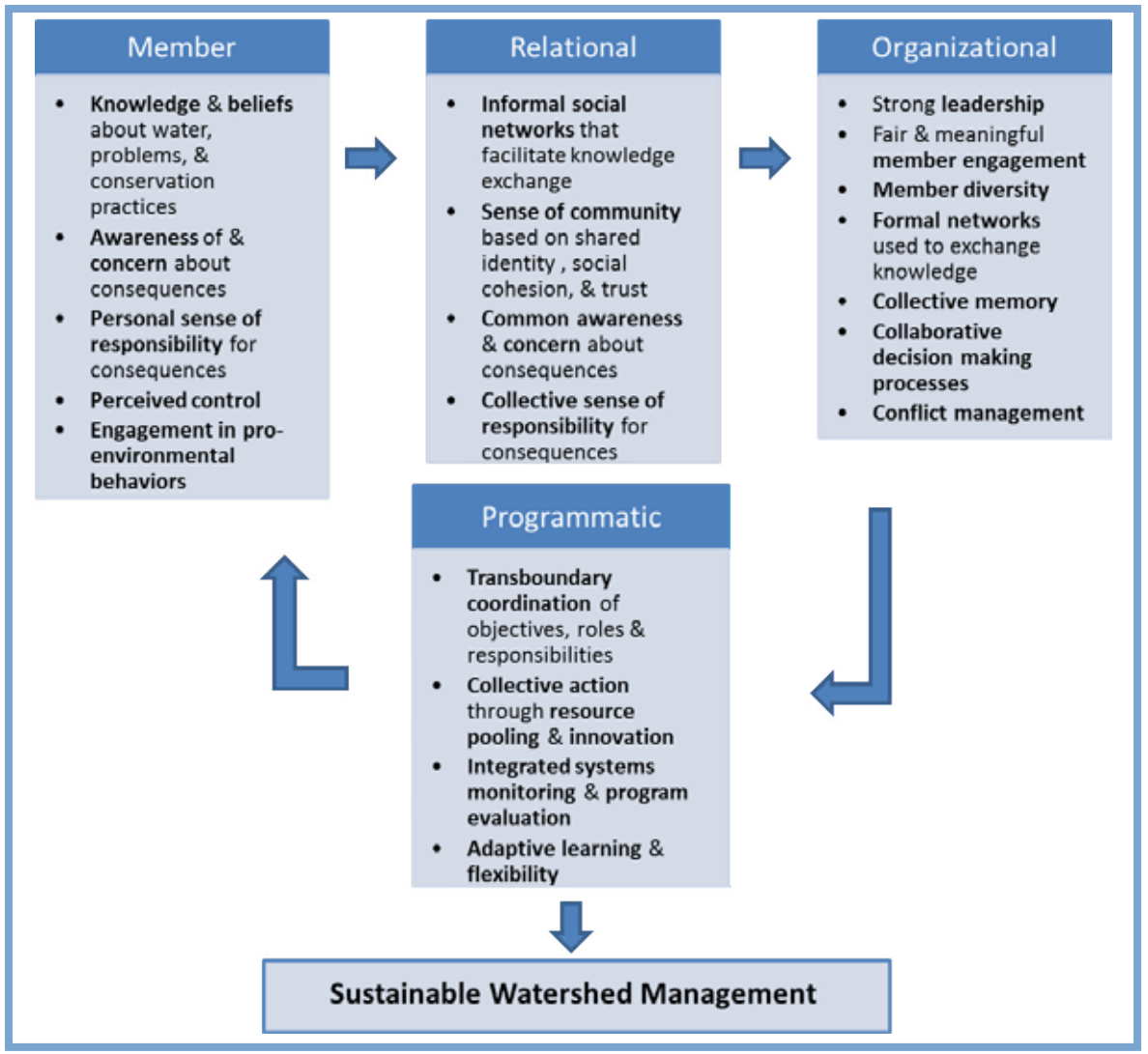


Figure 50: *Illustration of a multi- level community capacity building model.*

formed, it is time for collective action. Enhancing programs requires coordination, communication, civic engagement, monitoring/evaluation, and continued capacity building. Collaborative planning throughout the capacity building process needs to be transparent, consistent, and values the diversity of individual members in a manner that fosters trust, legitimacy, and fairness.

Wisconsin's farmer-led or producer-led watershed protection projects are an excellent example of how the community capacity building model could function. By understanding the members and social relationships of individual areas (or subwatersheds) potential interest and opportunities for the creation of a producer-led group can be identified. Information and support can be provided to nurture the organizational capacity of (and help formalize) a local producer group. Then, the group can tap into resources, such as the DATCP Producer-Led Grant Program, to undertake projects and programming in support of their goals. An additional benefit of building community capacity is that the community (and its members) will also be better prepared to identify and respond to emerging trends, take advantage of new opportunities, and mitigate new threats.

In short, the community capacity building model allows us to move from a community of many individual places and interests to a watershed community of shared interests and values. Such changes and relationship building will take time, and must be nurtured at the local level; a top-down model that does not consider local attitudes and relations will be ineffective.

INDIVIDUAL AND COMMUNITY CAPACITY WILL VARY BY GEOGRAPHY

When applying the model to a larger watershed, such as the Eau Claire, knowledge, beliefs, concerns, relationships, civic organization, and community capacity can (and will) vary by geography. This is reflected in the results of the sociological assessment in Section VI, which shows that attitudes can vary by subshed. These geographic differences are influenced by a variety of factors, but have important implications for the implementation of this Watershed Strategy, most notably:

- Citizen engagement and civic governance is often most effective at the local level by building the capacity of existing local relationship networks. The Coalition and other regional partners can help identify and nurture these local relationship networks, with an ultimate goal that such local networks evolve into self-sustaining, local-based civic governance groups.
- The Coalition and other partners can also provide support to these local networks to promote capacity building, messaging, and strategies that best fit local circumstances. While we can all work towards a shared vision, goals, and objectives for the overall watershed, the details of local citizen engagement and civic governance strategies cannot be "one size fits all" and need to be locally determined.
- The targeting and timing of the water quality BMPs identified in Section VIII will vary. As reflected in the Coalition's goal setting survey (Section V.C.), the top priority for addressing water quality threats should be subsheds and areas with high pollutant loading, high potential for improvement, and where landowners/communities are most willing to implement BMPs.

D. EDUCATION, CITIZEN ENGAGEMENT & CIVIC LEADERSHIP 10-YEAR ACTION PLAN

This section describes our approach to achieving the Education, Civic Engagement, and Capacity Building Goal and the Collaboration and Shared Responsibility Goal identified in Section VII. Ultimately, the actions recommended in this subsection are in support of the soil health, water quality, fisheries, and habitat objective and action plans identified in Sections VIII and IX. As such, the outcomes of the recommendations in this section are measured by the objectives and 10-year indicators in the previous two sections (Sections VIII & IX); objectives and 10-year indicators for this section were not developed.

The recommendations in this action plan falls into four general categories:

- Understanding Our Watershed Stakeholders and Communities Strategies (Research Focus)
- General Education and Outreach Strategies (Education Focus)
- Citizen Engagement, Civic Governance, and Capacity Building Strategies (Empowerment Focus)
- Eau Claire River Watershed Coalition Organizational Strategies (Plan Implementation and Building a Watershed Community Focus)

Build a Watershed Coalition Plan Implementation Team...

People are needed to put this plan into action; grants and cost-share dollars are not enough. We need people to work with landowners, their neighbors, and their communities.

The Eau Claire River Watershed Coalition is the broad community network of people, businesses, and other organizations who support the vision and goals of this plan. But to put this plan into action, a core group of champions is needed.

A Plan Implementation Team of 15-30 individuals is being formed to take the lead on coordinating and monitoring plan implementation on behalf of the larger Coalition. The Team will bring stakeholders together to foster communication and discuss the coordination of activities. Each Team member will then work within their own networks and make personal contacts to leverage resources, promote best practices, and strengthen the overall Coalition.

The County Land Conservation Departments will be core participants on this Team, along with the lake associations/districts. Efforts will be made to include representatives from farm organizations and services (e.g., agronomists, financing), farmers, agricultural enterprise areas, youth, elected officials, NRCS/FSA, UW-Extension, chambers/tourism, and other key stakeholders as part of the Team. Grant funding for a person/agency to assist with the initial coordination and activities of the Team may be required. The Team may establish work groups and coordinate with additional “advisors” for specific projects or issues.

SECTION X. EDUCATION, CITIZEN ENGAGEMENT & CIVIC LEADERSHIP STRATEGIES

It is imperative that the education, citizen engagement, and civic leadership strategies are general and flexible enough to adapt to changing conditions and to take advantage of opportunities.

During the planning effort, participants identified many specific ideas for education and outreach, such as hosting an annual duck race to raise awareness and developing a travelling "conservation café" that takes the soil health and water quality message to watershed communities. Such ideas are excellent and will be considered as the plan is implemented. But the Coalition decided that this action plan would be more effective and flexible if it prioritized key, over-arching strategies, rather than limiting the focus on a handful of very prescriptive activities.

