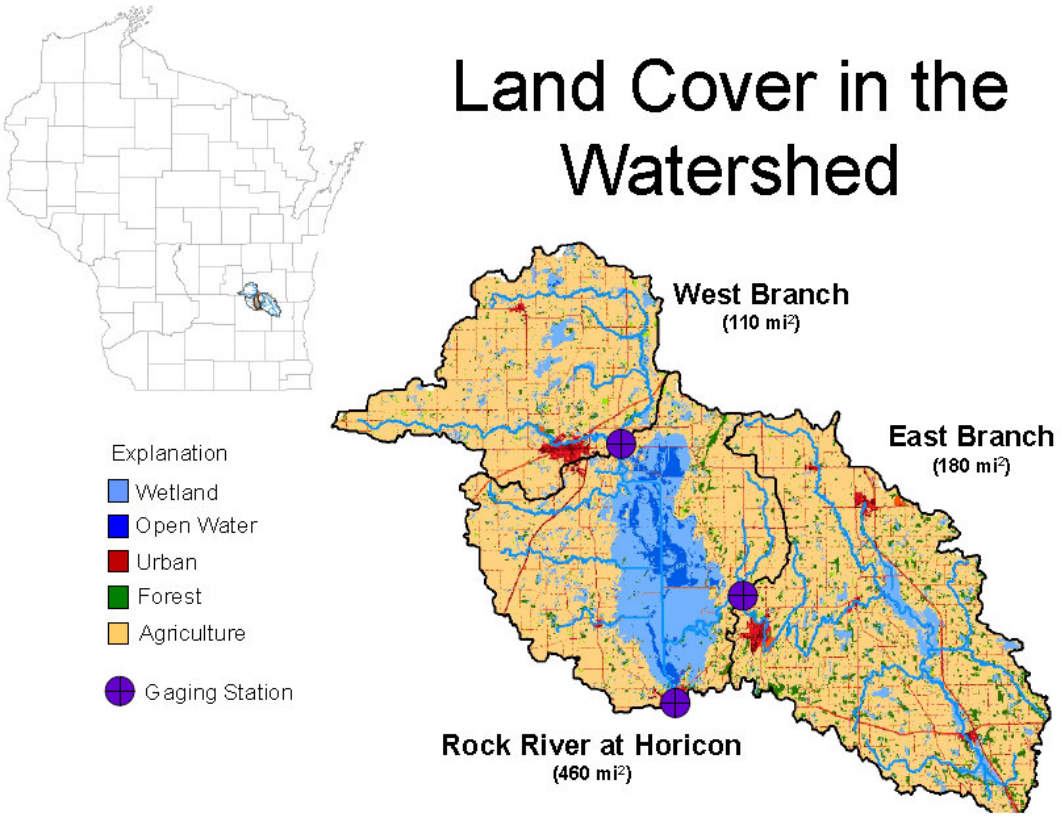
Rock River & Horicon Marsh Volunteer Initiative:
Project Year 1 Final Report

Overview of Project Area

The project area includes the portion of the Upper Rock River Basin above the dam at Horicon. It is a critical area for the entire Rock River Basin because it includes the headwaters of the East, West, and South branches of the river. It covers parts of 4 counties (Dodge, Fond du Lac, Washington, and Green Lake), 7 villages, 5 cities, and 22 towns. The area includes 340 miles of rivers and streams and a land area of approximately 600 square miles. The resident population of the area is approximately 55,000 people.

At the heart of the Upper Rock River Basin is the Horicon Marsh. On the north end of Horicon Marsh is the 21,000 acre Horicon National Wildlife Refuge. On the south end is the 10,000 acre Horicon Marsh State Wildlife Area. This wetland is of great importance, because of the significant wildlife habitat and other ecological functions provided by the Horicon Marsh ecosystem. In addition, there is a considerable economic impact to the community. Horicon Marsh has been designated as a Wetland of International Importance by the Ramsar Convention, a Globally Important Bird Area by the American Bird Conservancy, and one of the nine units of the Ice Age National Scientific Reserve by the National Park Service. The study area also includes the headwater areas of the Rock River resulting in this being a critical area affecting the entire river basin.



