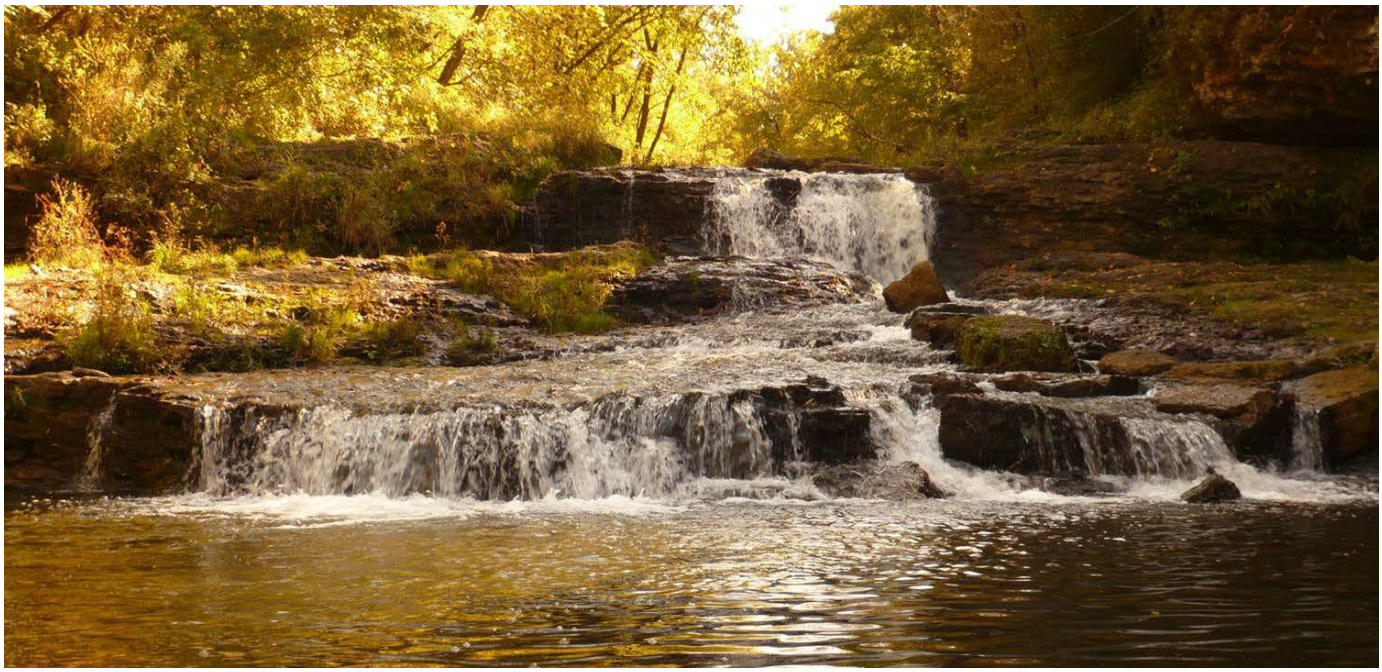
KINNICKINNIC RIVER WATERSHED

Strategic Action Plan

June 2016



Project Partners
City of River Falls
Kinnickinnic River Land Trust
National Park Service, Rivers Trails and Conservation Assistance Program
Pierce County
St. Croix County
St. Croix River Association
Trout Unlimited
UW Extension
UW River Falls
WDNR – Water, Fisheries, Wildlife

Project Managed by:
The Kinnickinnic River Land Trust

With Funds from:
The McKnight Foundation
Wisconsin Dept. of Natural Resources

Report Prepared by:
Harmony Environmental

ACKNOWLEDGMENTS

Special thanks go out to project partners and the organizations and agencies they represent.

Photographs provided by the Kinnickinnic River Land Trust unless otherwise noted.

Document formatting suggestions provided by KJE Design.

CONTENTS

EXECUTIVE SUMMARY

This strategic action plan for the Kinnickinnic River watershed was initiated by the Kinnickinnic River Land Trust (KRLT). Project funding was provided by the McKnight Foundation, a Wisconsin Department of Natural Resources River Planning Grant, and the KRLT.

The project included summarizing the results of the Kinnickinnic River Priority Watershed Project and convening a partner group to guide strategic action plan development.

Project partners included:

- City of River Falls
- Kinnickinnic River Land Trust (KRLT)
- National Park Service, Rivers Trails and Conservation Assistance Program
- Pierce County
- St. Croix County
- St. Croix River Association
- Trout Unlimited
- UW Extension
- University of Wisconsin River Falls (UWRF)
- Wisconsin Department of Natural Resources (WDNR) – Water, Fisheries, Wildlife

A series of four meetings were held from March through June 2016 to identify resource and social concerns; develop project vision, goals, and objectives; and propose and endorse a series of strategic partner actions to reach plan goals.

Plan Goals

Protect and improve Kinnickinnic River Water Quality.

Maintain and enhance instream and riparian habitat and ecosystem services in the Kinnickinnic River and its tributaries.

Restore and maintain habitats that provide a healthy watershed.

Protect and enhance groundwater resources.

Restore and maintain habitats that provide a healthy watershed.

Restore and maintain soil health to sustain cropland and surface and groundwater quality**.**

Encourage and partner with the farm community to ensure sustainability of working lands and a healthy river and watershed.

Encourage and engage citizens to be active river and watershed stewards.

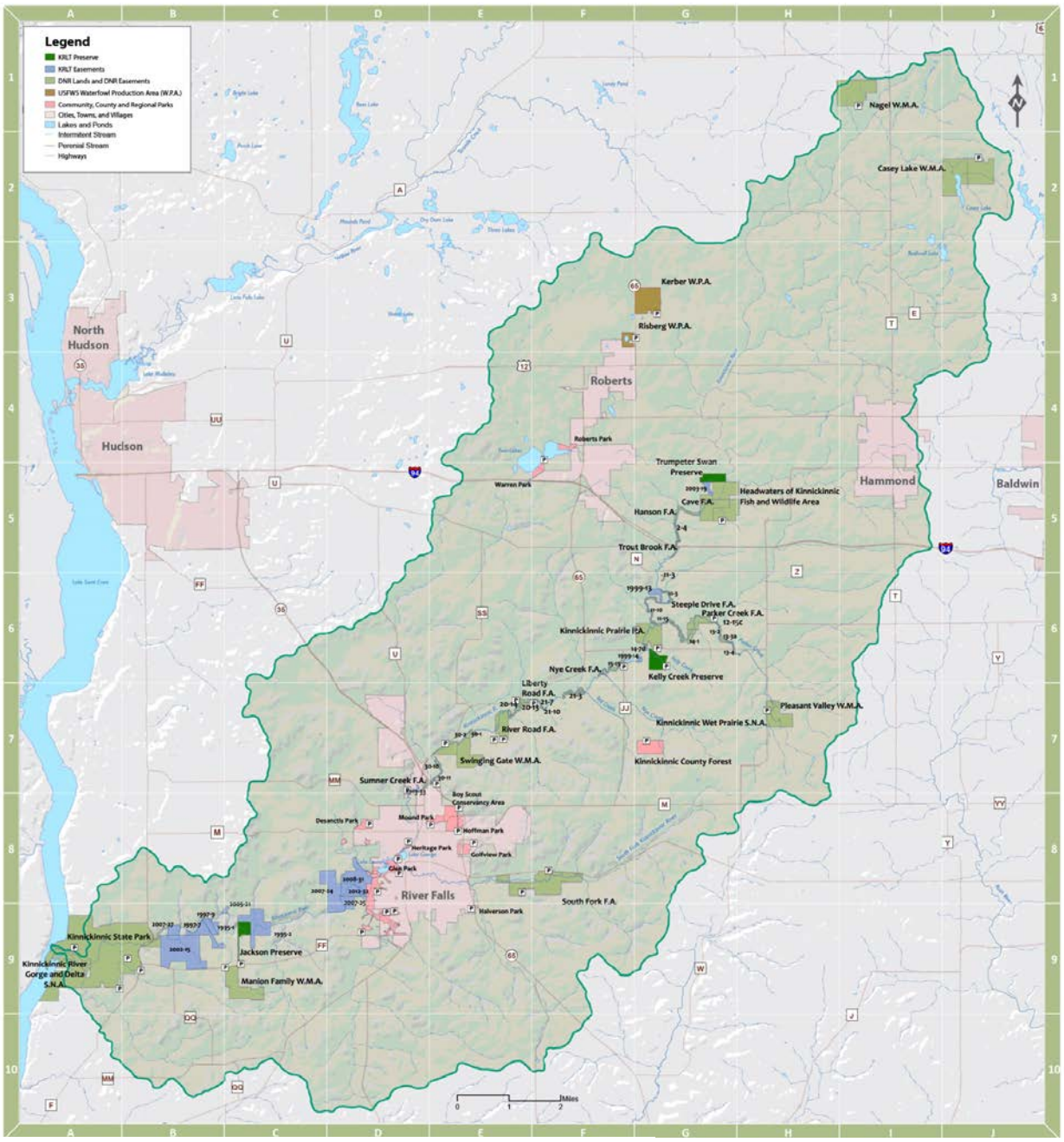
Engage policy makers at all levels of government to value, enhance, and protect the river and its watershed.

Involve and educate youth to become current and future leaders for river and watershed protection.