…and build upon the many great things already being done in the Eau Claire River Watershed.

This Watershed Strategy does not exist in a vacuum. In fact, plan implementation has effectively already begun!

It is important to recognize all of the hard work and efforts already being made by residents, farmers, lake groups, businesses, agencies, and other stakeholders to improve soil health and water quality in the watershed. Such activities vary widely, ranging from the shoreline, agricultural, and forestry BMPs adopted by individual landowners to education initiatives such as the Rain-to-Rivers campaign. Groups of farmers are coming together to consider innovative strategies, such as the aerial seeding of cover crops, and to work towards shared goals through the creation of agricultural enterprise areas, such as the Golden Triangle AEA.

All of these efforts do not need to be specifically identified within this Watershed Strategy, even though they are all very important to helping us meet the overall vision and goals of this plan.

We should build upon and celebrate these many great things to demonstrate what can be accomplished. They are important examples that can built upon in other areas.

Further, the various residents, groups, and stakeholders who are doing these many great things should be invited to have a role in the Coalition and the Plan Implementation Team. We should work together to support, enhance, and/or expand their efforts as resources and opportunities allow.

UNDERSTANDING OUR WATERSHED STAKEHOLDERS AND COMMUNITIES STRATEGIES

Currently, there is limited information on how the awareness, beliefs, and interests of watershed residents vary across the watershed on water quality and soil health concerns, programs, and economic impacts. This knowledge is core to the social science-based citizen engagement and civic leadership model discussed in the previous subsection. With such knowledge, the Eau Claire River Watershed Strategy can be updated and fine-tuned to increase the efficiency and effectiveness of plan recommendations, such as where to target certain BMPs and initiatives, what types of messages will be most effective, and how to tap into existing social networks. This knowledge can also be used to guide future planning and activities, as well as help evaluate the social impacts of projects. The following strategies are recommended to gain a better understanding of the Eau Claire River Watershed community.

Recommendations - Understanding Our Community	Timeline/ Milestones	Additional Guidance
1. The Plan Implementation Team should meet with the Center for Land Use Education to discuss and consider the results of the farmer social science survey summarized in Section VI. Education, civic engagement, and other plan recommendations should be guided by the survey results. In particular, the survey results suggest: • Enhancing soil health, reducing soil erosion and preventing phosphorus loading in rivers are clear, shared goals for all respondent groups. All groups value spending resources to protect our surface waters. • How we engage different groups may differ by group. • Landowners must believe that a practice will have positive impacts prior to implementation. • Most farmers are interested in additional educational materials, but it will also take "boots on the ground" and discussions with people they trust (e.g., County LCDs, UW-Extension Ag Agents, NRCS, other farmers, ag business and services, neighbors) • Funding support for projects is important to many farmers, but we must carefully balance targeting resources to priority areas and providing access to such resources by everyone.	Year 1, then ongoing consideration of the survey results during plan implementation.	This activity will be led by the Plan Implementation Team, with guidance from Center for Land Use Education at UW-Stevens Point as needed.

SECTION X. EDUCATION, CITIZEN ENGAGEMENT & CIVIC LEADERSHIP STRATEGIES

Recommendations - Understanding Our Community	Timeline/ Milestones	Additional Guidance
2. Additional sociological and community assessment is recommended to better understand the diversity of knowledge, attitudes, levels of trust, motivations, land practices, and related interests among watershed residents regarding water quality and soil health. Such assessment should also include assessment of social networks and the community capacity to engage in water resource management. The review of the survey results discussed in Section VI may suggest additional questions. Depending on resources, this additional survey work may or may not include all remaining HUC-12s not surveyed previously. Longer-term, a periodic reassessment is recommended to allow the tracking of potential changes over time, stay aware of emerging trends, and to help evaluate of the effectiveness of education and civic governance strategies.	1-3 years – Survey additional HUC-12s 8-10 years – resurvey to assess social changes	Funding for this activity may be available through WDNR River & Lake Planning Grants, as well as private foundations, such as the McKnight Foundation. Universities, Center for Land Use Education, and UW-Extension may be available to provide technical assistance or conduct the survey. Also see: Davenport, Mae. Civic Engagement Module: Community Assessment. University of Minnesota, August 2015.
3. Survey elected officials representing the watershed on their attitudes towards soil health and water quality and why they value our waters. A primary purpose of the survey is to better understand how best to engage elected officials and strengthen their support for the vision, goals, and recommendations of this Watershed Strategy (e.g., enhancing soil health, reducing soil erosion and preventing phosphorus loading).	3-5+ years, as resources and need dictate	This is a longer-term optional strategy that requires more discussion by the Plan Implementation Team.

The action plan recommendations throughout this Watershed Strategy can be implemented and funded in a variety of ways and new opportunities arise over time. As such, specific lead parties and funding resources are not identified for all recommendations.

Many of the recommendations overlap and it may be most effective to combine multiple recommendations into a single project when pursuing grant funding. Other recommendations have the potential to be largely supported by existing staff or volunteer efforts. Appendix B provides a fairly comprehensive list of technical and funding resources that are available to assist with strategy implementation. The Plan Implementation Team will bring stakeholders together to determine how best to align these recommendations with available people, technical, and funding resources.

Recommendations in this action plan that are highlighted in red are suggested initial priorities that should be addressed within 1-3 years.

Timelines and Milestones may change subject to available resources, emerging opportunities, and the efforts of individual Coalition.

SECTION X. EDUCATION, CITIZEN ENGAGEMENT & CIVIC LEADERSHIP STRATEGIES

GENERAL EDUCATION & OUTREACH STRATEGIES

The following are general education and outreach policies and strategies are recommended to enhance the public's understanding of the Watershed Strategy, the water quality and soil health challenges facing the Eau Claire River Watershed, why soil health and water quality are important, what political actions are needed, and what opportunities are available to participate in continued, related planning and management measures.

Recommendations - General Education & Outreach	Timeline/ Milestones	Additional Guidance
1. Develop educational materials and identify conduct outreach to the general public and other key stakeholders in support of the plan vision and goals. Potential ideas include: • Conduct presentations and discussion meetings with watershed stakeholder groups and communities, perhaps as part of a "conservation café" with student presentations and reports on actual BMPs and projects. • Develop customized messaging and materials targeting specific, key stakeholder groups and attitude groups (see farmer survey results in Section VI). • Establish a Clean Water Days campaign based on algae target objectives on lakes, similar to the Little Lake Wissota Stewardship Project with corporate sponsorship support. • Maintain an Eau Claire River Watershed email list, webpage, and Facebook page. Publish an Eau Claire River Watershed newsletter and other informational materials. Work with ag and electrical coops for mailings. • Work with local media to increase awareness of the relationship between soil health and water quality, as well as shared responsibility and how to get involved. Advocate for a series of related media stories. • Install and maintain educational kiosks about the watershed, the economic value of surface waters, and best practices at key locations around the watershed. • Engage in a conversation on soil health and water quality attitudes, interests, and opportunities with the Amish and Mennonite communities, beginning with bishops. • Create a "trade show booth" for the watershed that can be used at events, county fairs, speaking engagements, etc. Print related flyers, brochures, and other marketing items. • Develop and distribute a companion booklet to the Watershed Strategy that will educate the public and local officials on the life science, geology, and economic importance of water quality and soil health within the Eau Claire River Watershed.	1-3 years, then ongoing Specific activities will vary, in part, as opportunities become available.	It is okay to start small and, initially, rely on available materials and resources. Not all of the ideas may be implemented; the Plan Implementation Team and other stakeholders should set priorities based on needs and interests. The list of potential ideas is not exclusive; remain flexible. This task will require significant volunteer time, unless grant funded under a contract. Funding for customized materials, printing, webpage development, etc. will be needed. Potential funding sources include corporate sponsorships, private foundations, donations, and the resources lists in Appendix B. The Plan Implementation Team may create a work group or staff a coordinator position to take the lead on outreach. Public relations expertise may be valuable.