Project Partners

This project was possible because of the partnership between many entities that each brought their own expertise to the project. The U.S. Geological Survey (USGS) contributed funding, gages and sampling equipment, training for sample collection, data quality control, and expertise for data analysis. The U.S. Fish and Wildlife Service Horicon National Wildlife Refuge (FWS) provided funding, recruitment of volunteers, and information on installed conservation practices. The Wisconsin Department of Natural Resources (DNR) provided funding, sample collection and handling time, and information on point source discharges. The City of Horicon acted as the taxing agency required for the USGS involvement in the project. The Rock River Coalition provided volunteer time, and project management services.

Overview of Problem Addressed by Project

Sediment and nutrient pollution in the rivers and streams in the Upper Rock River Watershed has caused numerous waterways including Horicon Marsh to not meet their water quality standards. Because of this, numerous miles of streams and rivers in the Upper Rock River Watershed have been placed on the EPA 303(d) list of impaired waters due to excessive nutrient and sediment problems.

In November 1997, a comprehensive monitoring project of water quality and flow volume for Horicon Marsh began. The United States Geological Survey completed two years of monitoring. Results showed excessive amounts of sediment and phosphorous entering and leaving Horicon Marsh. For example, data showed nearly 1,500 tons of sediment and 9,000 lbs of total phosphorous entering Horicon Marsh on one storm event in late March following a 3-inch rainfall. Monitoring has shown this to be the norm during high precipitation events and not an exception. The two years of monitoring provided excellent background information as to the nutrient and sediment loading to Horicon Marsh.

Over the years, the data has been presented numerous times to encourage the installation of conservation practices to reduce the loading rates and to help receive funds to protect Horicon Marsh from nutrient and sediment loadings. This effort has been somewhat successful because many farms have adopted nutrient management plans and implemented conservation practices such as no till farming and conservation buffers along streams.

Have the installed conservation improvements and practices improved the water quality of the watershed? Did point source reduction show improved water quality? After 10 years of work on the watershed, these questions need to be answered. This project sought to provide some insight to these questions through data collection similar to what was done in the late 1990s. If new data shows significant improvement in the sediment and phosphorus levels in the rivers and streams, then we can prove that the implemented practices have made a difference to the water quality of the Rock River. Furthermore, the data will be used in the future to encourage other landowners to implement conservation practices and to request funding for more conservation projects in the watershed.

Overview of Project Goals

The goal of this project was to collect data and provide information to help show that the installation of conservation practices in the watershed and reductions in point source contributions has resulted in improved water quality. The current grant (RM-044-10) was used to (1) collect and analyze nutrient and sediment samples from the two largest inlets and one outlet of the Horicon Marsh, (2) compile a list of point and nonpoint source practices installed since 2000, and (3) compare data to that previously collected in 1998 and 1999 to see if there has been a measurable change in water quality. As a way to foster citizen involvement in their communities, volunteer citizen monitors were trained to assist in the sample collection.

Another goal of the project was to provide data and information that will be useful in the implementation of the Total Maximum Daily Load (TMDL) for the Rock River. Project data, information, and methodologies will be shared with federal, sate, and local agencies and organizations involved in the implementation of the TMDL. This data will be useful in developing an implementation plan for the Rock River TMDL. The Department of Natural Resources could use the project information in a variety of ways: TMDL model refinement, baseline data for TMDL implementation, and educational tools for future conservation practice implementation. The final draft of the Rock River TMDL has been completed and is expected to get final EPA approval in late January 2011.

Data Collection and Analysis

At the beginning of the project, the project partners recruited volunteers to perform sample collection and handling duties. The United States Geological Survey trained volunteers and staff from the Department of Natural Resources, and Fish & Wildlife Services, and the Rock River Coalition. Five volunteers and staff from DNR, FWS, and RRC were trained to handle sample retrieval and processing. It should be noted that original plans were to have a larger force of volunteers. However, the volunteers that came forward at the beginning of the project have been very dedicated and additional volunteers were not needed.

The project involves 3 sampling sites: the East Branch of the Rock River in the Village of Kekoskee, the West Branch of the Rock River at Hwy 49, and the Rock River at Horicon. The USGS installed gaging stations at the East and West Branches for this project. The Rock River at Horicon station was already in operation. The USGS monitored the 3 gages remotely and activated the automatic samplers as storm events occurred. They informed professional staff and volunteers when the samples were available for collection. All samples were analyzed by the Wisconsin State Laboratory of Hygiene.

