Columbia County Land and Water Resource Management Plan

Revised 2011

Prepared by:

Columbia County Land and Water Conservation Department

The following individuals are recognized for giving of their time and effort toward development of the 2006 edition of this plan and this current 2011 Update.

The 2011 update was developed off the 2006 plan platform

Their contributions are greatly appreciated.

Columbia County Land and Water Resource Management Plan
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Introduction

Welcome to the Columbia County Land and Water Resource Management Plan. This plan is an update to the 2006 Columbia County Land and Water Resource Management Plan. The process of updating the plan benefited from guidance from the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) and valuable large-scale citizen involvement and input. This revision process began in the spring of 2010 in preparation for a deadline early in the fall of 2010. Existing input derived from a local Citizen Advisory Committee (CAC) that was formed to complete the 2006 revision was used as foundation for this plan. We chose to develop and interactive online survey tool based around the current plan content to gauge citizen input. Following completion of the survey, a CAC meeting was held in late July 2010, to discuss survey results, report LWRMP accomplishments to date and include opportunities to add to the current list of CAC priority resource issues and concerns. This plan was completed, in part, to meet the requirements set forth by the DATCP to remain eligible for state program participation. However, early on it was evident that local staff, agency advisors and our CAC had a vision to make this plan much more than just another "Plan" developed to meet requirements.

It is with this vision that our plan demonstrates a wide range of resource issues, assessments and impacts. The resource concerns range from groundwater quality protection to an overall increase in information and educational efforts on the full scope of Natural Resource issues in Columbia County. Throughout this plan you will see that we have done our best to use current and up-to-date data to provide a clear picture of natural resource management in Columbia County.

The plan begins by providing a detailed review and assessment of all Columbia County's natural resource issues. A review of all our major surface water resources including location, description and assessment is provided. It is clear that there are many trends in different areas and issues in the County that are impacting land and water conservation. This plan also offers suggestions of how to deal with these changing trends and how to integrate resource protection and management effectively.

In October 2002, the state legislature passed rules to help protect Wisconsin's lakes, streams and groundwater resources. Department of Natural Resources (WDNR) rule NR 151 sets performance standards and prohibitions for farms. It also sets urban performance standards to control construction site erosion, manage runoff from streets and roads and manage fertilizer use on large turf areas. As a requirement of this plan, you will find Columbia County's strategy for the implementation of the agricultural standards found in NR 151 and the process used in the identification of priority farms.

In addition to the WDNR rules, the existing CAC input and the survey responses and associated comments we received from 54 citizens were essential in the development of this plan. This group made up of local citizens, elected officials, cooperating agency and local staff provided input and decision-making. Together we identified resource issues and concerns across Columbia County. A detailed summary of those resource issues and priority concerns are included in the plan.

This plan identifies both long and short-range goals for resource protection and enhancement throughout Columbia County. Our goals and action items range from Best Management Practice (BMP) implementation, ordinance development and enhancement, to larger visionary goals such as increasing issue awareness through information and educational activities in the County.

Monitoring the long and short-term effectiveness of this plan will begin with the ongoing use of our existing CAC committee. We plan to continue to utilize our LWCC meeting structure to provide a venue to an annual review process that will allow us to discuss and keep the citizen base abreast of the progress towards implementation of the plan's goals and discuss and or update issues as they present themselves. The development and continued use of our GIS Data Management System and the use of water quality

monitoring data will be the target of our ground based monitoring. Spatial GIS data will allow us to manage and track implementation of conservation priorities. The development of water quality monitoring processes will help us make scientific conclusions about the effectiveness of our resource protection efforts and help us target resources were necessary.

Plan Development (2006) & Update Process (2011)

At the time of this update it was felt that our current 2006 plan was a solid plan developed to address long-term LWRM issues in Columbia County. The results we received from our 2011 update survey of citizens reinforced this fact. Citizens widely support the continuation of priority issues along with actions and objectives outlined in the current plan. We chose to complete this update based on the assumption that we would use our current 2006 plan and build into it additional priorities that came up during our CAC interactions in 2010.

(2006) The development of this original plan began in January of 2005. The Columbia County Land and Water Conservation Department (LWCD) notified the public through the local media of the process and requested citizen involvement. We requested that any citizen interested in being part of our Citizen Advisory Committee (CAC) for the Land and Water Resource Management Planning process please contact the LWCD.

This call for involvement was answered by a wide range of citizens interested in learning more and being part of our revision process. A diverse mix of stakeholders; including many active farmers; a WPDES permitted farmer, rural landowners, environmentalists, County Board Supervisors, Lake District representatives and a large number of City, Village and Township representatives, were assembled.

In addition to the creation and utilization of our CAC, we enlisted the help and input of colleagues who also work to protect Columbia County's natural resources. We received help and comments from many WDNR associates, Natural Resource Conservation Service (NRCS), UW Extension and Farm Service Agency (FSA). ***The WDNR participated throughout our process. There involvement included three Basin Team Coordinators, an Animal Waste Management Specialist, a Wildlife Manager, a Fisheries Biologist and a Forester.*** A complete listing of all those who participated can be found in the acknowledgement section of this plan.

The CAC and advisors worked on the plan in three main public meetings. The first meeting was held March 30, 2005, and included background work setting the stage for our second meeting. The second meeting, held on May 10, 2005, was our information gathering and problem-solving meeting. We spent the majority of the evening taking input from members in regard to natural resource issues facing Columbia County. We also spent a large amount of time talking about what we can do to address these issues and what the group, as a whole, felt we should use for strategic planning in regards to our needs and priorities.

Based on the results of the first two meetings a draft LWRM plan was put together by the LWCD staff with input and comments from our cooperating advisors. At the third CAC meeting, held on June 30, 2005, full-scale presentation of the Draft LWRM Plan was given to the CAC members. Discussion took place and changes were made as suggested.

During this entire plan development process the departments governing body, the Columbia County Land and Water Conservation Committee (LWCC), was kept abreast of the process through regular

monthly meetings. The LWCC was encouraged to attend the CAC meetings to further their knowledge of the plan, in preparation for County Board approval in January of 2006.

(2011) The update process began with the development of a survey that was designed to determine if the existing CAC priority resource issues were still priority issues. We also used the survey to determine support and understanding associated with specific goals and objectives outlined in the current plan. The survey was completed in the summer of 2010. We had 54 citizens complete the survey. We developed a targeted mailing list requesting participation in the survey from our existing CAC committee along with numerous other citizens, governmental leaders and organizations. We were very satisfied with both the number of survey responses we received along with the content of their responses. People responding to the survey were able to leave comments specific to the issues being discussed. There were also able to list other or updated resources issues that were not addressed in the 2006 list of issues and concerns. We held a public meeting on July 27, 2010. During this meeting we presented a summary of the results of the survey followed by a detailed discussion reporting accomplishments over the last 5 years and how they measured up to goals and objectives. The final task for the meeting was to receive final input on priority resources issues and concerns that citizens would like to see added to the current list of resource issues and concerns. The LWCD then used the current and updated list of resource issues and concerns to update and develop goals and objectives that will be used to work towards address those issues. A draft revision (2011) was submitted to DATCP for review at the end of August 2010. The LWCB approved the plan at its December LWCB meeting. The Columbia County Board of Supervisors approved the Final 2011 at its December meeting.