Recommendations - General Education & Outreach	Timeline/ Milestones	Additional Guidance
2. Increase 1-on-1 contacts and networking opportunities within the watershed, including building the capacity of peer-to-peer networking by residents. As staffing resources allow, professional staff (e.g., County LCDs) will provide 1-on-1 contacts and other networking opportunities (e.g., farm field days, demonstration projects, farm tours, soil health workshops) with farmers, landowners who rent farmland, and farm organizations on enhancing soil health, reducing soil erosion, and preventing phosphorus loading. For landowners who rent farmland, such outreach could also include model lease agreements and example projects that encourage more active management of their lands. When opportunities allow, similar networking opportunities can be provided for other watershed residents (e.g., lake tours, trout days) or target audiences (e.g., forest management BMPs for foresters, timber companies, and MFL landowners). Increase the capacity of residents (non-governmental) to engage in 1-on-1 discussions with their neighbors by developing a brief, easy-to-understand "watershed neighbor kit" of materials and talking points that can be used for peer-to-peer networking and media relations.	1-3 years, then ongoing As suggested in the farmer survey (Section VI), this is a key plan priority.	County LCDs, along with farmers, farm organizations/service providers, UW-Ext Ag Agents, and NRCS/FSA will be primary entities reaching out to farming community. May also network with agronomists, local banks, cooperatives, Farmers Union, Farm Bureau, and other ag business or farm groups. However, all Coalition members can have a peer-to-peer networking role, especially if provided the necessary tools.
3. Through a report, poster, video, or other appropriate format, provide farmers, those who rent farmland, watershed residents, and elected officials an explanation of the economic importance of good soil health, how it benefits farm profitability, and the importance of soil health to the long-term sustainability of agriculture. Include testimonials from area farmers, results of before/after monitoring, etc., that demonstrate that good soil health practices work and increases overall farm productivity. Discuss some of the most common BMPs, as well as available resources. Also encourage civic leadership and governance.	1-3 years	Use the farmer survey results as guidance (Section VI). This may be a potential student-assisted project (e.g., CVTC, UW-EC). Support may be available through private foundations, WI River Alliance, or other resources in Appendix B.
4. Conduct an annual Eau Claire River Watershed event, or become part of another, broader regular event, to provide networking, educational, and outreach opportunities on soil health, water quality, and civic governance.	Conduct the first event in 2017 or 2018	Xcel Energy Watershed Resources Fund for initial start-up; Event Sponsors; event registration fees
5. Implement demonstration and pilot projects and conduct soil health demonstrations to show the economic and ecological value of good soil health and erosion reduction projects to farmers and those who rent farmland. Acquire equipment (or assist with equipment cost-sharing) that can be used or rented by farmers to test different BMPs.	2+ years, then ongoing	Could be coordinated through Farmer-Led Councils or other farmer-led groups (e.g., AEAs). Explore potential funding support from area ag lenders for equipment (or other recommendations).

Recommendations - General Education & Outreach	Timeline/ Milestones	Additional Guidance
6. Perform and widely distribute an analysis of the economic importance of clean water and good soil health within the Eau Claire River Watershed. Such study(s) should consider farm profitability, property values, business, recreation, and tourism. If possible, consider costs to improve waters to date, opportunity costs, and costs if current actions were halted.	1-3 years	UW-Stout is performing some similar survey work in the Red Cedar Watershed
7. Implement a demonstration project to show shoreland owners good practices and proper landscaping	3-5 years	WDNR and related lake grants; private landowners lake groups
8. Encourage UW-Eau Claire, CVTC, and schools within the watershed to undertake water quality related projects	As opportunities allow	Universities, CVTC, and school districts, CESAs, Wildland School, Scouting groups
9. Work with local FFA groups to develop a watershed conservation certification, recognition, or award program.	5+ years, then ongoing	FFA groups and schools

CITIZEN ENGAGEMENT, CIVIC GOVERNANCE, AND CAPACITY BUILDING STRATEGIES

The following strategies recommend how the social science-based citizen engagement and civic leadership model discussed in the previous subsection can be used within the Eau Claire River Watershed to achieve the vision and goals of this Watershed Strategy. Initial emphasis should be given to creating the organizational structure (e.g., nurturing civic leaders and local champions), while realizing that such changes will require time and sustained commitment.

It is important to note that many of the strategy recommendations in the Soil Health & Water Quality Action Plan (Section VIII) and the Fisheries & Habitat Action Plan (Section IX) are also engaging citizens and building capacity. For example, we can engage municipalities by encouraging them to fund non-point source pollution reduction efforts as an economical way to meet WPDES obligations. And citizen water quality and habitat monitoring is a great way to involve and empower residents. Such recommendations are not repeated here.

SECTION X. EDUCATION, CITIZEN ENGAGEMENT & CIVIC LEADERSHIP STRATEGIES

Recommendations - Civic Engagement & Civic Governance	Timeline/ Milestones	Additional Guidance
1. Recognize conservation farms and other good practices within the watershed through signs, press releases, etc. Host site visits and field days so residents can see these practices first hand.	1-3 years, then ongoing	The Plan Implementation Team can start small, but demonstrating the value of BMPs should be a priority.
2. Encourage farmer-led councils or groups that can work with farmers and landowners to help prioritize soil health and water quality projects and share best practices at a local level. Additional education and awareness on this approach is needed within the watershed. The Golden Triangle AEA has the foundation in place to potentially take on this role in the very near future, if these farmers are interested. The creation of additional AEAs within the watershed may offer additional such opportunities.	1-3 years, then ongoing	Based on the farmer survey results (Section VI), Fall Creek HUC-12 subwatershed (and/or nearby subsheds) may be a good area to pilot this.
3. Actively engage municipalities and elected officials. • Educate local, county, state, and federal officials on the economic value of soil health and water quality, watershed issues/trends, accomplishments, and priority needs. Encourage policy and funding actions that support the vision and goals of this Watershed Strategy. • Provide models and example tools that can be implemented locally, including opportunities for cost sharing. • Encourage state, counties, and local municipalities to incorporate and/or reference the goals, objectives, and recommendations of the Eau Claire River Watershed Strategy in their own outdoor recreation plans, comprehensive plans, and other related plans. • Promote the adoption of minimal or low impact design standards for stormwater management.	1-3 years, then ongoing	The Plan Implementation Team could establish a work group to take the lead.

SECTION X. EDUCATION, CITIZEN ENGAGEMENT & CIVIC LEADERSHIP STRATEGIES

Recommendations - Civic Engagement & Civic Governance	Timeline/ Milestones	Additional Guidance
4. As opportunities allow, empower the general public by increasing their awareness of: • Cost-sharing opportunities for conservation and habitat practices • Water quality and habitat monitoring opportunities • The WDNR Adopt a Fish & Wildlife Area Program and other such adoption opportunities • How to recognize good land practices and environmentally problematic activities to help promote citizen action that can reduce pollutant loading, along with agency contact information if a resident has questions or believes more formal action may be needed.	1-3 years, then ongoing	This would be implemented in conjunction with the previous general education and outreach strategies.
5. Empower and build the capacity of watershed residents to take action and a leadership/civic governance role to promote soil health and water quality. This can be accomplished through potential activities such as: • Creating and supporting diverse, inclusive peer leadership and action teams on different aspects of soil health and water quality, such as the water quality monitoring team recommended in this Watershed Strategy. • Encouraging businesses and institutions to promote active citizenship and civic governance policies and activities, as well as provide financial sponsorship of plan activities. • Nurturing civic leaders and the creation of inclusive, local civic governance organizations, such as farmer-led groups and subwatershed advocacy groups. • Developing a website with an interactive map a resident can use to report BMPs and success stories.	3+ years; ongoing policy direction and will grow over time	Efforts towards this strategy will likely begin sooner than Year 3. While this is an overall priority and crucial, it will take some time for the Plan Implementation Team to build its own capacity before local, effective civic governance will be in place throughout the watershed.
6. Explore creation of an Eau Claire River Watershed Master Stewardship Program similar to the St. Croix Watershed pilot project.	5+ years	Evaluate based on the results of the St. Croix Watershed pilot project experience.

SECTION X. EDUCATION, CITIZEN ENGAGEMENT & CIVIC LEADERSHIP STRATEGIES

EAU CLAIRE RIVER WATERSHED COALITION ORGANIZATIONAL STRATEGIES

The recommendations in this section encompass the Eau Claire River Watershed Coalition's overall role and structure, including how to bring stakeholders together to implement this Watershed Strategy.

Recommendations - Coalition Organizational Strategies	Timeline/ Milestones	Additional Guidance
1. Form and grow a Plan Implementation Team of 15-30 watershed champions to take the lead on coordinating and monitoring of plan implementation on behalf of the larger Coalition. The initial Team should identify other key stakeholders who should be part of the Team, then make 1-on-1 contacts to encourage their participation. The Plan Implementation Team may establish work groups and have additional "advisors" to assist with specific issues or activities.	Immediate, then ongoing; currently being formed	County Land Conservation Departments to take a lead role. If needed, pursue River Grant dollars to fund an initial coordinator and related activities.
2. Encourage Plan Implementation Team members to participate in or host civic leadership, capacity building, team building, and 1-on-1 peer networking educational workshops. The outreach and civic governance strategies in this plan may be further fine-tuned based on the ideas and lessons learned. This strategy is the first step in developing a diverse base of civic leaders across the watershed who are trained in citizen engagement and civic leadership techniques and can nurture local capacity building within their own communities and social networks.	1-3 years; involve others over time	Grant dollars or private donations to assist with workshop fees or host speakers may be needed.
3. The Coalition should consider becoming a partner organization of the Fishers & Farmers Partnership of the Upper Mississippi River Basin. (http://fishersandfarmers.org/)	3-5 years	Identify a Coalition member to be a F&F Partnership Liaison.
4. Over time, increase awareness of the overall Watershed Coalition and grow its membership. Related activities could include creation of a logo and slogan/brand, increasing the Coalition's web presence, and developing a Coalition membership structure, certificate, etc.	3+ years	The formation of the Plan Implementation Team, setting up tracking systems, and addressing other 1-3 year priorities should be the initial priorities.