The samplers measured flow, and collected water for analysis of dissolved phosphorus, total phosphorus, and total suspended solids on a monthly and event basis. The sampling period covered by this project is October 2009 through September 2010. During that time, the total samples analyzed were as follows: 237 total phosphorus, 237 total suspended solids, and 85 dissolved phosphorus.

Nonpoint Source Practices

Since 2006, a part-time conservationist has been working with landowners in the Upper Rock River Watershed (including both the West and South Branches of the Rock River) to increase the number of conservation practices on the land. This work is a collaboration with the Fond du Lac and Dodge County Land and Water Conservation Departments and the US Fish and Wildlife Service Horicon National Wildlife Refuge. Several federal, state, and local cost-sharing programs are being used to accomplish the adoption or installations of the following: buffer strips, nutrient management plans, conservation plans and revisions, shallow water areas (also know as wetland scrapes), and upland wildlife nesting cover. Table 1 provides the total number of practices installed in each county.

Table 1. Conservation Practices Installed in the Upper Rock River Watershed (August 1, 2006 – December 1, 2010)

Practice	Fond du Lac County	Dodge County	Total
Buffers	16.1 miles		16.1 miles
Nutrient Management Plans	24,275 acres	2,816 acres	27,091 acres
Conservation Plans and Revisions	34,636 acres	3,051 acres	37,687 acres
Shallow Water Areas	28	1	29
Upland Wildlife Nesting Cover	410 acres		410 acres

Note: Additional practices are planned & contracted in each county that are not included in the totals above. They will be included in totals only after implementation.

The map at the end of the report illustrates the work accomplished in the Upper Rock River Watershed. As can be seen from the maps, there has been a significant increase in the best management practices put on the land since the beginning of the project in 2006.

Point Source Reductions

There has been significant point source reductions in the amount of phosphorus discharged since the late 1990s due to changes in laws governing point source discharges. In the Upper Rock River Watershed (which includes the South and West Branches of the Rock River), the point source discharges are the following: Saputo Cheese (formerly Alto Dairy), City of Waupun wastewater treatment plant, Village of Brandon wastewater treatment plant, Village of Kekoskee wastewater treatment plant, Burnett sanitary district, Waupun Correctional Institute, and the National Rivet and Mfg. Table 2 shows that the phosphorus discharges at the two largest facilities has decreased by more than 85% since 1999.

Table 2. Annual Phosphorus Discharges – Upper Rock River Watershed

Year	Saputo Cheese Annual Phosphorus (lbs)	City of Waupun Annual Phosphorus (lbs)
1999	53,064	30,801
2000	53,027	17,119
2001	48,687	28,495
2002	31,175	37,842
2003	18,878	22,002
2004	10,749	3,955
2005	6,475	2,066
2006	4,508	2.872
2007	4,661	3,432
2008	5,263	3,327
2009	6,656	4,554

Note: figures were rounded

In the East Branch Rock River Watershed, the point sources include: the City of Mayville wastewater treatment plant, Grande Cheese in Brownsville, Village of Brownsville wastewater treatment plant, Village of Theresa wastewater treatment plant, and the Village of Lomira wastewater treatment plant. Table 3 displays the 2 largest point sources that have more than a 93% reduction in phosphorus discharges since 1999.

Table 3. Annual Phosphorus Discharges – East Branch Rock River Watershed

Year	City of Mayville Annual Phosphorus (lbs)	Grande Cheese Annual Phosphorus (lbs)
1999	13,862	21,678
2000	13,495	10,514
2001	13,953	10,985
2002	11,955	16,381
2003	3,134	2,795
2004	1,013	860
2005	1,042	9,423
2006	1,027	1,372
2007	992	613
2008	1,086	545
2009	971	563

Note: figures were rounded

Water Quality Comparisons

Preliminary results of the water quality data obtained in 2009-2010 show a reduction in phosphorus and total suspended sediment as compared to the data collected in 1997-2000. It is important to note that this data comparison will be more robust and statistically correct only after another year of data collection, and sediment and nutrient load computations (concentration x

water discharge) can be statistically evaluated to account for differences in hydrology among the study years. Such analysis was not funded with the current grant and is actively being pursued.