General County Information

General Characteristics:

Columbia County is located in the south central part of Wisconsin. It covers about 774 square miles and has a total land area of about 495,300 acres. It has a county population of 54,802 (2003). There are 56 lakes totaling 11,982 acres, of which Lake Wisconsin is the largest with a total acreage of 9,000 acres. It also has 50 miles of trout streams and includes 35 miles of the Wisconsin River. Portage is the County seat and largest city with a population estimated at 9,800. There are 4 cities, 10 villages and 21 civil townships are within Columbia County. Agriculture encompasses 296,236 acres or 60% of the county, making it the main land use.

History:

For hundreds of years, prior to European settlement, Native American tribes inhabited the land that is now Columbia County. Mascoutins, Illinois, Kickapoos, Miamis, Sacs, Winnebagoes and Menominees used the land extensively for hunting, fishing and travel.

The county was located within the Winnebago and Menominee Territories until the land was turned over to the government as a result of treaty agreements. The first treaty was signed with the Winnebago tribe on August 1, 1829. This gave the government ownership of land in what is now the southwest portion of the county. The borderlines ran west of a line that runs south through Duck Creek Marsh and the area south of the Fox River. On February 13, 1833, a second treaty was signed with the Winnebago tribe. This included the land east of the Duck Creek Marsh and east of the Fox River, or what is now the southeast portion of the county. With these two treaties signed, only the townships of Caledonia, Newport, Lewiston and Fort Winnebago, west of the Fox River were still owned by the Native American tribes. A treaty signed in November of 1837, with the Winnebago tribe gave the government ownership of the township of Caledonia. The Menominee tribe signed the final treaty on January 23, 1849, giving the government ownership of the rest of the townships of Fort Winnebago, Newport and Lewiston, or the whole area of Columbia County.

The importance of the Fox and Wisconsin Rivers and their navigable tributaries has been recognized throughout history, in written records by all nations and tribes in the region. With the numerous prehistoric sites found along the rivers, one may conclude that the rivers have furnished a medium of livelihood and transportation even before written historical records. The “portage” occupies a central and important position in this transportation route.

Father Jacques Marquette and Louis Joliet are recorded as the first European settlers to discover Columbia County. They first set foot on Columbia County at the “portage.”

The rich productive soils, producing abundant quantities of grain, such as oats, wheat and rye and supporting livestock production have given Columbia County a rich agricultural history. Corn was introduced early in history as a staple crop. Soybeans have more recently been added to the list of common crops in the county. Canning companies became an integral part of nearly every community and production of vegetable crops for the canning industry flourished. The farming industry in Columbia County has been a rewarding lifestyle choice for many generations.

Related Trends and Issues

Cropland Soil Erosion:

Soil conservation practices to reduce soil erosion and sediment delivery continue to be utilized by crop farmers throughout Columbia County. Beginning in 2001 the LWCD began an annual process of completing a transect survey, which is targeted at giving us a realistic idea of where we sit in regards to meeting tolerable soil loss or "T" on all fields throughout Columbia County.

Breakdown of transect results as of 2010:

	Less Than or Equal T		
Watershed	**Count**	**Pct**	**Acres**
Beaver Dam River	56	88%	16270.73351
Buffalo and Puckaway Lakes	54	95%	15689.63588
Duck and Plainville Creeks	6	100%	1743.292876
Duck Creek and Rocky Run	102	100%	29635.97889
Lake Wisconsin	151	93%	43872.87071
Lower Baraboo River	39	95%	11331.40369
Lower Grand River	7	88%	2033.841689
Neenah Creek	39	100%	11331.40369
Roxbury Creek	2	100%	581.0976253
Swan Lake	68	99%	19757.31926
Upper Crawfish River	148	90%	43001.22427
Yahara River and Lake Mendota	42	95%	12203.05013
Totals	714	94%	207451.8522
Average County Soil Loss Acreage			
Soil loss	Acres	Percent	
Less Than or equal T	207451.9	94.2	
1-2 T	11622	5.3	
2-3 T	871.6	0.4	
Greater than 3 T	290.5	0.1	
Missing	0	0	
Totals	220236	100	

By examining the data we have gathered on soil erosion we can tell that, on one hand, a high percentage of farmers have implemented conservation planning and realize the value of soil erosion control. On the other hand, the data shows us that we still have a ways to go. Currently based on the transect data we have over 12,784 acres of land not meeting the tolerable soil loss rates. In 2004, we recorded that we had 102,000 acres not meeting T. The current 2010 report shows us that we have 89,000 less acres not meeting T. This is a tremendous change and shows and increase in agricultural buy in associated with limited tillage and no till agricultural practices. Changes from livestock to cash cropping has reduced the amount of hay being grown in rotations. Hay is an important crop in stabilizing soil and decreasing

erosion. We are seeing an increase in the loss and utilization of grassed waterways. It is important to note that meeting tolerable soil loss does not always mean we do not have active gully erosion to deal with on the landscape. We still see many areas in which permanent grass waterways and buffers would help reduce soil erosion overall. Upcoming changes to RUSLE factors K, HSG and Twill, likely result in some changes associated with our status.

The development of our GIS conservation-planning layer will help us better locate cropland acres within Columbia County on which conservation farm planning should be emphasized. It is likely that the utilization of the revised Farmland Preservation Program Conservation Certification Requirements (WLI) will serve as a starting point for this focus. Currently, an updated certification process is being used to assess landowner status for all Farmland Preservation Program (FPP) participants. The increased focus on using SNAP Plus to develop required Nutrient Management Planning will also help us locate and work with necessary acres.

Development and Land Use Trends:

Columbia County continues to be dominated by a mixture of agricultural land, forests and wetlands. Residential development has been primarily located in and around smaller cities and villages. However, the counties relatively close proximity to the Madison metropolitan area and the increasing growth of the area's commuting shed is beginning to put increasing development pressures on the southern portion of Columbia County. This southern area is within easy commuting distance to Madison. Communities such as Lodi and Poynette will continue to see Madison growth pressure. Townships such as West Point, Lodi, Arlington and Leeds, which lie in the southern portion of the County, contain many of our most productive prime soils. Balancing the emerging development values for these areas with their value in agricultural production will continue to be a tough challenge. The LWCD is working closely within the Smart Growth planning process to try and develop an approach that will value all the needs of future growth and agricultural preservation. Columbia County is experiencing rapid population growth. We have experienced a 16% increase since 1990. This compared to the statewide average of 9.6%. Proper land use planning and implementation of that planning will be very important for the future of Columbia County and for sound resource management and conservation. The Working Lands Initiative will provide some tools to work towards continued preservation of agricultural areas.