Recommendations - Coalition Organizational Strategies	Timeline/ Milestones	Additional Guidance
5. Maintain and grow the Eau Claire River Watershed Coalition with the following primary roles: • facilitate education and information sharing • nurture relationships between stakeholders • encourage the coordination of plans, projects, and best practices that benefit soil health and water quality • advocate for and monitor progress of this Watershed Strategy.	Ongoing; overall policy direction	Wisconsin River Alliance may be able to assist with strategic planning if needed.

EDUCATION, CITIZEN ENGAGEMENT & CIVIC LEADERSHIP MONITORING AND EVALUATION PLAN

The strategies in this section will primarily be monitored and evaluated based on the following:

1. Was there progress on each of the above strategies as suggested by each milestone? Progress should be evaluated annually as will be discussed in Section XI.
2. Participation in the various best practices, civic governance strategies, and other activities recommended in the overall Watershed Strategy. This metric not only includes the number of participants, but should consider the diversity and inclusiveness of participants from throughout the watershed.
3. Changes in awareness, attitudes, levels of trust, willingness to take action, and community capacity to engage in water resource management as suggested by the Understanding the Watershed Community Strategy. This is a longer-term metric that will first require a baseline, as well as sufficient time to allow for such changes to take place.

As stated previously, the effectiveness and outcomes of the recommendations in this section will ultimately be measured by the objectives and 10-year indicators in the prior two sections (Sections VIII & IX). The overall monitoring plan for this Watershed Strategy is discussed further in Section XI.

SECTION X. EDUCATION, CITIZEN ENGAGEMENT & CIVIC LEADERSHIP STRATEGIES

EDUCATION, CITIZEN ENGAGEMENT, CIVIC LEADERSHIP TENETS

The following overarching policies should be followed when implementing the strategies recommended in this section:

- Active citizenship and collaboration should be transparent, fair, and built on trust (not blame), while calling on watershed citizens to govern for the good of the whole.
- Civic governance should be inclusive and equitable. All watershed stakeholders should be invited to participate in civil discussion and problem solving towards shared goals both locally and regionally. Everyone has a role to play.
- The strategies in this subsection should be implemented in a manner that supports the overall vision, goals, and objectives of this Watershed Strategy.
- Civic governance, capacity building, and change require time and commitment. It is okay to start small and grow over time. But start somewhere!

Civic Governance Policy Document

Civic Governance Identity Statement: *Civic Governance is a new approach to policy making that produces the civic infrastructure needed to govern for the common good and sustain democracy as a just system of governance.*

The Purpose of the Civic Governance pilot is to develop the civic imagination, and organize the civic infrastructure needed to make a case for Civic Governance.

The Civic Governance Identity is grounded in the following five Civic Principles:

(1) Human Capacity (to govern for the common good)
- *Every individual is a policy maker and has the capacity to know what is good, to grow in that knowledge, to govern for the common good, and to be a co-producer of justice in the world. Civic Leaders are obligated to organize the infrastructure to achieve this outcome.*

(2) Democracy (A system of governance that requires citizens to govern for the common good)
- *Rule by "the people" is the best system of human governance. All stakeholders organize a civic infrastructure to govern for the common good and produce justice in the tension between individual and diverse interests.*

(3) Active Citizenship (Civic Leadership) (Role that obligates all stakeholders to govern for the common good)
- *An active citizen is a governing member. In a democracy, citizens are obligated to govern for the good of the whole. In return for their contributions, citizens share in the rewards of a just society. Civic Leaders are obligated to organize the infrastructure needed for individuals to be active citizens in institutions of family, faith, community, work, learning and governance.*

(4) Political Competence (mindset and skill needed to carry out obligation of active citizenship)
- *Politics is the "work of the citizen". All citizens are responsible to develop the political competence to define problems, produce solutions, and establish policies in light of civic principles and standards while achieving their particular goals. This mindset and the civic skills needed to carry out the role of active citizenship is dependent upon civic leaders who organize the capacity for key stakeholders in their jurisdiction to carry out the obligation of active citizenship.*

(5) Institutional Efficacy (Societal structure needed to sustain democracy and develop active citizenship)
- *In a democracy, institutions of family, faith, work, community, learning, and governance sustain the democratic values of our society and ensure the capacity to govern for the common good. Civic leaders and active citizens know they are obligated to produce the civic institutions and infrastructure necessary to sustain democracy as a just system of governance.*

Civic Standards guide all decision-making
- All those impacted by the problem are stakeholders and help define the problem in light of civic principles and the realities of their situation.
- All stakeholders are accountable for contributing resources (leadership/time, knowledge, constituencies & dollars) to solve the problem.
- All stakeholders are engaged in decision-making and policy-making that contributes to the common good.
- All stakeholders implement policies grounded in civic principles in the places where they have the authority to act.

Civic Organizing Disciplines and Political Skills are used to meet Standards while achieving goals.

Civic Organizing Disciplines
- Civic Governance Policy Document-Primary policy document
- Civic Leadership Development-Basis for implementing Policy Document while achieving goals. (Civic Organizing Agency)
- Power Analysis-Guides Strategic Planning
- Work Plan-Implements agreements
- Used to advance work plan:
  - Principled Driven Calendar
  - Public Meeting
  - Public Evaluation
- Civic Policy Making-Outcome from use of disciplines and skills-organizes the civic infrastructure needed to solve complex problems and sustain a just democracy.

Political Skills
- Critical thinking: Distinguishing objective reality (facts) from subjective reality (interpretative) as both relate to achieving our principles and common goals.
- Open-ended questions to engage different perspectives.
- Strategic listening to determine and clarify self-interest as it relates to common goals.
- Suspending judgment to understand divergent points of view.
- Ability to negotiate and compromise while staying accountable to civic principles.
- Fostering constructive tension to work through values that are each good in their own right but often conflict (e.g. freedom and equality).
- Holding self and others accountable for following through on agreements.

SECTION XI: MONITORING & EVALUATION PLAN

SECTION XI. MONITORING & EVALUATION PLAN

A 9-Key element plan must include a monitoring component to evaluate progress towards the water quality objectives. The overall monitoring and evaluation plan for the Eau Claire River Watershed Strategy includes the following primary three components:

A. Process (or Progress) Evaluation - Process evaluation is the monitoring of the implementation of the action plan strategy recommendations in Sections VIII, IX, and X to determine whether the nonpoint source management measures and other strategies are being implemented. The process evaluation will be measured against the 10-year milestone for each action plan strategy, as well as most 10-year indicators for each objective.

B. Outcome (or Impact) Evaluation - Outcome evaluation is the monitoring of the effectiveness and impacts of the implementation efforts to quantify and demonstrate that we are making positive strides towards would water quality goal and target objectives. The primary focus on the outcome evaluation is on the quantifiable phosphorus and algae target objectives and indicators in order to meet the 9th key of the 9-key element plan framework for non-point source pollutant loading.

C. Tracking Attitudes, Knowledge, and Social Networks - The third monitoring component includes parts of both process and outcome evaluation. This monitoring activity will track progress on the education, citizen engagement, and civic leadership strategy recommendations identified in Section X.

This section provides the overall framework for monitoring, evaluating, and maintaining the Watershed Strategy. In addition to this overall monitoring and evaluation approach, Sections VIII, IX, and X include specific monitoring and evaluation plan recommendations for each respective section.

It is important to note that the above three components are interconnected and change will not occur overnight. Action (as measured by the process evaluation) must occur before improved water quality (outcome evaluation). It will require significant time before the cumulative positive impacts of the many individual actions will be measurable at the watershed level. Further, the civic governance and community capacity building recommendations of this Watershed Strategy are a catalyst, but will also require time and effort. Many of the actual on-to-ground management changes will likely lag behind the education, outreach, and civic governance activities that will be measured through the third component. In short, we will need to have patience, remain diligent, and stay focused to allow all of these components the time needed to work together and become effective.

> ***Outcome evaluation*** assesses what we ultimately want to achieve—in this case reduced phosphorus levels and attitude changes.
>
> ***Process evaluation*** assesses our progress on the strategies we have recommended to achieve our outcome.

A. PROCESS (OR PROGRESS) EVALUATION - ARE WE IMPLEMENTING THE PLAN?

Process monitoring and evaluation is an ongoing activity, with a more formal annual review starting with year two. The process evaluation will include the following primary activities:

Tracking of Water-Quality Best Management Practices

The tracking of the best management practices, such as the BMPs identified in Appendix E, will primarily occur at the county level with the County Land Conservation Departments taking the lead

role. The UW-Extension Agricultural Agents and local USDA Farm Service Agency and NRCS staff will be asked to provide tracking assistance.