River flow in cubic feet per second and total suspended solids concentration are plotted in Chart 1. Data comparison showed total suspended solids (TSS) in the West Branch of the Rock River to have a peak level of approximately 302 mg/l in 1997-1998, and 584 mg/l in 1999-2000. Preliminary data for 2009-2010, showed a peak level of 98 mg/l TSS.

River flow and total phosphorus concentration are plotted in Chart 2. Data indicates total phosphorus levels having a peak of 3.1 mg/l in 1998-1999, and 3.2 mg/l in 1999-2000 as compared to only having a peak level of 0.6 mg/l in the 2009-2010 collection.

These preliminary results are encouraging and the reduction in suspended solids tentatively supports the idea that improvements in agricultural land management practices have likely contributed to an improvement in water quality in the upper Rock River Basin beyond the improvement from reduced point source contributions of total phosphorus. A second year of data collection will enhance this dataset. Targeted analyses of the data, as supported by future funding, will provide a better understanding of land management and water quality improvements.

Overview of Project Continuation

The 2nd part of this project is continuing with further water sampling and analysis at all three collection sites for 2010-2011. This continued work is possible because of funding from the DNR River Planning Grant (RP-197-11), the US Fish & Wildlife Service Horicon National Wildlife Refuge, and the US Geological Survey. In addition, the City of Horicon will continue to act as the taxing authority to ensure the involvement of the USGS.

Flow and load data from samples collected in 2009-2010 will be published in 2011. Final data analysis and reporting will occur during 2011-2012 with the level of analysis contingent on the level of available funding.