Agricultural Trends:

Farm numbers within Columbia County are on the decline and remaining farms are shrinking in land base each year. Animal numbers related to dairy farms are on the decline opening the door for more cash grain operations. The face of agriculture is changing in Columbia County. Pressures related to low milk prices, tight profit margins, competition for land (agricultural, residential and recreational) and off-farm labor opportunities are all part of the mix.

Columbia County has 1,526 farms with an average size of 228 Acres. There are 211 dairy farms, over 500 beef, sheep and hog farms plus everything from large cash grain operations of 500-1000 acres to 5-10 acre fresh market vegetable producers. Collectively farmers own and manage 348,396 acres of land. Field crops, dairy, cattle and calves, poultry products and vegetables are primary commodities in Columbia County. Horticulture is growing in Columbia County. Sand and muck soils found in the Wisconsin and Fox River systems support commercial vegetable and mint production. High quality prairie soils in the southern and northeastern parts of the County put the area in the top 10 for corn and

soybean production. Evidence of this, perhaps, is the efforts of local farmers who organized the United Wisconsin Grain Producers, Inc., to build Wisconsin's fourth ethanol plant near Friesland in the northeast corner of the county. Columbia County currently has 3 livestock operations that exceed 1000 animal units and are permitted under a ***WDNR*** WPDES permit. They include Blue Star Dairy projected 3089 a.u., Pulfus Poultry projected 1096 a.u and UW Arlington Research Station projected 1880 a.u. **Information provided by Columbia County UWEX and WDNR.*

Agriculture is big business in Columbia County. It has an overall $672 million dollar annual impact. Agriculture provides 5,312 jobs in Columbia County, which is 18% of the workforce. For every new dollar of agricultural income, an additional $1.07 of county income is generated. Dairy is the largest part of Columbia County agriculture. Providing for a strong dairy future in Columbia County is not only financially important but also is important for the utilization of forages in crop rotations and resulting soil erosion implications. **Information provided by Columbia County UWEX*.

Wind Farm interest has grown in Columbia County over the last several years. One wind farm is under construction in the NE portion of the County with interest growing in other portions of the County. Balancing the role wind power generation will play in the rural landscape will be an important issue over the next decade in Columbia County.

The future of dairy and livestock production in Columbia County will depend on our ability to manage demand for agricultural land and our ability to provide adequate land base to address phosphorous-based nutrient management into the future.

Natural Resources and Assessments

Geology and Topography

The entire county is underlain with Precambrian bedrock of which is igneous or metamorphic. Some bedrock outcrop through the Cambrian layer of sandstone, siltstone, shale and dolomite can also be found. (See *Appendix B*)

Preglacial, glacial and postglacial erosion formed the bedrock topography surface. Most of the bedrock valleys were part of a preglacial drainage system.

The bedrock surface ranges from about 500 feet above sea level in some valleys, to about 1,400 feet above sea level, west of the Wisconsin River. Bedrock valleys that underlay and control present surface drainage are filled with drift that form important aquifers.

The drift is largely glacial sediment laid down by the Green Bay lobe during Wisconsin Glaciation, but they also include some alluvium and marsh deposits. Distinctive landforms (end moraine, ground moraine, outwash and lake plains) resulting from glaciation are composed of sediment types determined by their mode of deposition. (See *Appendix C*)

The topography of Columbia County generally consists of a ground moraine with gentle slopes. (See *Appendix D*) The valleys of Neenah Creek and the Fox River occupy an area of glacial lake deposits characteristically broad and flat. Land surface elevations vary from the Baraboo area west of the

Wisconsin River (elev. 1200-1400 feet) to the Wisconsin River at Prairie du Sac (elev. 740 feet). The divide that separates the Wisconsin River and Rock River Watershed is 1,000 feet to 1,150 feet above sea level. **Information taken from 1978 Soil Survey of Columbia County.*

Fishery Resources

The waters of Columbia County provide a diverse fishery resource. There are eight named trout streams (50 miles), which represent the highest level of water quality. Stocking maintains about 80% of these waters, as they lack habitat conditions necessary for natural reproduction. Presently, wild strain trout stocking provides 3 times higher survival rates than previous domestic strain stock. Trout requires a high standard of water quality. Thus, it is extremely important that good land use practices are conducted in these watersheds. Increasing impervious surface areas from urban development in Lodi and Poynette areas have the potential to increase water temperatures and will push the water temperature tolerance levels to the limit. Proper storm water management is of the utmost performance.

Agricultural impacts of livestock, soil erosion and chemicals continue to require best management practices. Many watersheds of the county contain some trout water. They include the Jennings/Roelke Creek system and the receiving portion of the north branch of Duck Creek. Upper Prentice Creek above Highway 78 supports a native brook trout fishery up into its headwaters in Sauk County. Lodi Creek, which arises from a large spring complex in Dane County, supports trout throughout, however, because of natural reproduction within the City of Lodi, contains its best trout population on its lower reach. The Rowan Creek drainage and a tributary, Hinkson Creek, are the gems of the trout resource, not only in the county but the southern portion of the State. Upper Rowan supports an excellent native brown trout resource and Hinkson, native brook trout. Finally, eight miles of the middle portion of Rocky Run Creek maintains water quality that supports stocked browns and some native brook trout. The Mud Lake Waterfowl Area impounds its headwaters and many miles of stream from there down to Highway 22 have been ditched. Below Highway 22, increased spring flow and an unaltered creek corridor, reestablish water quality. In addition to proper land-use practices, beaver activities have a significant impact on water quality. Therefore, trapping and dam removals are critical to preserving our trout waters.

There are nine waters, larger than 50 acres within Columbia County, which support warm water fisheries. They include Lake Columbia, Dates Millpond, Lazy Lake, Long Lake, Park Lake, Silver Lake, Swan Lake, Lake Wyona, 9,000-acre Lake Wisconsin and the 35 miles of Wisconsin River upstream to the Kilbourn Dam in Wisconsin Dells. Significant smaller waters that contain significant fisheries are West Lake, Tarrant Lake, Spring Lake, Lake George, Curtis Lake and Crystal Lake (east of Pardeeville). Warm water streams in the county with sport fish importance include the lower Baraboo River, Big Slough/Neenah Creek, Crawfish River and tributaries, Duck Creek system and the Fox River. Dominant sport fish species in most of these waters include largemouth bass, northern pike, bluegill and crappie. Swan Lake supports an excellent stocked walleye and musky fishery and Silver Lake also has stocked musky. In addition, two waters support other significant fisheries. They are Lake Columbia with hybrid striped bass, catfish, smallmouth and largemouth bass and the Lake Wisconsin/Wisconsin River fishery of walleye, sauger, white bass, smallmouth bass, channel catfish, musky and lake sturgeon.