Watershed partners proposed strategic actions that fit with the vision, goals, and objectives described in the plan. Strategic actions listed beneath each goal are initial actions endorsed by partner representatives who attended the final meeting of the group.

The assembled partners agreed that ongoing coordination was critical for successful plan implementation. The University of Wisconsin-River Falls will coordinate the Kinnickinnic Watershed Partnership for the next three years through 2019.

The Kinnickinnic Watershed Partnership will support initial strategic actions and consider more in the future. Priority strategic actions not currently sponsored or funded are also listed along with the goals.



Kinnickinnic River Watershed

Kinnickinnic watershed vision

The cold, clean, clear Kinnickinnic River is a valued coldwater ecosystem and community resource. It is one of the best self-sustaining trout streams in the Midwest.

The watershed is a quality place to live, work, and play - sustaining natural, agricultural, and built landscapes in the face of change.

Our community has the understanding, capacity, and commitment to conserve, protect, and improve the river and its watershed.

Photo by Andy Roth

INTRODUCTION

The Process

This strategic action plan for the Kinnickinnic River watershed was initiated by the Kinnickinnic River Land Trust (KRLT). As the only organization whose geographic area encompasses the watershed, the KRLT recognized a need to examine past watershed efforts and gather interested organizations and agencies together to continue focus on the watershed into the future. Project funding was provided by the McKnight Foundation, a Wisconsin Department of Natural Resources River Planning Grant, and the KRLT.

An initial step in the project was to complete a report of the Kinnickinnic River Priority Watershed Project. The priority watershed project, completed from 1999-2010, provided resources for St. Croix and Pierce Counties and the City of River Falls to offer technical and financial assistance for installation of a variety of best management practices. The original project plan was developed with considerable monitoring of surface and ground water resources, inventory of nonpoint sources of pollutants, and public involvement from various agencies and individuals. The next steps for the Kinnickinnic River watershed strategic action project were to summarize available background information and convene a partner group to guide strategic action plan development.

The Partners

A list of project partners follows:

- City of River Falls
- Kinnickinnic River Land Trust
- National Park Service, Rivers Trails and Conservation Assistance Program
- Pierce County
- St. Croix County
- St. Croix River Association
- Trout Unlimited
- UW Extension
- UW River Falls
- WDNR – Water, Fisheries, Wildlife

The organizations and agencies are all involved in the management of the Kinnickinnic River and its watershed. Both are commonly referred to as the “Kinni”, a name we use throughout this document. One or more individuals from each partner organization provided resource information, participated in partner meetings, reviewed draft documents, and provided input outside of meetings. A series of four meetings were held from March through June 2016 to identify resource and social concerns; develop project vision, goals, and objectives; and propose and endorse a series of strategic partner actions to reach plan goals.

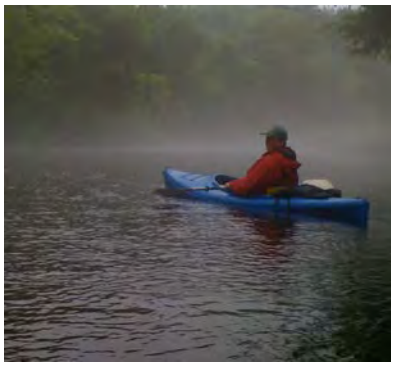


Photo by Ray Zemke

Kinnickinnic Watershed Partnership

The assembled partners agreed that ongoing coordination was critical for successful plan implementation. The University of Wisconsin-River Falls offered the following proposal to continue the partnership for another three years through 2019. It was endorsed by all who attended the June 2016 meeting of the group. For more formal partner endorsements of this and other strategic actions, see Appendix B.

As the lead agency for a Kinnickinnic Watershed Partnership, UWRF will do the following:

- Coordinate the implementation of the Strategic Action Plan;
- Support student intern Kinnickinnic River watershed focused projects;
- Create a central organizing depository for Kinnickinnic River past, present, and future watershed research, studies, community action outcomes, and other related activities;
- Develop a Kinnickinnic Watershed Partnership tab within the KinniConsortium website;
- Convene quarterly meetings of the watershed partner group; and
- Organize community based educational functions through an annual meeting/presentation.

Strategic Partner Actions

Watershed partners proposed strategic actions that fit with the vision, goals, and objectives of this plan. Those listed here beneath each goal and objectives are initial actions endorsed by partner representatives who attended the final meeting of the group. For a detailed description of each proposed action, see Appendix A. For more formal partner endorsements of the overall plan including strategic actions, see Appendix B.

The Kinnickinnic Watershed Partnership will support these initial actions and consider more in the future. Priority strategic actions not currently sponsored or funded are also listed along with the goals. While the partner group thought these were priorities for implementation, they are not currently “in the works.”

One of the proposed strategic actions was to develop an updated watershed plan which incorporates new information to develop new and updated strategic actions and more thoroughly addresses groundwater management.

RESOURCE GOALS AND OBJECTIVES

It's about the river and the watershed . . .

GOAL. PROTECT AND IMPROVE KINNICKINNIC RIVER WATER QUALITY.

OBJECTIVES

a. Meet coldwater temperature standards in the Kinni and its tributaries to protect and enhance the trout fishery and coldwater ecosystem.
b. Meet water quality standards for the Kinni:[1]
   - Total Phosphorus (75 *u*g/L)
   - Dissolved Oxygen (6 mg/L, 7 mg/L spawning)
c. Meet Lake St. Croix Total Maximum Daily Load phosphorus reduction goals: 20% reduction of P by 2020.[2]
d. Meet or exceed compliance with MS4 permit – 40% reduction of TSS/TP (City of River Falls).[3]
e. Identify and address other water quality contaminants.

EVALUATION

- Coldwater Fishery Monitoring (WDNR Fisheries)
- TMDL Phosphorus Modeling (City of River Falls)
- Cropland Erosion Transect Survey (Pierce County Land Conservation Department and St. Croix County Resource Management Division)
- Stream Monitoring (WDNR, UWRF, Kiap-TU-Wish Chapter, Trout Unlimited, KRLT, USGS, City of River Falls, Citizen Volunteers)
- Watershed Phosphorus and Sediment Modeling (UWRF with Science Museum of Minnesota)

Evaluation (proposed, no current sponsor)

- Targeted monitoring plan
- BMP tracking tool (Further develop to track private owner BMPs and agencies' efforts in addition to counties')

COLD WATER . . .
is critical to survival of trout and the invertebrates which support them.

Optimum Temperature Ranges
Brook Trout: 55-61 °F
Brown Trout: 54-68 °F
Invertebrates: <63 °F

Upper Temperature Limits
Brook Trout: 75 °F
Brown Trout: 77 °F
Invertebrates: 70 °F

Lethal Temperature
Brown Trout: 77-86 °F

The Kinni already exceeds 75°F on some days during the summer. Predicted temperature increases with climate change would further negatively impact trout populations and the entire cold water ecosystem.

Sources:
Armour, 1994 (Brown Trout)
Bell, 2006 (Brown Trout)
Cunningham, et.al., 2014 (Brook Trout)
Galli, 1990 (Invertebrates)
Mitro, Lyons, and Sharma, 2011 (Climate Change Impacts)

[1] Water quality standards are established for the Kinnickinnic River and other Wisconsin surface water resources in state regulation NR 102. http://docs.legis.wisconsin.gov/code/admin_code/nr/100/102
[2] The Lake St. Croix Total Maximum Daily Load Implementation Plan can be found at https://www.pca.state.mn.us/water/tmdl/lake-st-croix-excess-nutrients-tmdl-project
[3] The MS4 permit is a stormwater permit for which the City of River Falls is required to meet certain standards and reporting requirements. Information about city's stormwater program is found at http://www.rfcity.org/index.aspx?nid=251

STRATEGIC ACTIONS

- Agricultural Best Management Practice Implementation (Pierce County Land Conservation Department and St. Croix County Resource Management Division)
- Lake St. Croix TMDL Participation (St. Croix County Resource Management Division)
- Strategic Conservation Plan (Kinnickinnic River Land Trust)

Strategic Actions (proposed, no current sponsor)

- Strategy for watershed BMP installation (priority practices and locations)

GOAL. **MAINTAIN AND ENHANCE INSTREAM AND RIPARIAN HABITAT AND ECOSYSTEM SERVICES IN THE KINNICKINNIC RIVER AND ITS TRIBUTARIES.**

OBJECTIVES

a. Restore degraded instream habitat.
b. Increase infiltration of precipitation.
c. Protect and enhance the capacity of the river corridor to provide ecosystem services.