To implement this tracking, funding assistance may be needed by the counties ($4,000 to $6,000 per county) to acquire and set-up a tracking tool (e.g., Flat Rocks Geographics, Transcendent). Such a tool would assist in tracking BMP installations and help estimate pollutant loading reductions over the long-term. It is strongly recommended that the County LCD's work cooperatively with WDNR in exploring tracking options and the types of BMPs and data that will be valuable for water quality monitoring and modeling updates. Coordination is also needed to ensure consistency in what is being tracked and how BMPs are being recorded. WDNR is currently considering the establishment of a statewide standard tracking system, so further guidance from WDNR is recommended prior to action.

Creation and Activities of a Citizen Water Quality & Habitat Monitoring Group

As described in Section VIII, this Watershed Strategy proposed the creation of a Citizen Water Quality and Habitat Monitoring Group of volunteers willing to take a lead coordinating role of citizen-led water quality, habitat, and AIS survey/inventory and monitoring efforts within the watershed. It is not the intent of this group to "take over" existing monitoring effort, but to assist, complement, and help "fill gaps" where necessary. In order to perform this role, it will be necessary for this group (or Coalition sub-committee) to be familiar with the monitoring-related recommendations and milestones within the Watershed Strategy and to track progress on these recommendations.

Eau Claire River Watershed Coalition Progress Monitoring & Annual Review Meetings

The Watershed Coalition, through its Plan Implementation Team, will take a lead role in monitoring plan progress, sharing data, identify barriers, coordinating resources, etc. It is recommended that the Coalition conduct a special annual plan review meeting, starting in year two, to discuss and consider:

- The review and, if needed, update of the Plan Implementation Summary (Section XI.E.). This includes progress on the implementation of the strategy recommendations as suggested by the monitoring and evaluation plans included in Sections VIII, IX, and X.
- Share accomplishments and data.
- Identify barriers to implementation, plan coordination issues, and needed resources.
- Any emerging issues, changing trends, or new opportunities.
- The potential need to further amend or update this Watershed Strategy.

As part of the annual preview, the Watershed Coalition should invite participation from those agencies and partners who have an active or potential role in strategy implementation. It is also important that the Coalition keep the public and elected officials informed of plan progress and related success stories.

B. OUTCOME (OR IMPACT) EVALUATION - IS WATER QUALITY AND HABITAT IMPROVING?

The previous actions plans recommend a variety of data collection, monitoring, and assessment activities with various Coalition partners taking a lead role. This information can inform the overall outcome evaluation.

Currently, the outcome evaluation for quality will be measured against the phosphorus and algae bloom water quality target objectives and 10-year indicators in Section VIII. In the future, if additional data on sedimentation, habitat quality, or other water quality-related measures (e.g., nitrogen, invasive species, peak flow) become available, target objectives for these other water quality measures can be established. The specific water quality monitoring and evaluation plan recommendations are included at the end of Section VIII.

The outcome evaluation for fisheries and habitat should be measured against the 10-year indicators in Section IX, as well as the recommended biological data collection, physical habitat data, signs of success surveys, AIS survey results, and shoreland health habitat assessments. While each of these fisheries and habitat outcomes are individually very important, the objectives for these inherent benefits are less measurable within this Watershed Strategy given the plan's primary focus on non-point pollution. In the context of this plan, the evaluation of these activities will rely more on the process evaluation (e.g., did we complete the activity?) rather than determining if a specific, quantified objective is being met.

It is recommended that any monitoring and evaluation activities be coordinated for two reasons: (1) to increase potential cost-sharing, leveraging of resources, and capture any economies of scale in related expenses and (2) for greater consistency when tracking and evaluating outcomes and impacts. It is natural that the Wisconsin Department of Natural Resources will take an overall lead role in outcome evaluation, with support from the Coalition and other stakeholders.

And, as discussed in Section IV.E., we live in a dynamic world. Water quality can be influenced by a variety of physical, environmental, economic, and political factors. For example, a significant change in land use or land management practices has the potential to offset actions that resulted in phosphorus-loading reductions on nearby properties. Such influences should be considered during the outcome evaluation. It is important that we do not undervalue the efforts being made.

C. TRACKING ATTITUDES, KNOWLEDGE, AND SOCIAL NETWORKS - IS THE COMMUNITY READY TO EMBRACE THE NEEDED CHANGE?

Changes in attitudes and the organizing of civic governance groups is the innovative step needed to move more producers toward better soil health and make water quality a higher priority for all watershed residents. This is a catalyst, which will take time. Many of the BMPs needed to reduce phosphorus loading to water bodies have small to significant lag times when looking for actual water quality improvements. Therefore, tying civic engagement and civic governance to water quality improvements will, in part, be done through surrogates such as the number of citizens participating in activities. Some of these activities will include organizing (e.g., how many civic organizing groups, number of participants in each, growth the Watershed Coalition), BMPs installed via these organized

groups, and innovation sprouting from such organizing, etc. These metrics are more process (or progress) focused.

We can also evaluate social-based outcomes by monitoring changes in attitudes, knowledge, and the capacity of the community to engage in civic governance for water quality and soil health management. Such evaluation should be performed in a scientific, objective manner so we have a true, honest understanding the diversity of social influences within the watershed. Mae Davenport provides an excellent systematic and science-based framework[1] that we can adapt locally for gathering data on community capacity to engage in water resource protection and restoration. The monitoring system is designed for two primary purposes: (1) to assess and monitor over time community capacity to engage in water resource protection and restoration and (2) to provide a protocol for determining the effects of water resource education, outreach and civic engagement activities and programs on community capacity.

Measuring civic engagement and civic governance on a regular basis will require further resources beyond those designated in other parts of this strategy, including survey testing, implementation, collection, and quantitative analysis and reporting, as well as interviews, focus groups, ethnographic field methods, and qualitative analysis and reporting. The UW-Stout REU LAKES Project and the Center for Land Use Education at UW-Stevens Point are two area resources than can assist in further developing and applying social science-based research methodologies for the Eau Claire River Watershed.

D. PLAN MAINTENANCE AND ADAPTING TO CHANGE

The Watershed Strategy is an inflexible policy document. Our world is dynamic and this needs to be a living plan to be successful. As new data becomes available and new opportunities arise, the strategy recommendations and milestones can be modified and reprioritized based on need, feasibility, opportunities, resources, and effectiveness. Such change is expected, and is often necessary, as long as these changes support the overall vision, goals, and objectives of the plan.

During monitoring and evaluation, it must be remembered that this Watershed Strategy is intended to be a proactive, "living" document.

Our world is dynamic and we must be flexible in our response to emerging trends, new opportunities, and changes in available resources.

Each year, the Plan Implementation team should review and update the 1-3 year plan implementation timeline in Section XIII. Every five years, the Watershed Coalition should conduct a more comprehensive review of plan progress, available data, and current trends to determine the need for a formal plan amendment or update. For efficiency, a plan amendment could entail a new appendix, an addendum document, and/or an update to action plan tables rather than a complete update of all plan sections and data.

[1] Davenport, Mae. *Social Measures Monitoring Systems – Overview and Metadata Sheets*. University of Minnesota. 2013.

SECTION XI. MONITORING & EVALUATION PLAN

The action plans in Sections VIII, IX, and X, and in particular the indicators and milestones, are based on a 10-year planning horizon. As such, a comprehensive update of this Watershed Strategy should be completed at least once every ten years, with the next full update completed no later than Summer 2026. The comprehensive update should include updated (or recent) water quality modeling, as well as any social science-based data (Davenport). If feasible, the ten-year update should include a cost-benefit analysis of the progress being made toward the plan targets objectives and indicators versus the costs involved.

More frequent, interim updates of the plan may also be warranted to address:

- New data, modeling, and survey results that can be used to fine-tine the target objectives, 10-year indicators, efficiencies of certain BMPs, civic engagement activities, and other plan strategies.
- Update of plan recommendations and the plan implementation summary as recommendations are completed and in response to emerging issues and new opportunities.

SECTION XII: PLAN IMPLEMENTATION SUMMARY

SECTION XII. PLAN IMPLEMENTATION SUMMARY

This section is provided to assist the Watershed Coalition Plan Implementation Team's efforts to put the plan into action. It is important to remember that the Eau Claire River Watershed Strategy is intended to be flexible and new opportunities may arise. This summary should not deter Coalition members and other stakeholders from pursuing other activities that benefit the watershed.

Putting the Watershed Strategy into action, monitoring plan progress, and fostering communication throughout the watershed community will be led by the Watershed Coalition's **Plan Implementation Team** *as described in Section X.*

Look for opportunities to coordinate plan implementation in a manner that:

- *looks beyond individual lakes, streams, and political boundaries to combine similar plan recommendations into a single project*
- *creatively maximizes and leverages available resources*
- *targets areas with willing landowners, communities, and stakeholders to "get the most bang of our buck"*

Many, if not most, of the action plan recommendations in this Watershed Strategy are related. In some cases, it will be more efficient to combine multiple, related action plan recommendations into a single project, then pursue grant funding and resources for the project.