Chronic detrimental factors affecting warm water resources are sedimentation, agricultural ditching (wetland loss), high levels of nutrients and development activities near riparian zones. Acute influences from agricultural chemicals and manure occur infrequently, but are direct causes of catastrophic fish kills. Loss of spawning areas and fish habitat, periodic low oxygen levels and over abundant aquatic

plant growth are problems common to most waters. In addition, fish passage at both dams on the Wisconsin River should be sought. The dams act as barriers to natural fish movement on the river and allow for significant downstream movement out of Lake Wisconsin. Several fish and mussel species occur downstream from the dam at Prairie du Sac and not above. Most noteworthy are the paddlefish, shovelnose sturgeon and blue sucker. Lake sturgeon inhabited the Wisconsin River upstream to Stevens Point, however, due to pollution from paper mills and several dams constructed during the early 1900's, their distribution for practical purposes is now limited to waters downstream from the Wisconsin Dells dam. Reintroduction efforts are underway to restore them to their original range. Studies show significant downstream movement of walleye and sauger downstream from Lake Wisconsin and Bluegill are a dominant species in the tailrace fishery below Lake Wisconsin, which also occur there from downstream movement. The recent removal of the last three dams on the Baraboo River are allowing a segment of the Wisconsin River fishery (i.e. Smallmouth bass, walleye, sauger and catfish) to utilize areas of the Baraboo as summer habitat. In addition the 5 miles of riffles in Baraboo will allow for walleye, sucker, sturgeon and eventually paddlefish spawning. Both upstream and downstream fish passage at the Prairie du Sac dam has been recently ordered by the Federal government to re-establish natural fish and mussel movement. Diurnal fluctuating discharge, from the dam at the Dells, for the tour boat operations during low water periods, cause two to four feet water level changes, which negatively impact aquatic life and downstream recreation use. Invertebrates and forage fish species, though less documented, are critical as food sources for sport fish and indicators of detrimental environmental activity. Reduced species diversity and loss of intolerant species occur where habitat and water quality have been reduced. **This information was gathered in collaboration with WDNR fisheries staff and Basin Coordinators. Including the State of the Basin Reports for Lower Wisconsin, Rock River and Upper Fox.*

Groundwater Resources

Groundwater resources in Columbia County are, for the most part, of good quality but issues related to nitrates are on the increase. There has been an increasing incident of private wells exceeding the recommended safe nitrate nitrogen level of 10 mg/L (milligrams/liter) for drinking water. The nitrate problem in Columbia County is considerable. At Highway 60 and the 90/94 Interstate drillers are installing as much as 400 feet of casing to reach safe water. Much of the usable aquifer is badly contaminated with Nitrate. Agriculture is the primary source of nitrates caused by the application of Nitrogen fertilizers. There may come a time when there are no drilling solutions to the nitrate problem. Some wells in the county have tested above the state standard for atrazine levels. To help reduce the levels of atrazine in groundwater, *Atrazine Prohibition Areas* are identified in the county. This means in these areas no atrazine may be applied to the land. Columbia County has six *Atrazine Prohibition Areas*, equaling about 80,000 acres, in portions of Arlington, Leeds, Hampden, Marcellon, Caledonia, Courtland, Randolph, Lewiston, Fort Winnebago, Dekorra and Lowville Townships. For more detailed maps of the prohibition areas, see the Columbia County Land Conservation Department or Chapter ATCP 30 of the Wisconsin Administrative Code.

Two aquifers supply potable groundwater. The sand-and-gravel aquifer supplies the groundwater for industrial, irrigation and municipal uses. The aquifer is composed of the permeable sediments within the saturated unconsolidated materials. The second aquifer is the sandstone aquifer. This aquifer is an important source of water throughout the county. It is the principal source for most municipal, industrial and private domestic supplies. To help protect groundwater resources, all municipal wells are required to delineate a source area protection. This is a map of the groundwater recharge areas for that municipal well and this recharge area should be protected from possible contamination.

Much of the groundwater in the county originates from precipitation. Between 1 and 10 inches of precipitation infiltrates and recharges the ground-water resources annually. The greatest threat to groundwater pollution occurs in areas where highly permeable sand and gravel are exposed, fractured bedrock is exposed or thinly mantled with drift, or where depth to water is less than 10 feet. Some potential sources of contamination are from old unregulated landfills, old wells, underground storage tanks, on-site waste disposal systems, livestock manure handling and storage - including barnyards and septic disposal. **Information provided by WDNR in consultation with Adam Hogan, WDNR Groundwater Specialist.*

Surface Water Resources

Columbia County has numerous lakes, rivers and streams. The various lake types represented in the county are glacial, impoundments, excavations and oxbows. There are 56 lakes covering a total of 11,982 acres, Lake Wisconsin being the largest. The Fox, Baraboo, Wisconsin and Crawfish are the rivers that flow through Columbia County. There are also fifty miles of trout streams with ten miles being Class I trout streams (Prentice Creek, Roelke Creek and Rowan Creek). Many other streams, springs and ponds enhance Columbia County's water resources.

Exceptional Water Resources
The County has four exceptional resource waters, as defined by the WDNR. There are 3 exceptional Class I trout streams and Crystal Lake in the central portion of the county, Township of Wyocena, sections 1 and 12. Public hunting land surrounds the lake managed by the Department of Natural Resources.

Three exceptional streams in the county include the 5 miles of Prentice Creek (Durward's Glen Creek) above Highway 78, Roelke Creek, Section 30, T12N, R11E, to mid Duck Creek (1.0 miles) and Rowan Creek above County Highway J, above the Poynette Wastewater Treatment Plant (4.0 miles).
**Information gathered from WDNR website.*

Impaired Water Resources
Section 303(d) of the Clean Water Act requires the State to prepare a list of impaired water bodies that will remain so even after the application of technology-based standards typically applied to point sources of pollution. The State is to identify the pollutants causing the problem, identify the sources of that pollution and develop a Total Maximum Daily Load (TMDL) of that pollution that a water body can receive and still meet water quality standards. The State is then required to set priorities for implementing strategies to meet the TMDL.

Wisconsin's 2010-303(d) list includes water bodies in Columbia County. The Fox River from Swan Lake downstream to Portage and the Fox River north of Portage not including Buffalo Lake, the Crawfish River at the Columbus Mill pond and the Wisconsin River listed as impaired. These water bodies are listed as impaired in regards to the presence of PCB's and/or mercury.

Lake Wisconsin and Park Lake were added to the list recently. They were added to the list related to impairments associated with eutrophication and recreational restrictions.

Wetland Resources

A Wisconsin Wetland Inventory has been conducted for Columbia County based on 1978 to 1979 aerial photography and a minimum size of 5 acres. This inventory identifies 74,921 acres of wetland distributed throughout the county. Acreage is not available for wetlands less than 5 acres in size. The wetland areas documented in the late 1970's are probably less than half the total wetland acreage that existed in the county prior to the late 1800's.