EVALUATION

- Fish surveys with habitat evaluation (WDNR)
- Macroinvertebrate surveys with biometrics such as the MIBI (MacroinvertebrateIndex of Biotic Integrity)

STRATEGIC ACTIONS

- Master Plan for Trout Stream Management (WDNR Fisheries)
- Land and Easement Acquisition for Stream Protection, Restoration, and Public Fishing Access (WDNR Fisheries and Wildlife; KRLT)
- Habitat Protection through Limited Beaver Control (WDNR Fisheries)
- Trout Habitat Restoration (WDNR Fisheries)
- State Lands and Easements Management (WDNR Fisheries)

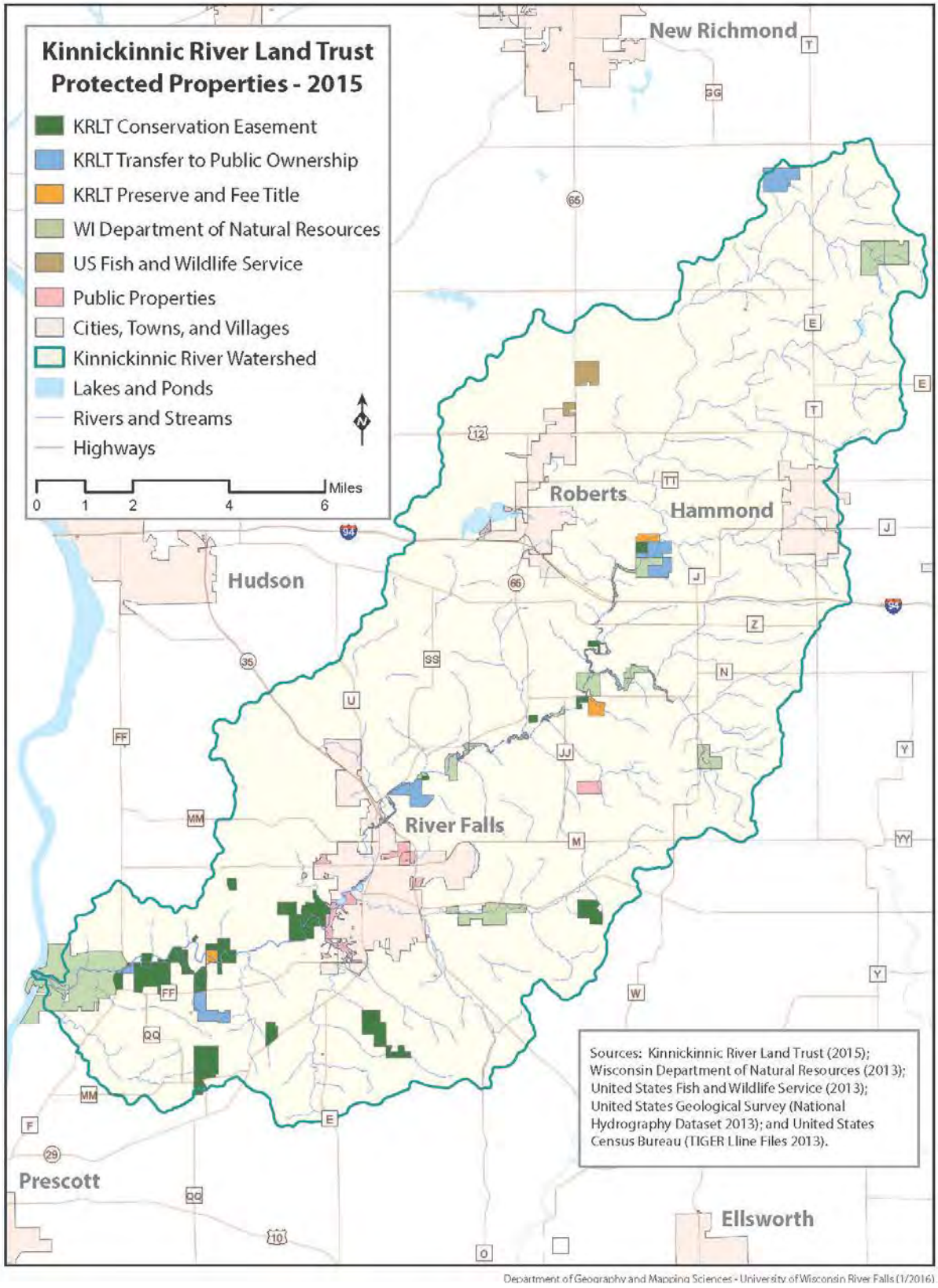
ECOSYSTEM SERVICES INCLUDE:

Provisioning services provide us with tangible, often marketable, products (e.g., food, fiber, water, energy).

Regulating services are benefits people obtain from the regulation of ecosystem processes (e.g., water purification, climate stabilization, flood mitigation, erosion control, pollination, storm protection).

Cultural services are the non-material benefits people derive from the presence of natural ecosystems (e.g., spiritual/religious values, knowledge systems, educational values, inspiration, aesthetics, recreation).

Supporting services allow for the production of other ecosystem services and operate over long time scales (e.g., genetic diversity, species diversity, photosynthesis, cycling of elements, the water cycle).


Kinnickinnic River Land Trust
Protected Properties - 2015
KRLT Conservation Easement
KRLT Transfer to Public Ownership
KRLT Preserve and Fee Title
WI Department of Natural Resources
US Fish and Wildlife Service
Public Properties
Cities, Towns, and Villages
Kinnickinnic River Watershed
Lakes and Ponds
Rivers and Streams
Highways
N
0 1 2 4 6 Miles
New Richmond
Roberts
Hammond
Hudson
River Falls
Prescott
Ellsworth
Sources: Kinnickinnic River Land Trust (2015); Wisconsin Department of Natural Resources (2013); United States Fish and Wildlife Service (2013); United States Geological Survey (National Hydrography Dataset 2013); and United States Census Bureau (TIGER Line Files 2013).
Department of Geography and Mapping Sciences - University of Wisconsin River Falls (1/2016)

GOAL. RESTORE AND MAINTAIN HABITATS THAT PROVIDE A HEALTHY WATERSHED.

OBJECTIVES

a. Achieve the restoration goals of the Western Prairie Habitat Restoration Area (WPHRA) where feasible in the watershed. WPHRA goals include the restoration and permanent protection of 20,000 acres of grassland and wetland habitat.
b. Protect Lower Kinnickinnic forested habitat from River Falls to the St. Croix River.
c. Restore wetlands to re-connect lost hydrology.

EVALUATION

- Acres of each restored/preserved.

STRATEGIC ACTIONS

- Native Habitat Restoration (WDNR, United States Fish and Wildlife Service)
- Strategic Conservation Plan (Kinnickinnic River Land Trust)

Kinni Watershed Habitats

Dry mesic* - *mesic hardwoods occur from River Falls to the St. Croix River. Species include high quality sugar maple-basswood forests and also some dry-mesic hardwoods dominated by red and white oaks.

Prairie and oak savanna are native grasslands dotted with oaks and wetlands. These areas are maintained with prescribed burning, mowing, herbicide application, and limited haying and grazing.
http://dnr.wi.gov/topic/lands/other/wphra.html

Wetlands are areas where water is at, near, or above the land surface long enough to support water-loving vegetation and to create wet , or hydric, soils. Wetlands are restored, created or protected through acquisition and management of wetland parcels.
http://dnr.wi.gov/topic/wetlands/

GOAL. PROTECT AND ENHANCE GROUNDWATER RESOURCES.

a. Reduce impacts from nonpoint sources of nitrogen and other pollutants.
b. Encourage infiltration of precipitation to replenish groundwater supplies and cool runoff waters.
c. Create buffers around direct conduits to groundwater.
d. Evaluate and address impacts of high capacity wells.

EVALUATION

- Well testing

STRATEGIC ACTIONS

- No current actions identified
- Several actions were identified in the *Nonpoint Source Control Plan for the Kinnickinnic River Priority Watershed Project* and could be re-examined during implementation of this strategic action plan.

GOAL. **RESTORE AND MAINTAIN SOIL HEALTH TO SUSTAIN CROPLAND AND SURFACE AND GROUNDWATER QUALITY.**

OBJECTIVE

a. Increase use of agricultural systems that use "continuous living cover" strategies such as cover crop, no till, perennial grains, perennial forage, etc. [4]

EVALUATION

- Measure soil health

STRATEGIC ACTIONS

- Soil Health Education (WDNR)

No-Till Planting

Measures of soil health:

- Infiltration rates
- Organic matter %
- Bioactivity
- Carbon sequestration

[4] Described further at http://greenlandsbluewaters.net/

SOCIAL GOALS

It's about all of us . . . .

Kinnickinnic River Watershed Partners

More work is needed to develop more specific objectives and effective strategies to address social goals. It is evident that while current strategic actions may include efforts to involve the public, few are focused specifically on civic engagement. Strategies are emerging, and more focused action is anticipated in these areas.

Objectives and actions for social goals will be pursued further by the Kinnickinnic River Watershed Partnership in the future.

GOAL. **ENCOURAGE AND PARTNER WITH THE FARM COMMUNITY TO ENSURE SUSTAINABILITY OF WORKING LANDS AND A HEALTHY RIVER AND WATERSHED.**

We need to ensure economic sustainability of working lands in order to achieve desired natural resource outcomes. Non-farming landowners who rent cropland to agricultural producers can be important partners.