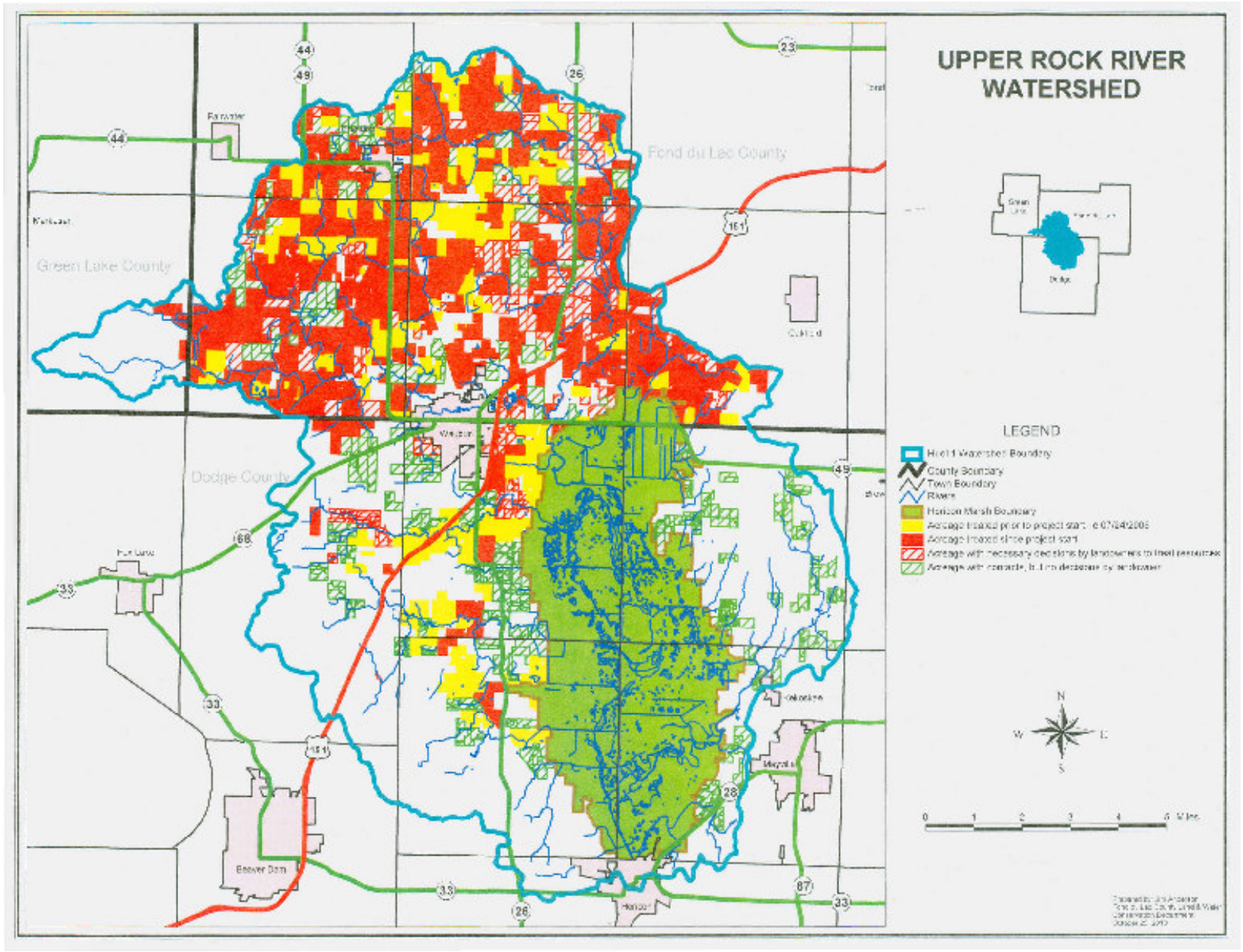

UPPER ROCK RIVER
WATERSHED
Fond du Lac County
Green Lake County
Dodge County
LEGEND
Horicon Marsh Boundary
N
S
E
W

Chart 1. Discharge and Total Suspended Solids Concentration

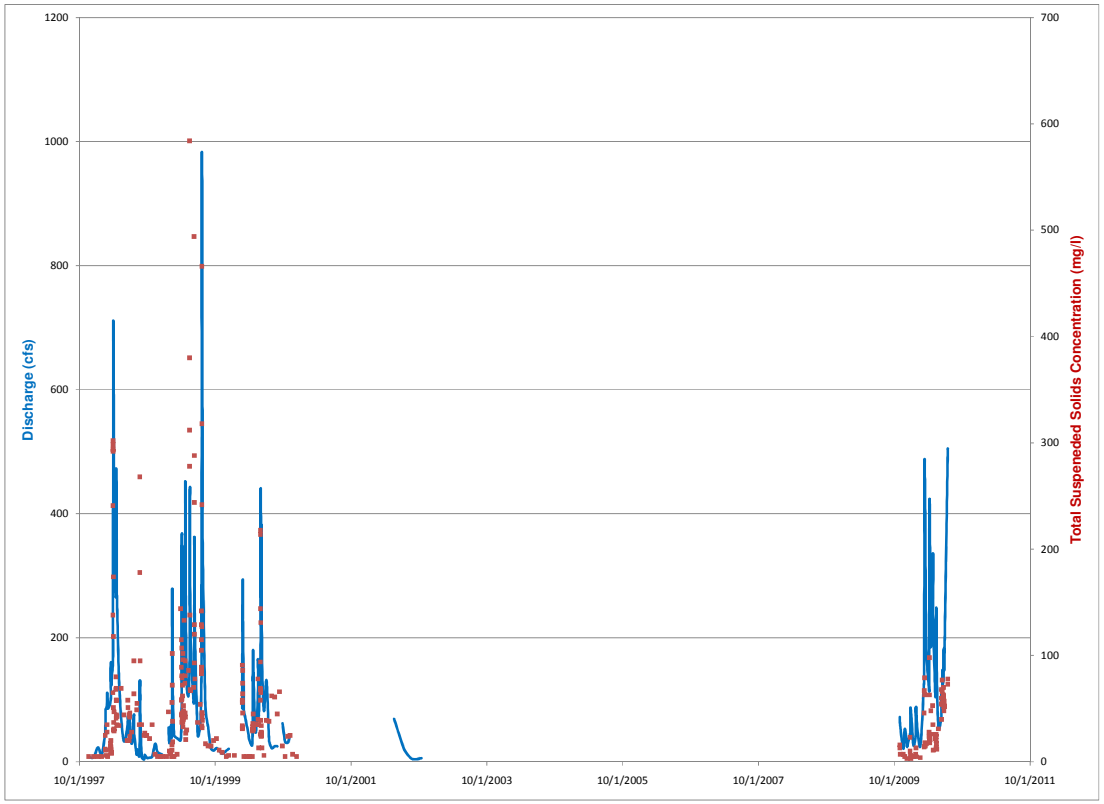


Chart 2. Discharge and Total Phosphorus Concentration