Three wetland habitat types are found in Columbia County; the Emergent Wetland, the Scrub-shrub Wetland and the Forested Wetland. Each of these represents a unique ecosystem based on hydrologic conditions, vegetation and location in relationship to other wetlands, drier upland sites, or adjacent water bodies.

Many large wetland complexes are associated with the stream and river systems. These include the Wisconsin River, Fox River, Baraboo River, Crawfish River, Neenah Creek, French Spring Creek, Duck Creek, Rowan Creek, Rocky Run Creek, Hinkson Creek, Lodi Spring Creek, Prentice Creek, Rowley Creek and Beaver Creek. Several large wooded tamarack type wetlands include the Lewiston Marsh, Big Slough and Hampden Marsh. There are numerous large, shallow to deep self-contained wetlands that include Mud Lake, Grassy Lake, Schoeneberg Marsh, Goose Pond, Swan Lake, Weeting Lake and Corning Lake. Several other large, shallow to deep wetlands that are impounded include French Creek, Park Lake, Wyona Lake and Lazy Lake.

Much of the wetland drainage in the county has been a result of attempts to increase acreage suitable for agricultural production and filling for urban development. This has resulted in degraded water quality; loss of natural filtration and storage areas, increased localized flooding and loss of important fish and wildlife habitats. Deep, organic soil wetlands of significant acreage were drained for organic or "muck" farming operations. However, the trend seems to be turning.

In recent years, some areas have been removed from cropland production and entered into the "Wetland Reserve Program." This is a voluntary program offering landowners the opportunity to protect, restore and enhance wetlands on their property. ***Since 1992 the "WRP" program has worked with over 75 Columbia County landowners to restore over 7300 acres of wetland habitat.***

In addition to providing habitat for fish, waterfowl and other wildlife species, the remaining wetlands are very important for recharging of aquifers and the protection of groundwater quality. Wetlands are extremely efficient at trapping and filtering out nutrients and sediments contained in runoff and they provide highly effective flood storage areas. It is critical the remaining wetland resources in Columbia County are protected from further destruction. Restoration of previously drained wetlands should be encouraged. Existing county, state and federal regulatory protection mechanisms need to be integrated and enforced to a greater extent than they are now. In addition, technical and financial resources for stream bank and shoreline erosion control measures need to be expanded to ensure the protection of wetlands adjacent to lakes and rivers.

Purple loosestrife is an invasive exotic plant species, which currently threatens the quality of our wetlands. Purple loosestrife invades wetlands and shades out most native vegetation. It drives marsh wrens and least bitterns completely from the wetland and the numbers of muskrats and waterfowl decrease dramatically. This results in elimination of our diverse wetland vegetation and any endangered

or threatened plant species that may exist there. One way to protect wetland is to stop the encroachment by invasive species. **Information gathered from multiple sources including: State of Basin Reports for Lower Wisconsin, Upper Fox and Rock River, 1978 Soil Survey of Columbia County and Priority Watershed Plans for Columbia County.*

Wildlife Resources

Columbia County has a very diverse landscape that entails excellent farmland, numerous lakes, streams, wetlands and significant woodlands. The total acreage of the county is 495,300 acres, of which cropland comprises 275,000 (55%), woodlands 98,000 (19%) and wetlands (i.e. farmed and unfarmed) 76,000 (15%). Such a composite mixture means significant habitats exist for numerous wildlife species. Wildlife populations include, waterfowl, deer, turkey and many small game species (squirrel, rabbit, pheasant, grouse, etc.) and fur-bearing animals (fox, coyote, muskrat, beaver, otter, etc.).

The lakes, wetlands, rivers and stream tributaries of Columbia County have provided a prime waterfowl habitat for centuries. The Department of Natural Resources has established several large wetland areas and stream tributary systems as state-owned wildlife area projects. Also, under the Waterfowl Production Area Program, the U.S. Fish and Wildlife Service has protected some smaller wetlands through land acquisition. These areas and private lands, provide very good duck hunting opportunities during the fall season for primarily mallards, blue-winged teal and wood ducks. Significant numbers of migrating Canada geese use private farm lands for feeding and resting during the fall and spring migrations.

The diverse landscape with its mixture of wildlife habitats has allowed for excellent deer population to develop. The county has regularly been among the Wisconsin top ten counties for annual deer harvest during the past ten years, with the harvest range being 6,000 to 12,000 animals. In the past few years, many landowners and hunters have become more selective when taking antlered deer. Yearling bucks are being bypassed with the intent for those animals to become two or three-year-old animals and thus allow for greater antler development as "trophy sized" animals.

With this plenty comes problems. The whitetail deer population in Columbia County has remained high in many areas, meaning 25% to 50% above over winter population goals. Agricultural crop loss claims and deer shooting permits (25 to 35 per year) are issued annually. Coincidentally, in 2002 a fatal deer disease "Chronic Wasting Disease" (CWD) was found in the deer population of southern Wisconsin. This included a CWD positive deer in southwest Columbia County. Much of Columbia County, specifically deer management units 70B, 70E and 70G, are included in the CWD deer management zone.

The rich woodland resources of the county also provide excellent habitat for the reintroduced wild turkey. Wild turkeys have been restored to the county and are common throughout. Spring and fall turkey hunting seasons provide considerable hunting opportunities.

The eastern and southern parts of Columbia County were historically part of a prairie grassland environment that covered much of southern and eastern Wisconsin. In an effort to maintain and restore this historic landscape, the Department of Natural Resources initiated the Glacial Habitat Restoration Area Project that includes the townships of Fountain Prairie and Courtland in eastern Columbia County. This project is designed to restore wetlands and grasslands on private lands and public lands for the benefit of mallards, blue-winged teal, pheasants and grassland songbirds.

The county also has many special "concern resources" that require protection and recognition in planning and implementing land and water resource management. Many natural communities exist around the county associated with private and public lands and the waters of the county. These include various wetlands, prairie and forest and oak-savannah communities. There are 3 species of endangered plants, 10 species of threatened plants, 3 endangered bird species and 4 threatened bird species have occurred in Columbia County. Other species of concern include 8 threatened fish species, 3 endangered reptile species, 2 threatened reptile species, 3 endangered mussel species, 3 threatened mussel species and 1 threatened butterfly insect species documented in the county.

Bald eagles are once again using Columbia County as nesting grounds. There are now 4 active nesting bald eagle pairs confirmed within the Wisconsin River and the Fox River areas. This likely has occurred due to the expanding population of eagles on a statewide basis. The increasing population of Wisconsin eagles are now seeking additional suitable habitat for nesting and can now be found further south in Columbia County.

Osprey have now reestablished their presence in Columbia County with 2 active breeding pairs and established nests along the Wisconsin River. The ospreys are primarily fish eating birds and like the eagles they are now establishing more territories in riverine habitats of southern Wisconsin.