STRATEGIC ACTIONS

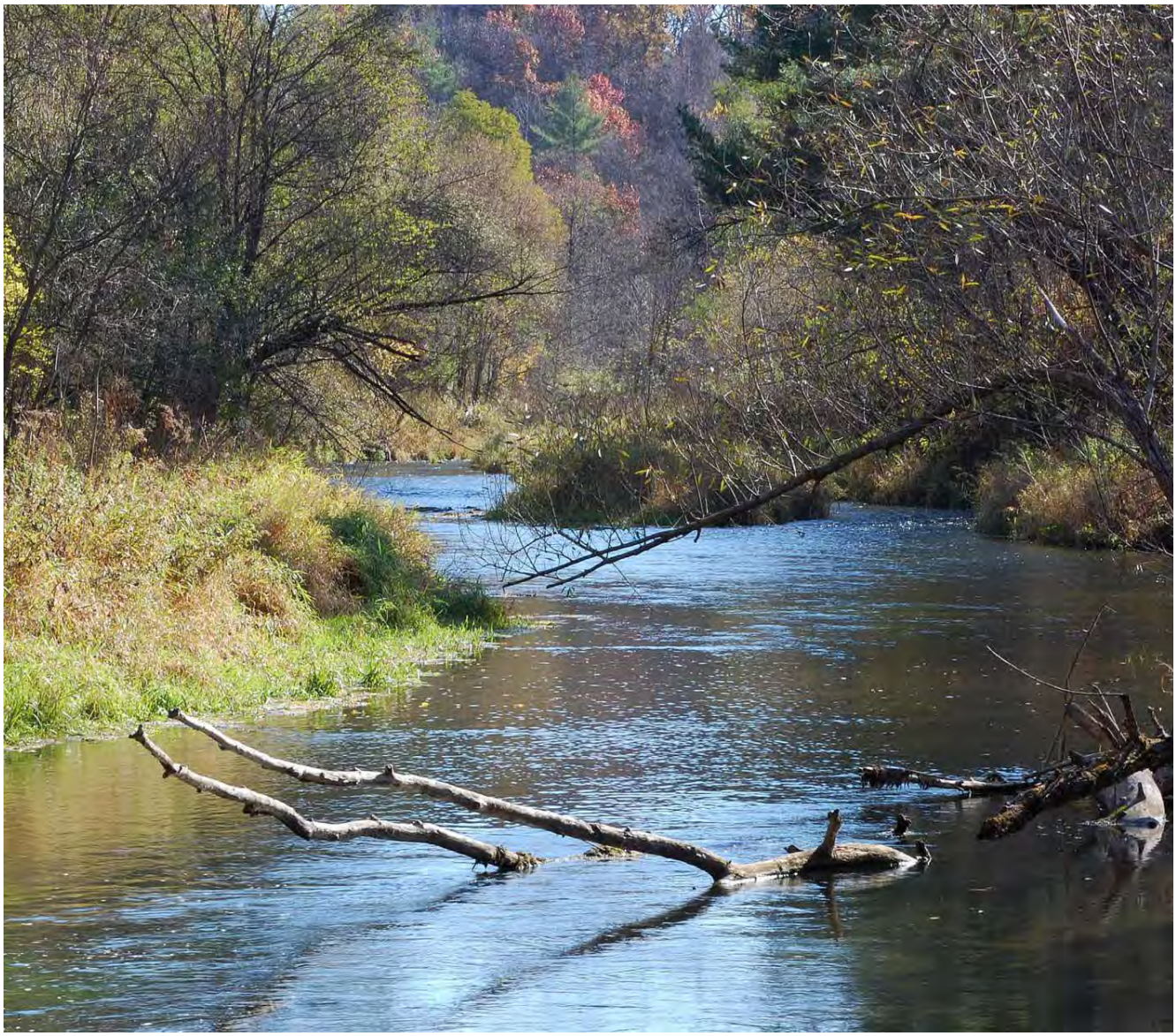
- South Kinni Farmer-Led Council (Pierce County Land Conservation Department)
- In-field Cropping Practice Research (UWRF)

GOAL. **ENCOURAGE AND ENGAGE CITIZENS TO BE ACTIVE RIVER AND WATERSHED STEWARDS.**

Our efforts here can focus on building a sense of community around a shared watershed vision and promoting river use and enjoyment. Our sense of place and connection to the land and river can help us all be better stewards. A steward takes responsibility and cares for the river and watershed. Watershed partner actions can raise awareness that everyone's actions have an effect on the river and watershed.

STRATEGIC ACTIONS

- Kinni Consortium (UWRF)
- Kinnickinnic River Corridor Plan (City of River Falls)



GOAL. ENGAGE POLICY MAKERS AT ALL LEVELS OF GOVERNMENT TO VALUE, ENHANCE, AND PROTECT THE RIVER AND ITS WATERSHED.

Decision makers at the town, village, city, state and federal level all impact the Kinnickinnic. We hope to start with increased local involvement, but acknowledge that state and federal policies impact us locally.

GOAL. INVOLVE AND EDUCATE YOUTH TO BECOME CURRENT AND FUTURE LEADERS FOR RIVER AND WATERSHED PROTECTION.

Youth really are the future. Helping youth to experience and understand the river can greatly enhance their lives and prepare them to be future leaders in watershed protection efforts.

STRATEGIC ACTIONS

- Youth Summer Camp (UWRF)
- Undergraduate Courses (UWRF)

Photo by Andy Roth

APPENDIX A. STRATEGIC PARTNER ACTION DETAILS

Watershed partners proposed strategic actions that fit with the vision, goals, and objectives of this plan. Those included on following pages are initial actions endorsed by partner representatives who attended the final meeting of the group.

The Kinnickinnic Watershed Partnership will support these initial actions and consider more in the future. Priority strategic actions not currently sponsored or funded are also listed along with the goals. While the partner group thought these were priorities for implementation, they are not currently "in the works."

GOAL PROTECT AND IMPROVE KINNICKINNIC RIVER WATER QUALITY.

STRATEGIC ACTION:
AGRICULTURAL BEST MANAGEMENT PRACTICE IMPLEMENTATION

SPONSORING ORGANIZATIONS

Pierce County Land Conservation Department (LCD):

- Animal Waste BMPs using small scale Targeted Runoff Management (TRM) grants

St. Croix County Resource Management Division:

- Watershed-wide BMPS using large scale TRM grant

PARTNER INVOLVEMENT

Protection and improvement of the water quality of the Kinni is vital to all other components of this plan. All partners can be involved in promoting conservation measures that work towards this common goal.

Partner support for staff resources for technical assistance may be helpful as staffing decisions are made at the county level.

Monitoring and modeling to identify priority sites and best management practices would help target efforts.

IMPLEMENTATION

Pierce County LCD will use the TRM grant program to provide technical and financial assistance to agricultural landowners with animal waste runoff issues within the Kinnickinnic River watershed.

GOAL PROTECT AND IMPROVE KINNICKINNIC RIVER WATER QUALITY.

STRATEGIC ACTION:
LAKE ST. CROIX TMDL PARTICIPATION

PARTICIPATING ORGANIZATIONS

St. Croix County Resource Management Division
Pierce County Land Conservation Department
City of River Falls

IMPLEMENTATION

Annual reports to Wisconsin Department of Natural Resources will track progress toward phosphorus reduction goals.

GIS-based best management practice tracking systems and standard agricultural BMP sediment and phosphorus models (STEPL) will be used.

Urban phosphorus modeling with WinSLAMM (City of River Falls)

GOAL PROTECT AND IMPROVE KINNICKINNIC RIVER WATER QUALITY. (ALSO ALL OTHER GOALS)

STRATEGIC ACTION:
STRATEGIC CONSERVATION PLAN

SPONSORING ORGANIZATIONS
Kinnickinnic River Land Trust
Upper Mississippi Wetlands and Floodplains Land Trust Coalition

PROJECT DESCRIPTION
Develop a Strategic Conservation Plan to refine existing priority conservation areas of the Kinnickinnic River Land Trust for future acquisition of conservation properties and easements in the Kinnickinnic River watershed. This plan will incorporate new data, GIS analysis, and water quality parameters based on guidance and methodologies provided by the national Land Trust Alliance. The plan would be most effective if developed in conjunction with a larger multi-purpose watershed plan that would address and meet the needs of all watershed partners.

In the planning process, evaluate the potential for water quality improvement through floodplain and wetland protection and restoration in the watershed. Use guidance and a five-step methodology being developed by the Upper Mississippi Wetlands and Floodplains Land Trust Coalition to refine existing priority conservation areas of the Kinnickinnic River Land Trust for future acquisition and/or restoration of floodplain or wetland properties and easements.

PARTNER INVOLVEMENT
Our service area is the Kinni watershed, and most of our private conservancy and conservation programming is carried out in partnership with other public and private conservation partners with programs within the watershed. Updating and upgrading our conservation planning to incorporate water quality parameters will improve the focus and outcomes of our collective work. Federal, state, and county public agencies could help with funding, technical assistance, and data. Conservation NGO's could help through joint programming and funding. Private funding could also be secured through individual donors and foundation funding.

IMPLEMENTATION
Priority Conservation Areas have previously been established based largely on landscape and habitat features. This action would update this past effort with new data, methodologies, and water quality parameters. This action would likely take place in the next 2-3 years pending available funding. Additional scoping of available information and resources is needed to initiate this action.

GOAL PROTECT AND IMPROVE KINNICKINNIC RIVER WATER QUALITY: EVALUATION

STRATEGIC ACTION:
COLDWATER FISHERY MONITORING

PROJECT DESCRIPTION

Monitor the health and status of the cold water fishery (primarily trout) throughout the Kinnickinnic River Region. Annually complete long term trend monitoring surveys at CTH F, Glen Park, STH 35 and CTH JJ. Complete rotation surveys on all named trout stream within the Kinnickinnic River Region on an 8 year rotation basis. Survey frequency is dependent on funding.

Monitoring is an important tool to determine the health and status of the resource. Trend and rotational data will help access accomplishments and failures of the priority watershed project and strategic actions included in this plan.

PARTICIPATING ORGANIZATIONS

WDNR Fisheries Management and survey volunteers

IMPLEMENTATION

This activity is ongoing with data collected beginning in 1996.