For example, in December 2011, Eau Claire County Land Conservation developed a three-part watershed inventory and stabilization project concept that included lake and farm tours, shoreland and stream inventories, and the implementation of streambank stabilization, energy dissipation, sediment traps, etc. This project could potentially be funded from a mix of WDNR and NRCS grant funding, private foundation dollars, farmer-led initiatives, County staff resources, and the efforts of volunteers. The Plan Implementation Team should consider this concept and other plan recommendations to help identify how best to coordinate such projects to most effectively leverage all available resources for the benefit the entire watershed.

SECTION XII. PLAN IMPLEMENTATION SUMMARY

A. GENERAL THREE-PHASE APPROACH

For the best practices and recommendations in this Watershed Strategy to be most successful, our baseline data must be accurate and responsive to our changing landscape, land practices, climate, and stakeholder attitudes. In the Eau Claire River Watershed there are many sources of phosphorus and sediment that contribute to the total non-point source load. Models can provide clues to source hotspots and magnitudes, but they can be out-of-phase with real-time reality, particularly when abrupt weather (near-time climatic) conditions heavily impact phosphorus and sediment loading. We need to understand how the watershed works before implementing larger projects.

As such, many (but not all) of the recommendations in this action plan will likely be approached in three general phases:

Phase I: Studies and additional information are often needed to determine the feasibility, costs, priorities, interests of landowners, or other details required prior to determining funding sources or commencing with implementation. Projects that are lighter, quicker, and cheaper ("low-hanging fruit") are also good candidates for implementation during Phase I. Additional projects can be pursued based on available resources, including cost sharing for BMPs.

Phase II: Implementation based on the recommendations of the studies can begin. And while soil health and water quality improvements are needed throughout the entire watershed to meet the target objectives, many of these action plan recommendations should be strategically targeted, at least initially, in order to "get the most bang for our buck" as previously discussed.

Phase III: We need to start evaluating the outcomes of our efforts. Have phosphorus and sediment loads decreased? What actions were most effective? Documenting and tracking of load reductions should begin during Phase II, then evaluated during Phase III. Based on our evaluation during Phase III, we can update the Watershed Strategy to further modify and prioritize our plan strategies.

B. SUMMARY OF 1-3 YEAR PRIORITY RECOMMENDATIONS

The following is a summary of the suggested priority plan recommendations that should be substantially begun or completed within the next 1-3 years. This is a synopsis; the recommendations are further described in the previous plan sections. The summary should be reviewed and updated annually by the Team. WCWRPC, who took the lead role in facilitating the development of the Watershed Strategy, may be able to assist the Team in maintaining this summary. The timelines and milestones in this plan may change subject to available resources, emerging opportunities, and the efforts of individual Coalition members. The Education, Citizen Engagement, and Civic Leadership recommendations appear first, since forming the Plan Implementation Team, outreach/networking, and building community capacity for civic governance will provide the needed foundation for many of the other recommendations.

SECTION XII. PLAN IMPLEMENTATION SUMMARY

EDUCATION, CITIZEN ENGAGEMENT, AND CIVIC LEADERSHIP STRATEGIES (1-3 YEAR PRIORITY RECOMMENDATIONS)

Recommendation Summary	Timeline	Also See
1. Form Plan Implementation Team.	Immediate	Section X.D. (Coalition Organizational strategies)
2. Provide a coordinator position for the Plan Implementation Team. Pursue grant dollars to fund, but may require interim coordinator.	Immediate	Section XII. B. (Monitoring & Human Capital Cost Estimates)
3. Plan Implementation Team should meet with Aaron Thompson, CLUE at UW-Stevens Point to discuss farmer survey results.	Year 1	Section X.D. (Understanding Our Watershed strategies)
4. Encourage Plan Implementation Team members to participate in or host civic leadership, capacity building, team building, and 1-on-1 peer networking educational workshops.	1-3 years	Section X.D. (Coalition Organizational strategies)
5. Increase 1-on-1 contacts and networking opportunities.	1-3 years	Section X.D. (General Education strategies)
6. Provide video/materials on economic importance of good soil health.	1-3 years	Section X.D. (General Education strategies)
7. Develop recognition program. Recognize conservation farms and other good practices through signs, etc.	1-3 years	Section X.D. (Civic Governance strategies)
8. Encourage farmer-led councils or groups.	1-3 years	Section X.D. (Civic Governance strategies)
9. Actively engage municipalities and elected officials.	1-3 years	Section X.D. (Civic Governance strategies)
10. Conduct additional sociological surveys.	1-3 years	Section X.D. (Understanding Our Watershed strategies)
11. Develop educational materials and conduct outreach.	1-3 years, and grow over time.	Section X.D. (General Education strategies)
12. Increase public awareness of opportunities and BMPs.	1-3 years; can be part of #11	Section X.D. (Civic Governance strategies)
13. Conduct annual watershed event or become part of a regional event.	2+ years	Section X.D. (General Education strategies)
14. Implement soil health demonstrations and pilot projects. Acquire equipment (or assist with equipment cost-sharing) that can be used or rented by farmers to test different BMPs, for demonstrations, etc.	2+ years; some discussions underway	Section X.D. (General Education strategies)

SECTION XII. PLAN IMPLEMENTATION SUMMARY

SOIL HEALTH & WATER QUALITY STRATEGIES (1-3 YEAR PRIORITY RECOMMENDATIONS)

Recommendation Summary	Timeline	Also See
1. Encourage implementation of agricultural, forestry, and urban/development BMP recommendations to meet 10-year indicators.	Immediate; ongoing	Section VIII.D. (S.H. & W.Q. Action Plan strategies)
2. Support the efforts of Lake Districts and Associations in implementation of their plans.	Immediate; ongoing	Section VIII.D. (S.H. & W.Q. Action Plan strategies)
3. Establish BMP tracking system for LCD use, continue farm transect surveys, and begin other early monitoring activities.	ASAP	Section VIII.E. (S.H. & W.Q. Monitoring and Evaluation Plan)
4. Complete ACOE technical review of Lake Eau Claire floodplain/wetland re-connectivity strategy; implement if feasible.	Complete review in 1-2 years; underway	Section VIII.D. (S.H. & W.Q. Action Plan strategies)
5. Identify/address failing septic systems.	Begin in 1-3 years	Section VIII.D. (S.H. & W.Q. Action Plan strategies)
6. Work with municipalities and industry to explore innovative P reduction strategies (e.g., water quality trading, adaptive management).	Targeted outreach within 1-3 years	Section VIII.D. (S.H. & W.Q. Action Plan strategies)
7. Install monitoring gauges. Begin trained volunteer monthly TP (and maybe suspended solids) sampling in areas targeted for BMPs, as BMPs are implemented. Discuss/begin collection of additional baseline data as needed.	1-3 years; possibly longer on BMP-related sampling	Section VIII.D. (S.H. & W.Q. Action Plan strategies) and Section VIII.E. (S.H. & W.Q. Monitoring and Evaluation Plan)
8. Conduct lake and delta coring and develop bathymetric maps.	1-3 years	Section VIII.D. (S.H. & W.Q. Action Plan strategies)
9. Establish aerial record of river course and delta deposition changes; identify erosion hotspots for potential bank stabilization projects.	1-3 years	Section VIII.D. (S.H. & W.Q. Action Plan strategies)
10. Form a Citizen Water Quality & Habitat Monitoring Group to help support and/or coordinate volunteer monitoring efforts as needed.	By 2018	Section VIII.D. (S.H. & W.Q. Action Plan strategies)

FISHERIES & HABITAT STRATEGIES (1-3 YEAR PRIORITY RECOMMENDATIONS)

Recommendation Summary	Timeline	Also See
1. Conduct in-stream health and habitat monitoring.	Ongoing; target areas with BMPs in future	Section IX. F&H Objective 1
2. Engage 2-6 landowners/year in stream shoreland and in-stream habitat projects.	Ongoing; target areas with BMPs in future	Section IX. F&H Objective 1
3. Complete or update the lake shoreland habitat assessments.	1-3 years	Section IX. F&H Objective 2

Recommendation Summary	Timeline	Also See
4. Support lake shoreland, fisheries, and aquatic habitat projects planned and proposed by lake groups.	Ongoing	Section IX. F&H Objective 1
5. Support Aquatic Invasive Species (AIS) efforts as opportunities allow.	Ongoing	Section IX. F&H Objective 3
6. Highlight water- and riparian-based recreational opportunities within the watershed and the economic value of our surface waters.	1-3 years	Section IX. F&H Objective 4

C. IMPLEMENTATION COST ESTIMATES

In addition to timelines and project schedules, it is important for the Plan Implementation Team to consider and monitor the potential costs for implementing the plan. The action plan recommendations throughout this Watershed Strategy can implemented and funded in a variety of ways and new opportunities arise over time. As such, specific lead parties and funding resources are not identified for all recommendations. The Plan Implementation Team will bring stakeholders together to determine how best to align plan recommendations with available people, technical, and funding resources.