Along with some of these large birds of prey establishing breeding territories in southern Wisconsin, in the past 5 years there have been more frequent sightings of black bear and timber wolves here in Columbia County. There were 2 or 3 black bear sightings per year and 1 to 2 timber wolf sightings have occurred. Most of these sightings occur in late spring or early summer seasons. In most cases these animals are 1 to 2 years old and most often males that have been forced from the maternal family group. Mostly they appear to be searching for new territories in these nomadic movements and generally return to the northern parts of Wisconsin. However, if those populations continue to increase these sightings will likely occur on a more continuous basis in southern Wisconsin. **Information provided by Pat Kaiser, WDNR Wildlife Biologist for Columbia County.*

Forestry Resources

Forested land comprises about 98,000 acres or approximately 19% of the land area of Columbia County. The acreage by forest types is as follows:

Pine	13,400
Oak & Hickory	66,300
Elm, Ash, Maple	4,000
Maple & Basswood	9,800
Aspen	4,500

County growing stock is estimated at 131,400,000 cubic feet and saw-timber at 315,699,000 board feet. Quality of woodlands, like the soils of the county, vary from excellent to poor.

The demands on county woodlands are increasing on many fronts. Development for housing, recreation and strong markets for forest products have all increased dramatically during the past few years resulting in a rise in value of wooded acreage. The traditional woodland values of aesthetics, soil and water conservation, clean air and wildlife habitats are frequently being degraded. The fragmentation of wooded areas is especially destructive of woodland values. While clearing for cropland and grazing of

livestock were the main threats to woodlands in the past, the development of wooded areas for housing is currently the major threat to county woodlands. If the values of Columbia County woodlands are to be maintained, new programs and zoning ordinances are needed, along with the expanded use of current programs.

Insect pests also threaten county woodlands. Columbia County is now under gypsy moth quarantine for all lumber products. In recent years, Columbia County has participated in the WDNR Gypsy Moth Suppression program and treated just less than 1,130 acres with heavy Gypsy moth infestation.

The Managed Forest Law Program is widely used and accepted within the county as a means to gain valuable long-term forestland management. The use of Aspen clear cuts has been on the increase in Columbia County. These cuts are providing valuable wood resources and providing for new growth aspen regeneration and the cumulative wildlife resources that come along with it.

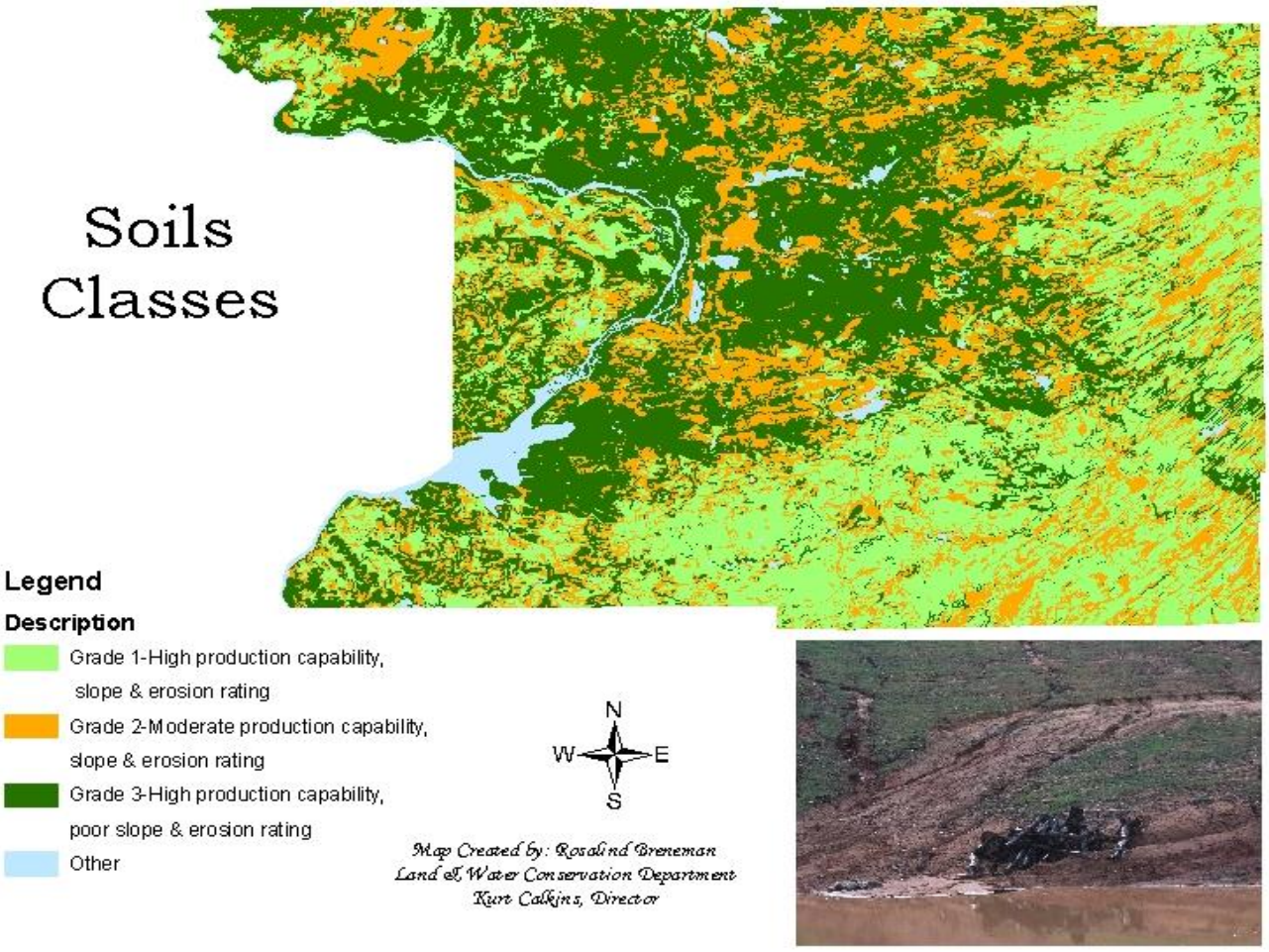
The forestry resource in Columbia County as well as statewide has forest succession occurring. The forests are heading from an oak/hickory cover type to a maple climax forest. This in turn, will cause a shift in wildlife species. Wildlife managers agree maple tree species offer very little wildlife value. Exotics such as buckthorn, black locust, honey suckle, garlic mustard and over browsing by deer is hindering all facets of the forest resource throughout Wisconsin. **Information provided by Jim Bernett, WDNR Forester Columbia County.*

Mineral Resources

Mineral resources are abundant and contributed substantially to the development of Columbia County. Large deposits of dolomitic limestone are available and are used for agricultural lime, road paving and riprap. The glacier deposited large volumes of sand and gravel utilized for road construction and building construction. Southeast of Portage, silicone sand is mined and shipped to foundries for casting molds. There are approximately 40 active mines within Columbia County and another 16 inactive mines. There is growing concern for increasing the oversight and management of these active and inactive mines. Utilization of a sound process to assure long term compliance and rehabilitation will be very important for Columbia County.