GOAL PROTECT AND IMPROVE KINNICKINNIC RIVER WATER QUALITY: EVALUATION

STRATEGIC ACTION:
TMDL PHOSPHORUS MODELING

PARTICIPATING ORGANIZATIONS
City of River Falls

PARTNER INVOLVEMENT
The modeling will be done by City of River Falls staff using WinSLAMM. City of River Falls will work with UWRF (Jill Coleman Wasik and student) on phosphorus monitoring in key locations.

IMPLEMENTATION
To be completed in 2016.

GOAL PROTECT AND IMPROVE KINNICKINNIC RIVER WATER QUALITY: EVALUATION

STRATEGIC ACTION:
CROPLAND EROSION TRANSECT SURVEY

PARTICIPATING ORGANIZATIONS

St. Croix County Resource Management Division
Pierce County Land Conservation Department

PROJECT DESCRIPTION

This annual survey provides a measure of annual average soil erosion across the watershed.

IMPLEMENTATION

St. Croix County is considering adding additional points to improve survey accuracy.

GOAL PROTECT AND IMPROVE KINNICKINNIC RIVER WATER QUALITY: EVALUATION

STRATEGIC ACTION:
STREAM MONITORING

PROJECT DESCRIPTION

There are several organizations that monitor water quality of the Kinnickinnic River and its tributaries. Parameters include temperature, sediment, phosphorus and flow, among others.

There is a need for a coordinated monitoring plan. Past data sets can provide insight for future efforts.

PARTICIPATING ORGANIZATIONS

Wisconsin Department of Natural Resources
UWRF
Kiap-TU-Wish Chapter, Trout Unlimited
Kinnickinnic River Land Trust
United States Geological Survey
City of River Falls
Citizen Volunteers

PARTNER INVOLVEMENT

UW River Falls has undergraduate research projects to monitor water quality and habitat in the watershed. Input from partners with responsibility for water quality and habitat within the watershed can help define the most useful monitoring projects/identify monitoring needs.

GOAL PROTECT AND IMPROVE KINNICKINNIC RIVER WATER QUALITY: EVALUATION

STRATEGIC ACTION:
WATERSHED PHOSPHORUS AND SEDIMENT MODELING

PROJECT DESCRIPTION

Construct a SWAT model of the Kinnickinnic River watershed as a means of identifying landscape factors and activities crucial to protecting water quality in the river.

PARTICIPATING ORGANIZATIONS

University of Wisconsin River Falls
Science Museum of Minnesota's St. Croix Watershed Research Station

PARTNER INVOLVEMENT

This action is strategic because it will both inform efforts to protect river water quality and help to guide selection and implementation of best management practices in the watershed and serve as a tool for land use planning efforts. Kinnickinnic Watershed Partners with responsibility for implementing BMPs, protecting/preserving land, managing agricultural lands could provide useful feedback to define desired scenarios to be analyzed after the model is constructed. Partners could provide environmental and land use data for use in parameterizing, calibrating, and validating the model.

IMPLEMENTATION

Currently under way; expected completion July 2017

GOAL MAINTAIN AND ENHANCE INSTREAM AND RIPARIAN HABITAT AND ECOSYSTEM SERVICES IN THE KINNICKINNIC RIVER AND ITS TRIBUTARIES. (ALSO COLDWATER TEMP GOAL AND GROUNDWATER GOAL)

STRATEGIC ACTION:
MASTER PLAN FOR TROUT STREAM MANAGEMENT

PROJECT DESCRIPTION
Update the master plan for the management of trout streams and Wisconsin Department of Natural Resources (WDNR) fishery properties in the Kinnickinnic River Region.

SPONSORING ORGANIZATION
Wisconsin Department of Natural Resources Fisheries Management

PARTNER INVOLVEMENT
The plan update will renew WDNR commitments to the watershed and the community. That includes time, effort, and funding to carry out the master plan goals and objectives which are very similar to the strategic action plan goals. All partners should remain active in any public input opportunities.

IMPLEMENTATION
The Regional and Property Analysis for the development of a master plan for Department of Natural Resources' properties along Trout and Smallmouth streams in the Driftless Area (including Kinnickinnic River) is complete. However completion of the master plan has been on hold for more than a year. Future progress is anticipated.

GOAL **MAINTAIN AND ENHANCE INSTREAM AND RIPARIAN HABITAT AND ECOSYSTEM SERVICES IN THE KINNICKINNIC RIVER AND ITS TRIBUTARIES. (ALSO COLDWATER TEMP GOAL AND GROUNDWATER GOAL)**

STRATEGIC ACTION:
LAND AND EASEMENT ACQUISITION FOR STREAM PROTECTION, RESTORATION, AND PUBLIC FISHING ACCESS

PROJECT DESCRIPTION

Implement an acquisition program using existing master plan to secure lands for stream protection, restoration, and public fishing access within the approved acquisition boundary. Purchase stream bank easements and fee title land from willing landowners. Secure fee title lands on a limited basis with long term planning and advanced approval.

PARTICIPATING ORGANIZATIONS

Wisconsin Department of Natural Resources Fisheries Management
Kinnickinnic River Land Trust (KRLT)

PARTNER INVOLVEMENT

Continued acquisition of easement and fee title land by WDNR will help meet strategic action plan goals and objectives of protection and enhancement of habitat, infiltration, and water quality. Such efforts will complement other activities by KRLT, City of River Falls and other partners. Partners can aid in identifying landowners who are interested in enrolling in stream bank easements within the approved boundary, making contacts, and processing applications.

IMPLEMENTATION

This is an on-going, long term effort.

GOAL MAINTAIN AND ENHANCE INSTREAM AND RIPARIAN HABITAT AND ECOSYSTEM SERVICES IN THE KINNICKINNIC RIVER AND ITS TRIBUTARIES. (ALSO COLDWATER TEMP GOAL AND GROUNDWATER GOAL)

STRATEGIC ACTION:
HABITAT PROTECTION THROUGH LIMITED BEAVER CONTROL

PROJECT DESCRIPTION

Selectively remove beaver and beaver dams to prevent colonization of important headwater and main stem trout streams within the Kinnickinnic River region. The lack of fire and incidental promotion of early successional woody tree species has resulted in abnormally high populations of beaver, dams and colonies. Such activity has degraded cold water temperature regimes and habitat. A sustained, limited control effort is needed to prevent degradation and maintain cold water ecosystems. This action is part of the Wisconsin Beaver Management Plan.

PARTICIPATING ORGANIZATIONS

Wisconsin Department of Natural Resources Fisheries Management
Animal and Plant Health Inspection Service (APHIS)

PARTNER INVOLVEMENT

Partners may encourage trapping on private and public lands to assist in the effort.
Reports on recent beaver activity in the control areas would also be helpful to management efforts.

IMPLEMENTATION

This is an ongoing project in the headwaters of the South Fork of the Kinnickinnic River, Parker Creek, and the main stem of the Kinnickinnic River upstream of the City of River Falls.

GOAL **MAINTAIN AND ENHANCE INSTREAM AND RIPARIAN HABITAT AND ECOSYSTEM SERVICES IN THE KINNICKINNIC RIVER AND ITS TRIBUTARIES. (ALSO COLDWATER TEMP GOAL)**

STRATEGIC ACTION:
TROUT HABITAT RESTORATION

PROJECT DESCRIPTION

Restore degraded trout habitat within the Kinnickinnic River Region as time and funding allow. Use commonly accepted instream habitat techniques to improve cold water temperature regimes, cold water fish communities, trout habitat, trout populations, and size structure.

PARTICIPATING ORGANIZATIONS

WDNR Fisheries Management
Trout Unlimited
Other Partners

PARTNER INVOLVEMENT

Identify and prioritize problem areas needing work

IMPLEMENTATION

Such activity allows the use of dedicated Trout Stamp funds to restore habitat and reduce bank erosion and nutrient input. The use of Trout Stamp funds encourages partnerships and additional fund raising activity to increase the quantity of work in the watershed.

This action is ongoing as time and money permit.

GOAL MAINTAIN AND ENHANCE INSTREAM AND RIPARIAN HABITAT AND ECOSYSTEM SERVICES IN THE KINNICKINNIC RIVER AND ITS TRIBUTARIES. (ALSO COLDWATER TEMP GOAL AND GROUNDWATER GOAL)

STRATEGIC ACTION:
STATE LANDS AND EASEMENT MANAGEMENT

PROJECT DESCRIPTION

Manage state lands and easements within the Kinnickinnic River Region for safe and effective public fishing access, animal exclusion, and other incidental yet compatible outdoor recreational opportunities. Sign property boundaries and public access points. Manage vegetation within the riparian corridor for a desired state such as prairie and oak savanna and control exotic and invasive plants.

Providing public recreational opportunities places value on a resource which can help promote the protection and enhancement of the watershed. Restricting intense cattle grazing promotes water quality improvement through buffers and control of invasive and exotic vegetation helps promote a healthy native ecosystem.

PARTICIPATING ORGANIZATIONS

WDNR Fisheries Management
WDNR Wildlife Management

IMPLEMENTATION

This action is ongoing.

GOAL **RESTORE AND MAINTAIN HABITATS THAT PROVIDE A HEALTHY WATERSHED. (ALSO WATER QUALITY, GROUNDWATER, PARTNER WITH FARMERS GOALS)**

STRATEGIC ACTION: NATIVE HABITAT RESTORATION

PROJECT DESCRIPTION

Restore native habitats near existing, perpetually secured habitat to enhance landscape level management of wildlife. Create a corridor between existing habitats by targeting restoration of private lands along the river. Restoration of native habitats will enhance the watershed and river by buffering the river from runoff, prevent erosion/siltation, and help improve infiltration.