The following cost summary provides an opportunity to help further prioritize potential activities, explore cost-sharing partnerships, and seek out needed resources. As a 9-Key Element Plan, cost estimates are only provided for those key activities that support the phosphorus-reduction target objectives and may require significant funding support. The assumptions are subject to change based on changing costs, opportunities, and resources. As discussed during the planning process, the Plan Implementation Team will look for ways to creatively leverage and target resources, rather than the various watershed stakeholders independently competing for grant funding. Such targeting is important so that our lake groups, communities, and other stakeholders continue to have access to

The following is a list of grant programs potentially available for plan implementation that are funded in whole or part under Section 319 of the Federal Clean Water Act for non-point source pollution:

- Targeted Runoff Management Grant Program
- Notice of Discharge Grant Program
- Lake Protection and Management Grant Program
- River Protection Grant Program
- Urban Nonpoint Source & Storm Water Management Grant Program
- DATCP Soil Water Resource Management Grant Program
- NRCS financial assistance grants and programs
- EPA Nonpoint Source Related Funds
- Water Quality Trading
- Adaptive Management

those funding resources they've relied upon in the past for projects that are not eligible for Section 319-funded grant programs, while targeting Section 319-funded programs for our non-point source (NPS) pollution initiatives.

Unique to this Watershed Strategy is the comprehensive list of water quality grant and assistance resources included in Appendix B. In preparation of this plan, no similar list could be found. While many of the action plan strategies in Sections VIII, IX, and X. identified key resources, the Plan Implementation Team and other lead entities should also consider the resources in Appendix B to maximize and leverage available resources.

Human Capital Cost Estimate

For successful implementation of this Watershed Strategy, the most critically needed resource is people or human capital; that is why these costs are listed first. We need "boots on the ground" to work with farmers and landowners, to development and implement outreach activities, to engage stakeholder groups, to provide technical support, and to coordinate other activities in support of the vision and goals of this plan. As such, the following estimate is in support of the recommendation in multiple plan sections.

Recommendation/Cost Description	Assumptions	10-Yr Cost Estimate	Potential Funding Sources
1. Staff hours totaling approximately 6 to 10 FTE positions will be added incrementally over the 10-year period, primarily county-based as part of LCDs, to work on implementation of BMPs, provide technical support, engineering, coordination of farmer-led councils, and other outreach, education, and engagement activities.	6 to 10 FTEs x $75,000 to $100,000 per year; not all positions may be F.T.E. in all counties	$450,000 to $1,000,000	Staffing will likely come from a variety of sources, including counties, State, and Federal agencies. Potential funding sources for the 1-3 year priorities are identified later in this sub-section, so of which may include staff hours.

The staffing hours in the above represents a total of six to ten full-time equivalent (FTE) positions, but will involve more than six to ten individuals. For example, one to two full-time positions may be needed in Eau Claire County and Clark County, where the bulk of the watershed lies and have active lake associations/districts, but less staff time may be required for this project in the other three counties that have less geographic area (and fewer farms) within the Eau Claire River Watershed. The staffing estimate also assumes one to two FTE positions, by year 10, providing support to farmer-led councils and related farmer initiatives (e.g., demonstration projects, soil health outreach, 1-on-1 consultation) across the watershed, possibly provided with UW-Extension support. The equivalent of another FTE position may be required just to coordinate monitoring, BMP tracking, and related reporting.

SECTION XII. PLAN IMPLEMENTATION SUMMARY

Not all six to ten FTE positions require the hiring of new staff, but could include a portion of salaries of existing County Land Conservation Departments. And in some cases, these person hours can be provided by contracts and, possibly, Coalition volunteers and stakeholder groups. The six to ten FTE positions would focus on the soil health, water quality, education, and civic leadership strategies and monitoring in Sections VIII and X; additional people resources may be needed to carry out the fisheries and habitat recommendations in Section IX. As stated previously, the ability to fund these positions and other plan recommendations will be dependent upon the availability of resources.

Education, Citizen Engagement, and Civic Leadership Estimates for Recommended 1-3 Year Priorities

The following cost estimates are for those 1-3 year priorities in the previous implementation schedule summary.

Recommendation/Cost Description	Assumptions	10-Yr Cost Estimate	Potential Funding Sources
1. Form Plan Implementation Team	This task is underway. Will require 1-on-1 contacts by Team members to grow the Team.	$0	Supported and organized by Coalition members. LCDs to take a lead role.
2. Provide a coordinator position for the Plan Implementation Team.	$10,000 to $25,000 per year x 3 years	$30,000 to $75,000	WDNR River Grant for 1-2 yrs; potentially seek corporate or foundation dollars longer-term, perhaps as part of a special watershed initiative
3. Plan Implementation Team should meet with CLUE to discuss farmer survey results.	Existing staff time.	$0	none required
4. Encourage Plan Implementation Team members to participate in or host civic leadership, capacity building, team building, and 1-on-1 peer networking educational workshops.	Potentially no cost, unless hosting a speaker or covering registration fees	$0-$2,500	Team members. Agency budgets.
5. Increase 1-on-1 contacts and networking opportunities.	Primarily staff/volunteer time.	see Human Capital Cost Estimate	
6. Provide video/materials on economic importance of good soil health.	Pursue as a student-assisted project.	$5,000 to $15,000	UW-EC, CVTC (student time); private foundations, WI River Alliance, EPA Environ Educ. Grant
7. Develop recognition program. Recognize conservation farms and good practices.	Could vary, but could also grow over time.	$5,000 start-up; $250 per year	Business sponsor and/or private foundations

Recommendation/Cost Description	Assumptions	10-Yr Cost Estimate	Potential Funding Sources
8. Encourage farmer-led councils or groups.	Primarily staff/volunteer time.	see Human Capital Cost Estimate. Councils are eligible for max. $20,000 in DATCP grant funds for projects.	
9. Actively engage municipalities and elected officials.	Primarily volunteer time and staff time of existing agencies.	$0	Can be addressed through Plan Imp. Team (or work group) and partners, but may require additional Human Capital depending upon approach.
10. Conduct additional sociological surveys.	Based on costs from the Red Cedar Watershed, this activity can range from $100,000 to $220,000, depending on the scope.	$100,000 to $220,000	WDNR River or Lake Grants. Private foundations (e.g., McKnight). UW-Extension, Universities/National Science Foundation
11. Develop educational materials and conduct outreach.	Could vary widely, but maximize use of existing resources and materials. Can be combined with #12 below.	varies by activity	Existing agencies, partners, and material including Rain to Rivers and volunteers. EPA Environ Educ. Grant. Potential student support. See Appendix B for other ideas.
12. Increase public awareness of opportunities and BMPs	Could vary widely, but maximize use of existing resources and materials. Can be combined with #11 above.	varies by activity; a small allowance should be considered during Years 1-3	Existing agency and materials. Volunteers. Rain to Rivers. EPA Environ Educ. Grant. See Appendix B for other ideas.
13. Conduct annual watershed event, or become part of a regional event.	The Red Cedar Conference costs about $18,000 per year.	$10,000 to $18,000 for a sizable event	Xcel Energy Foundation, WDNR River Grant, or similar for first year or two. Sponsors and registration fees can self-support thereafter.
14. Implement soil health demonstration and pilot projects. Acquire equipment for sharing, demonstrations, etc.	$5,000 to $20,000 per demonstration/pilot project. Farmer-led councils may use DATCP grants for additional projects. $75,000 to $150,000 for equipment.	$15,000 to $60,000 for projects. $150,000 to $300,000 for equipment	Section 319 grant funds. Farmer-Led Council (DATCP grant) projects. DATCP Nutrient Mgmt Education Grant. River Country RC&D. Also work with ag lenders/cooperatives to explore cost-sharing of equipment purchases.

Soil Health & Water Quality Action Plan Cost Estimates for BMPs

The Current and 10-Year BMP Acreage Estimates by HUC-12 table in Section VIII.C. identified the primary BMPs that could be implemented over the next 10-years to achieve our 10-year indicators. As shown in the table below, these BMPs have different cost share estimates based on the NRCS rates for the EQIP program; some counties and agencies may offer additional incentives. In addition, the table below shows the projected total acres added and a cost estimate for each BMP over the next 10-years, along with the STEPL BMP phosphorus-reduction efficiency factor as discussed in Section VIII.C.