Soils

Individual soil types, with specific and unique characteristics, directly influence land uses. There are 69 different soil types are found throughout Columbia County. These are grouped into 11 major soil associations that have distinctive soil patterns, relief and drainage features. The Columbia County Soil Survey contains detailed descriptions for each soil type, including information of suitability and limitations for various types of land use and land management. The Columbia County Land and Water Conservation Department extensively uses the soils information. The availability and utilization of the Digital Soils Survey through our GIS system has made access to this information more useful.



Soil Associations

- Plano-Griswold-Saybrook association: Well drained and moderately well drained silty soils that have silty or loamy subsoil; underlain by sandy loam glacial till.
- St. Charles-Ossian-Dodge association: Well drained, moderately well drained and poorly drained silty soils that have silty subsoil; underlain by sandy loam glacial till or silty sediment.
- Mt. Carroll-Seaton-Dresden association: Well drained and moderately well drained silty and loamy soils that have silty or loamy subsoil; underlain by stratified silt and sand, silty sediment, or stratified sand and gravel.
- McHenry-Baraboo-St. Charles association: Well drained and moderately well drained silty soils that have dominantly silty subsoil; underlain by sandy loam glacial till or quartzite bedrock.
- Plainfield-Okee association: Excessively drained and well drained sandy soils that have sandy or loamy subsoil; underlain by sandy sediment or sandy loam glacial till.
- Boyer-Oshtemo-Dresden association: Well-drained sandy and loamy soils that have a loamy subsoil; underlain by sand or stratified sand and gravel
- Oshtemo-Plainfield-Briggsville association: Excessively drained to moderately well drained sandy and loamy soils that have a sandy, loamy or clayey subsoil; underlain by sandy sediment, sand and gravel, or clayey sediment.
- Lapeer-Wyocena association: Well-drained loamy and sandy soils that have a loamy subsoil; underlain by sandy loam or loamy sand glacial till.
- Grellton-Gilford-Friesland association: Well drained, moderately well drained and poorly drained loamy soils that have a dominantly loamy subsoil; underlain by sandy loam glacial till, stratified silt and sand, or silty sediment.
- Granby-Alluvial land, loamy, wet-Morocco association: Somewhat poorly drained to very poorly drained sandy soils that have a sandy subsoil and are underlain by sandy sediment; and loamy alluvial land.
- Houghton-Adrian-Palms association: Very poorly drained organic soils; underlain in places by sandy or loamy sediment

Compiled 1978 – Soil Survey of Columbia County, Wisconsin


Watersheds in Columbia County
N
W
E
S
Dell Creek
Duck and Plainville Creeks
Neenah Creek
Buffalo and Puckaway Lakes
Swan Lake
Lower Grand River
Lower Baraboo River
Beaver Dam River
Duck Creek and Rocky Run
Calamus Creek
Lake Wisconsin
Upper Crawfish River
Yahara River and Lake Mendota
Lower Crawfish River
Maunesha River
Honey Creek
Roxbury Creek
Legend
Watershed Name
Beaver Dam River
Buffalo & Puckaway Lakes
Calamus Creek
Dell Creek
Duck Creek & Rocky Run
Duck & Plainville Creeks
Honey Creek
Lake Wisconsin
Lower Baraboo River
Lower Crawfish River
Lower Grand River
Maunesha River
Neenah Creek
Roxbury Creek
Swan Lake
Upper Crawfish River
Yahara River & Lake Mendota
Roads
CTH
Interstate
STH
Water
Watershed Basins
Upper Fox River Basin
Lower Wisconsin Basin
Upper Rock River Basin
Lower Rock River Basin
Map Created by: Rosalind Breneman
Land & Water Conservation Department
Kurt Calkins, Director

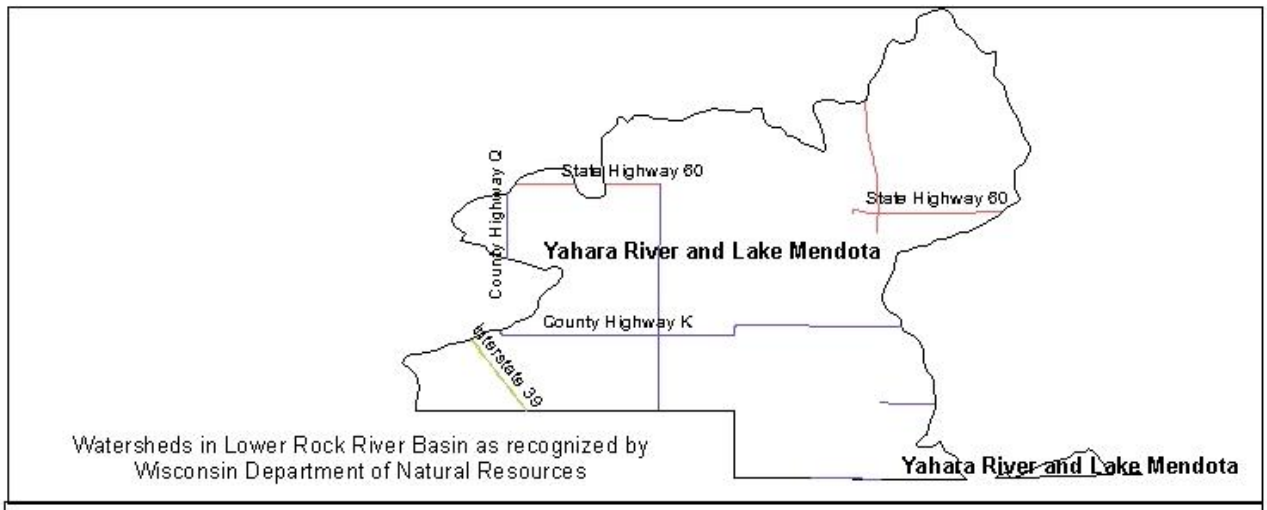
The State of Rock River Basin Report completed April, 2002 (Pub WT-668-2002)

The following are some of the highlights found in the most current WDNR Rock River Basin Report.