PARTICIPATING ORGANIZATIONS

US Fish and Wildlife Service
Wisconsin Department of Natural Resources
Kinnickinnic River Land Trust
St. Croix and Pierce Counties
Natural Resource Conservation Service
Farm Service Agency

PARTNER INVOLVEMENT

Work with private landowners through Farmer-led Council, NRCS, FSA, DNR, USFWS to create buffers on working lands.

Providing data regarding soil erosion, runoff, and problem areas along the river will help strategically implement restoration/private land work and help stretch conservation dollars (more bang for our buck).

IMPLEMENTATION

The activity is underway. Creating a larger initiative for restoration/watershed protection would greatly enhance the work currently being done.

GOAL RESTORE AND MAINTAIN SOIL HEALTH TO SUSTAIN CROPLAND AND SURFACE AND GROUNDWATER QUALITY.

STRATEGIC ACTION:
SOIL HEALTH EDUCATION

PROJECT DESCRIPTION

Educate farm producers about soil health.

PARTICIPATING ORGANIZATIONS

WDNR
Pierce County Land Conservation
USDA – Natural Resources Conservation Service

GOAL ENCOURAGE AND PARTNER WITH THE FARM COMMUNITY TO ENSURE SUSTAINABILITY OF WORKING LANDS AND A HEALTHY RIVER AND WATERSHED.

STRATEGIC ACTION:
SOUTH KINNI FARMER-LED WATERSHED COUNCIL

PROJECT DESCRIPTION
Continue technical support to the South Kinni Farmer-Led Watershed Council.

PARTICIPATING ORGANIZATIONS
Pierce County Land Conservation Department
Wisconsin Department of Agriculture, Trade and Consumer Protection
McKnight Foundation

PARTNER INVOLVEMENT
All partners can be involved in promoting conservation measures that work towards this common goal.

IMPLEMENTATION
This effort began in 2014 with the formation of the Rocky Branch Farmer Led Watershed Council. In 2015, the South Fork sub-watershed area was added to the project. There are plans to continue this effort for many years into the future.

GOAL ENCOURAGE AND PARTNER WITH THE FARM COMMUNITY TO ENSURE SUSTAINABILITY OF WORKING LANDS AND A HEALTHY RIVER AND WATERSHED.

STRATEGIC ACTION:
IN-FIELD CROPPING PRACTICES RESEARCH

PROJECT DESCRIPTION

Develop undergraduate research projects to study agricultural practices (e.g., no-till, cover crops, native prairie vegetation mixed with row crops, round-up ready alfalfa strips mixed with corn) that will be most beneficial to habitat and water quality in the Kinnickinnic River watershed while protecting the economic viability of agricultural landscapes.

Agriculture comprises the largest land use activity in the Kinnickinnic River watershed and productive practices that also protect habitat and water quality may have substantial impacts on these goals.

PARTICIPATING ORGANIZATIONS

UWRF
Science Museum of Minnesota's St. Croix Watershed Research Station

PARTNER INVOLVEMENT

Any partners who work with and/or are a part of the agricultural community in the watershed could aid this effort. Partners could provide information about current agricultural practices in the watershed, soil health, and types of practices that landowners/producers are willing to implement/try.

IMPLEMENTATION

Proposed for the near future, beginning fall 2016 through summer of 2019.

GOAL **ENCOURAGE AND ENGAGE CITIZENS TO BE ACTIVE RIVER AND WATERSHED STEWARDS.**

STRATEGIC ACTION: KINNI CONSORTIUM

PROJECT DESCRIPTION

The Kinni Consortium will host an annual meeting/workshop that is open to the watershed public. The annual meeting will serve to disseminate information about Kinnickinnic Watershed Partnership activities and initiatives and UWRF research and gather information about citizen beliefs about, attitudes toward, and perceptions of risks within the watershed.

This action is strategic because it fills the gap between the activity of watershed management organizations and the public.

PARTICIPATING ORGANIZATIONS

UWRF

PARTNER INVOLVEMENT

Any partner who needs an educational outlet for their organization or desires public input should be involved in planning and carrying out this meeting. Input, ideas, and feedback from partners would be helpful in determining meeting activities.

IMPLEMENTATION

Tentatively proposed to begin around May 2017.

GOAL ENCOURAGE AND ENGAGE CITIZENS TO BE ACTIVE RIVER AND WATERSHED STEWARDS. (ALSO POLICY MAKER GOAL)

STRATEGIC ACTION:
KINNICKINNIC RIVER CORRIDOR PLAN

PROJECT DESCRIPTION

Complete planning process for Kinni River Corridor within city of River Falls. While the process will examine removing or keeping the dams, the plan is much more than "dams or no dams." Project phases include Phase 1: Public engagement, recommendation on dam removal; Phase 2: Science and engineering; Phase 3: Design. The plan will be a living document.

PARTICIPATING ORGANIZATIONS

City of River Falls Community Development Department
National Park Service Rivers and Trails

PARTNER INVOLVEMENT

The Kinni Corridor planning process will provide numerous opportunities to involve the public in determining the long term vision for the Kinni through the City. All Kinnickinnic Watershed Partners are encouraged to participate in the process as opportunities become available.

IMPLEMENTATION

The consultant hiring process is underway in June 2016. The proposed time frame for the planning process spans 2-3 years.

GOAL INVOLVE AND EDUCATE YOUTH TO BECOME CURRENT AND FUTURE LEADERS FOR RIVER AND WATERSHED PROTECTION.

STRATEGIC ACTION:
YOUTH SUMMER CAMP

PROJECT DESCRIPTION

UWRF will host an annual summer camp for youth in grades 6-8 that will introduce participants to concepts such as ecosystem services, land use decision-making, agroecosystems, and ecological restoration.

This action is strategic because it introduces youth to many of the issues that Kinnickinnic Watershed Partners confront in trying to maintain a healthy, productive watershed. The curriculum developed for the camp will also inform SMM-KAYSC informal science education efforts in the Twin Cities.

PARTICIPATING ORGANIZATIONS

UWRF
St. Croix Valley Carpenter Nature Center
Science Museum of Minnesota's Kitty Andersen Youth Science Center

PARTNER INVOLVEMENT

Partners may be involved as guest speakers/activity leaders in future summers.

IMPLEMENTATION

Underway; the first camp will take place the second week of August, 2016 with 2 more camps to follow in summers 2017 and 2018.

GOAL INVOLVE AND EDUCATE YOUTH TO BECOME CURRENT AND FUTURE LEADERS FOR RIVER AND WATERSHED PROTECTION.

STRATEGIC ACTION: UNDERGRADUATE COURSES

PROJECT DESCRIPTION

UWRF will offer a course that introduces undergraduate students majoring in crops and environmental science/conservation to concepts such as ecosystem services, land use decision-making, agroecosystems, and ecological restoration. The course will facilitate interaction between students and external stakeholders as well as emphasize student reflection about issues promoting or detracting from the sustainability of the practices at these locations.

This action is strategic because it introduces future resource managers to many of the issues that Kinnickinnic Watershed Partners confront in trying to maintain a healthy, productive watershed.

PARTICIPATING ORGANIZATIONS

UWRF

PARTNER INVOLVEMENT

Partners may be involved as guest speakers, resources for student projects, and/or external stakeholders. Partners can provide access to innovative solutions undertaken to solve watershed issues that can serve as case studies for students.

IMPLEMENTATION

Underway; course will be offered fall semesters 2016, 2017, and 2018.

APPENDIX B. PARTNER ENDORSEMENTS

TO BE REQUESTED WITH FINAL DRAFT OF PLAN AFTER JULY 1

Thank you for your commitment to protecting and improving the Kinnickinnic River and its watershed.

Please request a letter on organization letterhead and signed by appropriate authority with the following:

- Endorsement of the vision, goals, and objectives of the Kinnickinnic River Strategic Action Plan
- Pledge/commitment to continuing participation in the Kinnickinnic Watershed Partnership with UW River Falls as the lead coordinating agency
- Endorsement of strategic actions described in Appendix A.
- Pledge/commitment to implementation of the following strategic actions (list and include timeframe)

Please send an image of your logo (or a photo of yourself) if you would like this to be included in the plan.

APPENDIX C. RESOURCE DOCUMENT SUMMARIES

Bonestroo, Rosene, Anderlik & Associates. *Lake George Area Stormwater Treatment Concept Plan. Final Report.* April 2005. City of River Falls.

FROM THE EXECUTIVE SUMMARY:

This project follows up on the *Water Management Plan for the Kinnickinnic River and Its Tributaries* completed in 1995, and the *Lake George Management Plan* completed in 1996. The 1995 plan identified the reconfiguration of Lake George as a potential project to decrease thermal and other pollutant loads to the river, and to complement possible future efforts by the City to link the City center to the river corridor. The *Lake George Management Plan* recommended converting Lake George to an artificial wetland and stream channel.

The purpose of this project was to develop an overall management strategy for that portion of the Upper Dam Minor Watershed of the Kinnickinnic River watershed, which includes downtown River Falls and Lake George.

In addition to evaluating reconfiguration alternatives for Lake George, this project examined the 176-acre watershed that drains untreated runoff directly to the river from just above Division Street to the Lake George dam. This examination included an identification and evaluation of watershed treatment practices for possible implementation to help reduce total suspended solids and thermal loads to the river from existing developed areas.