Best Management Practice	BMP Cost Share (rounded)	10-Yr BMP Acreage Added	Estimated Total 10-Yr Cost-Share per BMP	BMP Phosphorus Efficiency
Contour Farming	$7 per acre	14,670	$102,690	-55%
Diversion	$2 to $66 per foot	0	$0	-30%
Filter Strips (grassed waterways determined per foot)	$442 per acre	3,715	$1,642,030	-75%
Reduced Tillage (based on no till, strip-till)	$15 per acre	26,316	$394,740	-45%
Streambank Stabilization & Fencing (varies widely; cost shares shown are examples)	$44/cu yard for stream barb and up to $38/foot for riprap	2,357 ac to benefit from this BMP	feet or cubic yard estimated not avail.	-75%
Cover Crops (one species)	$46 per acre	15,930	$732,780	-32%
Nutrient Management	$10 to $50 per acre	26,149	$261,490 to $1.3 mil	-28%
Managed Rotational Pasture	$22 to $53 per acre	932	$20,504 to $49,396	-34%
Forest Dry Seeding (hardwood, direct)	$430 per acre	3,010	$1,294,300	not available
Replacing Failing Septic Systems	60% of $5,000 to $15,000/ site	275 systems	$825,000 to $2.5 mil	not available
		Total	**$5.3 to $8.0 mil**	

The above is one scenario of what it could be required financially to adopt the BMPs needed to attain our 10-year "goal", if a traditional cost-sharing approach is used based on historic economic practices. However, we can meet our 10-year phosphorus reduction goal in other ways and the final solution may look quite different, based largely on:

- As discussed previously, some practices offer a more cost-effective and cost-efficient approach in terms of how much phosphorus load reduction can be achieved per dollars spent on the ground. In some cases, it may not be feasible to provide incentive payments or

other financial "carrots" for all BMPs given limited resources. The Coalition has recommended that efforts should target the adoption of those BMPs with the highest phosphorus-reduction efficiencies to get the "most bang for our buck." For example, the large expense of replacing a failing septic systems compared to the anticipated low reduction in total pounds of phosphorus loading of other BMPs suggests that a septic-replacement initiative might be a lower priority, but it can have an important role in demonstrating that everyone is doing their part. In short, BMP efficiencies should be considered as discussed in Section VIII.C.

- The BMPs in the above scenario are distributed throughout the watershed. The Coalition has recommended that efforts should be made to especially target those HUC-12s with the highest potential for phosphorus runoff and the highest potential for improvement as suggested by the modelling results in Section IV.
- The Coalition has also recommended that the BMPs, at least initially, should target those landowners who are most willing to adopt BMPs. Such attitudes can vary by HUC-12 as demonstrated in Section VI and we currently do not have a full picture of how such attitudes vary throughout the entire watershed.

Through the methods of civic engagement and civic governance explained in Section X, we believe the costs will be considerably less than what is listed here. We believe that the approach explained in Section X will create more willingness to participate with less of a need for cost-share money or certain government programs. Peer-to-peer learning, building of trust, and creating community will go a long way toward lowering the potential costs of what's needed. This approach will require organizations funding agricultural efforts to put less emphasis on money for incentive payments and more emphasis on fostering peer networking. This is why the education, citizen engagement, and civic leadership concepts and strategies recommended in Section X are so very important.

Soil Health & Water Quality Action Plan Cost Estimates for Recommended 1-3 Year Priorities

Recommendation/Cost Description	Assumptions	10-Yr Cost Estimate	Potential Funding Sources
1. Encourage implementation of agricultural, forestry, and urban/development BMP recommendations to meet 10-year indicators.	As previously discussed, human capital is crucial to this activity. Potential per BMP cost-sharing estimates discussed previously.	Human capital + see cost estimates for BMP cost sharing in previous subsection	Variety of potential resources to assist. Promote cost sharing programs, such as FSA & NRCS CRP, CREP, FWP, ACEP, and EQIP. Other projects could be funded with Section 319 grants, such as Targeted Run-off Management (TRM) Grants, NRCS Miss. R. Healthy Watershed Initiative, WDNR Urban NPS grants, USF&WS Fishers & Farmers Program, and other grant programs identified in Appendix B.

Recommendation/Cost Description	Assumptions	10-Yr Cost Estimate	Potential Funding Sources
2. Support the efforts of Lake Districts and Associations in implementation of their plans.	varies; see Lake Management Plans	varies by Lake Group	WDNR Lake Grants, Lake Districts/Associations, Counties
3. Establish BMP tracking system for LCD use, continue farm transect surveys, and begin other early monitoring activities	5 counties x $4,000 to $6,000 per county for tracking system; other early monitoring activities largely supported by WDNR & LCD staff	$20,000 to $30,000	WDNR River Protection Grant. County LCDs. Potentially WDNR supported as a statewide initiative.
4. Complete ACOE technical review of Lake Eau Claire floodplain/wetland re-connectivity strategy; implement if feasible.	ACOE tech assist. for study that will provide project cost estimate	requires additional discussion with ACOE	ACOE Assistance to States Technical Assistance Program; WDNR Lake/River Grants
5. Identify/address failing septic systems.	How to best address failing systems (e.g., education, enforcement, incentives, # of replacements/yr) has not been determined	$5,000 to $15,000 per system with an estimated 275 failing systems in riparian areas.	Private landowners, WI Fund Grant, if available, for replacement. May be addressed through existing programs, but with increased attention to the issue.
6. Work with municipalities and industry to explore innovative P reduction strategies (e.g., water quality trading, adaptive management).	Exploring these concepts requires time, but can be accomplished with existing resources. No specific projects have been defined.	project scope and potential costs unknown	Municipalities; some Section 319 Adaptive Mgmt and WQT funding support may be available. Depending on the project and community, CDBG-PF and USDA-RD grants or loans may be available.

Recommendation/Cost Description	Assumptions	10-Yr Cost Estimate	Potential Funding Sources
7. Install monitoring gauges. Begin monthly TP and/or suspended solids sampling in areas targeted for BMPs, as BMPs are implemented. Discuss/begin collection of additional baseline data as needed. Monitoring at additional sites, such as tributaries, may be added as the project proceeds.	This includes two primary activities: (a) Monitoring gauges on Eau Claire River. Based on recent costs, USGS gauges installed and first year of operation is $22,600, with $11,500 in annual costs thereafter. The Lake Altoona Sedimentation Study (2015) suggested the cost per meter could range from $1,700 - $7,500, plus maintenance and licensing. (b) Trained volunteer monthly monitoring in target watersheds for TP and/or SS ($25-$50 per test per site per month).	Replace/reactivate two USGS gauges: $45,200 installation and year one operation + $23,000 per year thereafter Other gauges: $10,000 to $40,000 for installation, plus operating, maintenance, licensing, etc. Testing fees for volunteer monitoring: $300-$600 per site per year	WDNR River Protection Grant, WDNR TRM Grant, USGS, trained volunteer support for data collection
8. Conduct lake and delta coring and develop bathymetric maps.	Lake Altoona Sedimentation Study (2015) suggested $80,000 to $125,000 for Lake Altoona maps.	$240,000 to $375,000 for 3 lakes + $250-$500 per core	Lake groups, counties, WDNR lake grants
9. Establish aerial record of river course and delta deposition changes; determine erosion hotspots.	Lake Altoona Sedimentation Study (2015) suggested about 64 hours of effort needed, but could be expanded to other areas.	$3,200-$10,000	Lake groups, counties, WDNR lake/river grants, potential student project
10. Form a Citizen Water Quality & Habitat Monitoring Group to help support and/or coordinate volunteer monitoring efforts as needed.	Volunteer based activity.	$0	Use and promote existing WDNR and non-profit monitoring programs, networks, and resources.

Fisheries & Habitat Action Plan Costs Estimates

While important, the fisheries & habitat objectives and action plan were not a required part of this 9-key element plan. Many of these recommendations would not be eligible for Section 319 grant funding. As such, cost estimates for these recommendations are not included here. However, Appendix B does include a variety of grant funding and technical resources that are available to assist with implementation of these recommendations.

Using Partnerships to Develop Innovative Projects and Leverage Resources that Address Multiple Recommendations

The action plan recommendations in this Watershed Strategy support the overall vision and goals; they are not isolated, unrelated strategies. When pursuing resources (and identifying needed grant match contributions), it will often be more efficient and effective to combine many of the individual recommendations into a single project. And to maximize and leverage resources, partnerships that extend beyond individual lakes, communities, and counties are also crucial. The first page of Appendix B provides an innovative example from the nearby Red Cedar Watershed on how various resources can be used effectively.

One such example for the Eau Claire River Watershed could be the pursuit of a large-scale ($500,000 to $1 million) Targeted Runoff Management Grant (TRM Grant) to support BMP adoption, demonstration/pilot projects, educational efforts, and related monitoring in targeted subwatersheds as discussed in Section VIII. Such a project could be further enhanced through the creation of farmer-led councils that tap into DATCP grant funding or by exploring adaptive management with a downstream municipality.

Another example could be development of a community outreach project that could include the distribution of public educational materials, the development of a video on the economic importance of good soil health, the development of a recognition program for landowners adopting BMPs, and an initiative to encourage more resident participation in monitoring efforts. Such efforts can be supported by an EPA Environmental Education Grant and/or WDNR Lakes Grant with matching funds from private foundations, corporate sponsors, and support from post-secondary students (e.g., UW-EC, CVTC).

The potential funding sources for the 1-3 year cost estimates provided previously in this section offer a starting point for the development of potential projects in the short-term. There may also be opportunities to also address some of the longer-term action plan recommendations (3+ years) as part of a shorter-term project.