The second phase of this project looked at various options for reconfiguring Lake George itself. There was strong interest in making sure that any reconfiguration alternative selected has a demonstrable positive effect on thermal regimes in the river below Lake George dam under both baseflow and runoff conditions.

After evaluating several alternatives, a reconfiguration alternative was selected and is described in the report and executive summary.

Center for Watershed Protection. *Kinnickinic River Watershed Plan: Phase 1.* January 2013.

This report provides recommendations for tracking best management practices (BMP) implementation and estimating pollutant load reductions in the Watershed.

This report includes the following:
1. Problems associated with tracking practices. Examples may include: procedures for tracking temporary practices, or potential gaps resulting in underreporting of some practices.
2. Methods currently used to calculate BMP efficiencies in the Watershed.
3. Inconsistencies between techniques (e.g., BMPs where different efficiencies were assigned).
4. Coefficients and loading rates for more detailed land uses (e.g., crop type versus a broad "agricultural" classification). *Tracking representative/normal conditions in a given subwatershed can be used to compare loads in different time periods (p 10).*
5. Measures to calculate benefits of multiple practices applied on a single property.
6. Gaps in knowledge after this initial data review.
7. Ownership and use of the tracking and reporting tool.
8. Conclusions and blueprint for development of the tracking tool.

This report will provide the basis for developing the second phase of the project that includes developing a BMP Tracking tool for which funding is being sought by the KRLT. [Note that the second phase was not pursued.] Page 16 includes a flow chart illustrating BMP tracking and how tracking could influence estimates of watershed loading.

City of River Falls – Hydroelectric Operations Options. Executive Summary. 2014.

The City of River Falls owns and operates two hydroelectric facilities located on the Kinnickinnic (Kinni) River. The Kinni River is designated as a Class 1 trout stream upstream and downstream of the project, and agencies and other stakeholders expressed interest in evaluating options that may result from facilities being removed.

The City of River Falls contracted with TRC to provide an alternatives analysis to assist in determining the course of action for the facilities. A list of studies and costs is compiled for each of 5 options. Costs of studies range from $2,000 to $4,450,000.

Farmer Led Watershed Council. *The St. Croix/Red Cedar River Basin Farmer-Led Watershed Council Project: Utilizing Performance-Based Farm-Led Watershed Councils to Reduce Phosphorus Runoff, Improve Water Quality and Enhance Agricultural Productivity.* May 2014.

This 4-page handout describes how farmer-led councils work in four pilot watersheds in Wisconsin to encourage phosphorus reductions from agriculture. Projects are based on successful examples in Iowa. The methods are to:

1) Develop the farmer led councils with support of UW Extension and County (including Pierce and St. Croix) staff.

2) Conduct phosphorus loading inventories (P-indexing) for tracking and targeting.

3) Implement and track phosphorus reductions

4) Farmer councils identify BMPs and encourage their adoption.

Fritz, Dennis. *Priority Watershed and Priority Lake Program Final Report. Pierce County. Kinnickinnic River Priority Watershed.* April 2011.

The priority watershed plan was prepared from 1997-98 (approved 1999). Implementation ran from 1999-2010. The plan assessed nonpoint sources of water pollutions and identified best management practices (BMPs) to control pollutants. It also guided implementation of BMPs and was the basis for providing county local assistance grants and cost sharing available to landowners.

The Kinnickinnic River watershed is 174 square miles, and is located in St. Croix and Pierce Counties within the St. Croix River Basin. Gently rolling agricultural land comprises most (78 percent) of the watershed. Dairy farming and cash cropping are the primary enterprises, with the average farm size being 205 acres. Woodlands, wetlands and natural areas cover 17 percent of the watershed.

Urban land uses cover 5 percent of the watershed. Incorporated areas include the cities of

Prescott and River Falls, and the villages of Hammond and Roberts. About 25,300 people lived in the Watershed, with approximately 70 percent in cities or villages. Towns and villages had a growth rate over the last decade of about 20 percent. Regional trends suggest that the watershed's population will continue to expand rapidly. St. Croix County Townships in the watershed are Hammond, Warren, Kinnickinnic, Troy, Baldwin, Erin Prairie, Emerald and Hudson. Pierce County Townships are River Falls and Clifton.

The Kinnickinnic River is a high quality, COLD Class I trout fishery that originates in agricultural lands in St. Croix County, flows through City of River Falls and eventually drains through Pierce County to the St. Croix River. In rural areas of the watershed, the river is primarily impacted by agricultural runoff, flashy stream flow, and sedimentation. As the stream flows through River Falls, it is also thermally impacted by urban stormwater runoff and two shallow impoundments (known locally as Lake George and Lake Louise). The Kinnickinnic River, except the reach within the City of River Falls has been designated as an Outstanding Resource Water by the State or Wisconsin.

In 1997, approximately 24,300 people were estimated to live within the KNC watershed. Of the estimated, 14,900 people living within the Pierce County watershed boundaries, approximately 200 were eligible for cost sharing.

- Number of landowners/ operators eligible for cost-sharing and easements: 200
- Number of landowner contacts during the project: 1470
- Number of eligible landowners participating during the project: 70

A list of BMPs installed and their cost is included in the document.

All identified critical areas were corrected.

The report describes educational activities implemented and ordinances developed by the County and the City of River Falls. The City of River Falls also completed planning documents (summarized separately) and implemented stormwater practices.

Urban Nonpoint Source Project Component

Together the Cities of River Falls and Prescott, and the Villages of Hammond and Roberts comprise about 7,000 urban acres. The City of River Falls straddles the Kinnickinnic River at the center of its watershed, and thermal impacts of development on the river are a major concern.

City of River Falls is information and education partnership in the Eau Claire area called Rain to Rivers.

City of River Falls in partnership with KKRLT: Rain Garden Demonstration Project (2004). A total of about ten rain gardens were cost-shared through the KNC PWS project--at schools and elsewhere in the City of River Falls.

City demonstration project (2007) to reduce stormwater outflow with raingardens. Storm water retrofit infiltration practices included curb bump-outs that allowed runoff to infiltrate in vegetated depressions, permeable concrete roadside curb areas, and pervious pavers in low traffic alleys.

Plans and Ordinances

- City of River Falls Stormwater Management Ordinance (adopted 2002, updated 2005 & 2007)
- City of River Falls Utility Ordinance (1997)
- City of River Falls Illicit Discharge & Connection Ordinance (2007)
- City of River Falls Wellhead Protection Ordinance (2001)
- Village of Roberts-Stormwater Management Plan (USP grant-2007)
- Village of Roberts-Construction Site Erosion Control Ordinance (USP grant-2006)
- Village of Roberts-Post Construction Stormwater Management Ordinances (USP grant-2006)
- Village of Roberts-Wellhead Protection Plan (USP grant-2006)

Sediment and phosphorus reductions are partially reported and difficulties with tracking and reporting are noted.

Kiap-TU-Wish Chapter, Trout Unlimited. *Urban Storm Water Impacts on a Coldwater Resource.* 1995.

Kiap-TU-Wish Chapter, Trout Unlimited. *A Storm on the Horizon (video).* 1998.

Kiap-TU-Wish Chapter, Trout Unlimited. *Managing Storm Water in Wisconsin: A Local Partnership Protects the Kinnickinnic River.* 2003.

Kinnickinnic River Land Trust. *Kinnickinnic Watershed Public Recreation Map.* 2014.

Fold out color map describes the watershed and land trust. It also maps and describes KRLT preserves and easements, DNR land and easements, USFWS WPAs, public parks, and river access.

LimnoTech. *Implementation Plan for the Lake St. Croix Nutrient Total Maximum Daily Load.* February 2013.

Table of Contents (attach)

TMDL baseline = 1992

County P reduction goals established. Annual implementation tracking planned.

Heavy emphasis on community engagement for implementation.

Metropolitan Council Environmental Services. 1998. *Guidance for Watershed Stewardship, Lower St. Croix River: A Stream Protection Strategy.*

Minnesota Department of Agriculture. *2014 Final Project Report for Identifying Priority Management Zones for Best Management Practice Implementation in Impaired Watersheds.*

Critical Source Areas (CSAs) are defined as portions of the landscape that combine high pollutant loading with a high propensity to deliver runoff to surface waters. These areas have a higher likelihood of conveying more pollutants to surface waters than other portions of the landscape. Priority Management Zones (PMZs) are regions of the watershed targeted for conservation practices that address disproportionate or large pollutant loads.

Three main factors contribute to the identification of CSAs: the magnitude of pollutant sources, the transport potential and the risk for erosion. Depending on the pollutant and receiving water, some combination of these three factors can be used for prioritization and targeting of CSAs. PMZs, in turn, can be characterized by three areas of emphasis: source reduction, interception treatment, and in-channel assimilative capacity. New tools and technology make it possible to target conservation practices to areas of the landscape where they are needed most. With the increasing availability of LiDAR data for Minnesota, there is greater potential for rapid landscape assessments that help identify CSAs and PMZs. The primary goals and objectives for this project involve the development of a process that:

- Provides a scalable, streamlined approach that combines GIS terrain and spatial analysis techniques with targeted site visits for pinpointing vulnerable lands where conservation implementation and funding will provide the most beneficial water quality improvements
- Provides repeatable and measurable methods for ranking vulnerable sites during funding applications
- Is flexible and allows for increasing complexity from the integration of other sources of data (modeling, soils, land cover, pourpoint stability, phosphorus indices, etc.) with terrain attributes to enhance decision-making
- Quickly and efficiently analyzes large watershed areas and quantifies manageable number of high potential sites in a target area
- Facilitates the development of watershed restoration and protection strategies
- Supports funding requirements that implementation projects be:
    - o Prioritized
    - o Targeted
    - o Measurable
- Assists with initiating conversations with agricultural producers that provides visual communication regarding potential conservation activities will visualize the issues and potential solutions.

The report is intended to be an operation handbook or manual that provides combined guidance for watershed practitioners to use in identifying and prioritizing CSAs and delineating PMZs for optimum placement of conservation measures based on source magnitude, hydrologic connectivity and delivery mechanisms/erosion potential.

Minnesota Pollution Control Agency and Wisconsin Department of Natural Resources. *Lake St. Croix Nutrient Total Maximum Daily Load.* May 2012.

Table of Contents attached.

Uses export coefficient for watershed modeling. Ag Target: 0.338 lbs/acre/year.

Short Elliot Hendrickson. *City of River Falls Water Management Plan for the Kinnickinnic River and Its Tributaries.* April 1995. (399 pages)

The planning area encompasses approximately 64 square miles. This is the major urbanized area associated with the Kinni and two major tributaries: the South Fork (which flows through the 185-acre UW-River Falls campus) and the Rocky Branch.

The general approach of the study is to deliver good quality storm water runoff to the Kinnickinnic River at acceptable rates and volumes to reduce sediment loading and stream bed/stream bank degradation and maintain a suitable river temperature to support a cold-water fishery.
The study addresses the following:

- Thermal pollution
- Flooding as it relates to bank erosion and habitat degradation
- Sediment delivery
- Pollutant loading including nutrients and heavy metals
- Ground water

Policies and standards are described to meet the following goals:

1. Control flooding and minimize related public capital expenditures.
2. Achieve water quality standards in city lakes (impoundments) and the Kinnickinnic River and its tributaries, consistent with intended uses and classifications.
3. Protect and enhance water recreational facilities, fish and wildlife habitat.
4. Increase public participation and knowledge in management of the water resources of the community.
5. Promote ground water recharge, prevent contamination of the aquifers and protect spring areas.
6. Maintain wetland acreage and increase the wetland values within the planning area.
7. Prevent soil erosion.
8. Assume responsibility for managing water resources within the planning area and recognize the regulatory authority of other local, state and federal entities.
9. Finance water resources projects by means that are equitable to all citizens.
10. Preserve historical data, records, and files pertaining to the water resources of the planning area.

This detailed report divided the planning area into 7 watersheds which were further divided into subwatersheds for water quality modeling and stormwater infrastructure analysis. An action plan for each area identified problems, solutions, and activity steps, resources, measurement and target completion date.

The plan also examines groundwater and potential new city well location and impacts – including impacts to the Kinni River and wellhead protection areas impact to the well water itself.

A public involvement action plan is supported and laid out.

An implementation plan reviews implementation steps, responsibilities, ordinances, financing, and plan review and update procedures. Extensive appendices provide design and modeling standards, thermal mitigation techniques, soil association descriptions, a model ground water protection ordinance, and stream habitat improvement techniques.

Schreiber, Ken. Wisconsin Department of Natural Resources. *Kinnickinnic River Priority Watershed Surface Water Resource Appraisal Report.* 1998.

Short Elliot Hendrickson, Prepared for the City of River Falls Engineering Department. *City of River Falls North Kinnickinnic River Monitoring Project.* December 2013.

In 2002, the City adopted a new Storm Water Ordinance, which is designed to protect the Kinnickinnic River from the negative impacts of storm water runoff associated with new development. For new development and re-development projects, the ordinance requires that, for a 1.5-inch, 24-hour rainfall event, the post-development runoff volume and peak flow rate must not exceed the predevelopment runoff volume and peak flow rate using on-site infiltration of storm water. Standards adopted under the ordinance require that a safety factor of two be used for designing infiltration areas.

To take an active role in sustaining the river's health and well-being, the City of River Falls implemented the North Kinnickinnic River Monitoring Project in 2004. The goal of the project is to evaluate the effectiveness of the Storm Water Management Ordinance for preventing degradation of the Kinnickinnic River due to new City development. The project scope includes four primary monitoring elements:

- Temperature Monitoring
- Water Quality Monitoring
- Base Flow Surveys
- Macroinvertebrate Monitoring

The project uses an “upstream/downstream” approach to determine if storm water management practices in the Sterling Ponds subdivision protect downstream river conditions and examines performance of the on-site storm water management practices incorporated into new developments.

Thermal spikes were observed following storm events on specific stream segments. The performance of Sterling Ponds storm water management practices during the summer of 2013 is presented. With the exception of two very large rain events on June 21 (1.59 inches) and June 26 (2.31 inches) and a small-moderate rain event on June 22 (0.44 inch), all summer (May-September) rainfall events were fully infiltrated, as required by the River Falls Storm Water Management Ordinance.

Temperature monitoring of the Sterling Ponds storm water management practices during the 2005-2013 period indicates that storm water discharges to Sumner Creek are occurring:

- During rain events larger than 1.5 inches (2005-2007 and 2009-2013);
- During back-to-back rain events, when rainfall amounts range from 0.44-1.5 inches and time periods between rain events are less than 48 hours (2006, 2007, 2011, and 2013);
- During very intense rain events, when rainfall amounts range from 1.0-1.5 inches (2008).

Schreiber, Ken. Wisconsin Department of Natural Resources. Kinnickinnic River Priority Watershed Surface Water Resource Appraisal Report. December 1998.

The appraisal included monitoring of water flow, chemistry, and temperature at 7 sites on 3 streams in 1996 and 11 sites on 3 streams in 1997. It also monitored storm sewers and conducted fish surveys, habitat and macroinvertebrate assessments, and lake surveys. Results are reported and resource goals are developed for the watershed and individual subwatersheds. Subwatershed conditions are described.

Swanson, Roger A. and Samuel F. Huffman. University of Wisconsin River Falls. *Lake George Management Plan.* January 1996.

The plan uses the results of previous studies, sediment testing, and a public opinion survey to examine four alternatives for management of Lake George in the city of River Falls.

Alternative I - Do nothing option - this option assumes that Lake George is currently being managed in the most productive manner possible.

Alternative II – Remove the hydroelectric dam which creates the 18-acre Lake George impoundment.

Alternative III - Dredge to restore Lake George to a more "healthy lake ecosystem"

Alternative IV – Construct an artificial wetland/stream channel by constructing a berm to reroute stormwater from downtown to a wetland treatment area. This berm would also serve to more directly channel and maintain the cold water habitat for trout both in the lake and in the lower Kinnickinnic.

Alternative IV is selected as the recommended alternative.

Voss, Karen. *Priority Watershed and Priority Lake Program Final Report. St. Croix County. Kinnickinnic River Priority Watershed. (Draft).* January 2011.

Of the estimated 9,400 people living within the St. Croix County watershed boundaries, approximately 2,500 were eligible for cost sharing.

- Number of landowners/operators eligible for cost-sharing and easements: 2,500
- Number of eligible landowners contacted during the project: 2,500
- Number of eligible landowners participating during the project: 63

A list of BMPs installed and their cost is included in the document.
All identified critical areas were corrected.
Sediment and phosphorus reductions are partially reported.

University of Wisconsin River Falls (www.uwrf.edu/News/). *UW- River Falls Faculty Receive Undergraduate Research and Discover Grant to Create Kinni Watershed Consortium.* December 2014.

Assistant professors Blades and Coleman-Wasnik received a $30,000 UW System Undergraduate Research and Discovery Grant to create a “Kinnie Watershed Consortium to better coordinate research efforts, engage the community, and ultimately lead to the implementation” of BMPs for the Kinnickinnic River. Undergraduates will develop a web-based portal and associated public symposium. Other students will monitor water quality and habitat in the Kelly Creek Preserve. Contact: laura.walsh@uwrf.edu (715-425-3535)

Wisconsin Department of Natural Resources. Fisheries Management. *Stream Classification Report Kinnickinnic River.* 2015.

Wisconsin Department of Natural Resources. Pierce County. *KNC BMP Summary (Xcel Spreadsheet)*

Wisconsin Department of Natural Resources. *Summary of Barnyard P Reductions, Sediment Load Reductions, and Critical Sites Corrected (Xcel Spreadsheet).*

Wisconsin Department of Natural Resources. *General Permit to Discharge Under the Wisconsin Pollutant Discharge Elimination System WI – S050075-2.* http://dnr.wi.gov/topic/StormWater/documents/WPDES-WI-S050075-2.pdf

Wisconsin Department of Natural Resources. *River Planning Grant Agreement. Kinni River Community Report. Grant Agreement RP-237-13.*

Wisconsin Department of Natural Resources. *TMDL Guidance for MS4 Permits: Planning, Implementation, and Modeling Guidance.* http://dnr.wi.gov/topic/stormwater/documents/MS4TMDLImpGuidance.pdf

Wisconsin Department of Natural Resources, et. al. *Nonpoint Source Control Plan for the Kinnickinnic River Priority Watershed Project. April 1999.*

Blog Posts

http://kinniconsortium.org

http://blogs.ces.uwex.edu/wflcp/