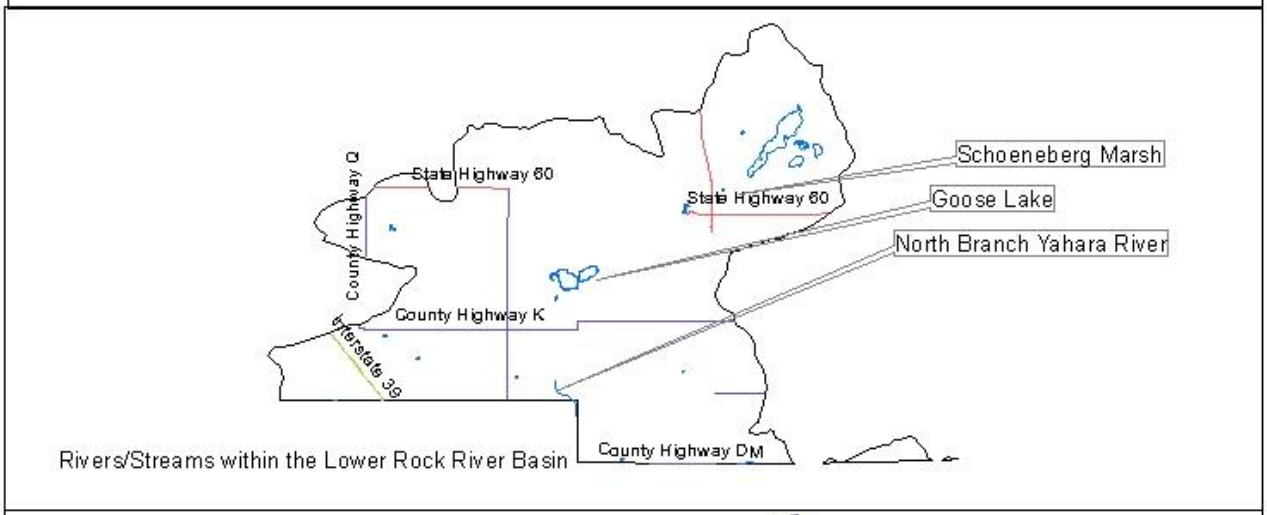
WDNR Basin Recommendations and Priorities:

- Increase citizen participation in water quality through information and education efforts
- Implement basin-wide stream water quality monitoring
- Develop new financial incentives to restore wetlands
- Promote wise land use planning to support Smart Growth
- Increase utilization of Stormwater Management Programs
- Promote CRP, CREP and WRP
- Encourage Whole Farm Conservation Planning
- Education related to nutrients and lawns, storm drains and septic systems
- Establish 40,000 feet of shoreland buffers and 1,500 acres of wetland restoration
- Identify and prioritize shoreland and wetlands in need of protection
- Restore 100 acres of oak savannahs and prairies in basin
- Increase monitoring efforts related to resource protection benefits
- Identify streambank protection sites
- Address gully, rill and sheet erosion on agricultural lands
- Increase local ordinance protection and enforcement of construction site erosion
- Prevent and control non-native and invasive plant and animal species
- Promote and protect groundwater recharge areas
- Demonstrate 5 proper well abandonments
- Support Wellhead Protection plans and ordinances
- Promote Nutrient and Pesticide Management (NPM) Plan utilization
- Improve, enhance and promote recreational trails in basin
- Increase adult and youth participation in conservation and other outdoor activities
- Identify facilities, boat and recreational needs and increase these types of access areas within basin
- Implement Deer Management 2000 and Beyond recommendations

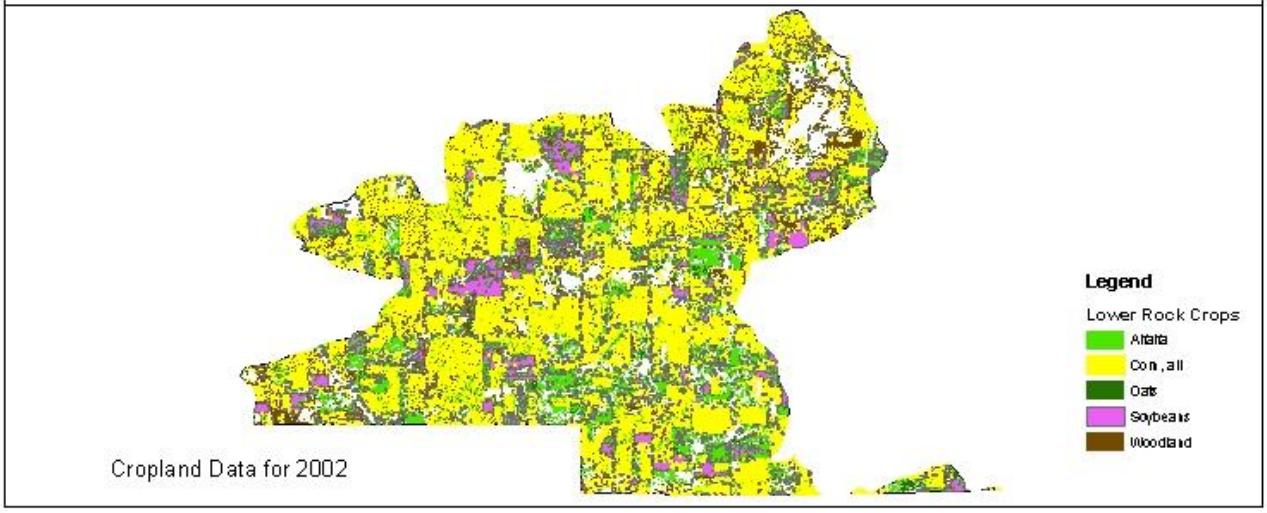
Lower Rock River Basin



Watersheds in Lower Rock River Basin as recognized by Wisconsin Department of Natural Resources



Rivers/Streams within the Lower Rock River Basin



Cropland Data for 2002

Map Created by: Rosalind Breneman
Land & Water Conservation Department
Kurt Calkins, Director

Lower Rock River Basin

Yahara River/Lake Mendota Watershed:

General Characteristics:

The Yahara River/Lake Mendota Watershed is in the south central portion of the county. The watershed lies within the Lower Rock River Basin and has a drainage area of 230 square miles. Of this about 205 square miles (88%) of the watershed are in Dane County and 28 square miles (12%) are in Columbia County. The townships of Leeds and Arlington contain approximately 14,196 acres that are in the watershed. The township of Arlington, including the village of Arlington, is one of the top 5 townships for growth in Columbia County. This growth may affect land use along with nutrient and sediment loading in the future.

The Yahara River/Lake Mendota Watershed was selected as a priority watershed project in 1993; planning and inventory began in 1994. Inventory results have shown sediment and nutrient delivery from both agricultural and urban sources to be the most significant nonpoint sources of pollution in the watershed; delivery from agricultural sources is the most significant in Columbia County. The watershed plan was approved April, 1997. Signing of landowner cost-share agreements for installation of Best Management Practices (BMP's) was initiated in June of 1998. The watershed project is projected to continue through the year 2009.

Agriculture is the main land use in the watershed. In Columbia County 12,405 acres of the 14,196 acres, or about 87% of the land, is agriculture. Most of the agriculture is cash grain farming, vegetable crops for the canning industry and dairy farming.

Note: Assessment Information was compiled from use of current reference materials such as WDNR Basin Plans, Priority Watershed Plans and other current applicable data sources. This information was reviewed and discussed with local WDNR Basin Coordinators and in the field WDNR fisheries staff. We feel based on this combination of reference sourcing, we are providing a detailed up to date assessment of our current resource conditions.

Assessment of Main Tributary Resources:

Goose Lake:

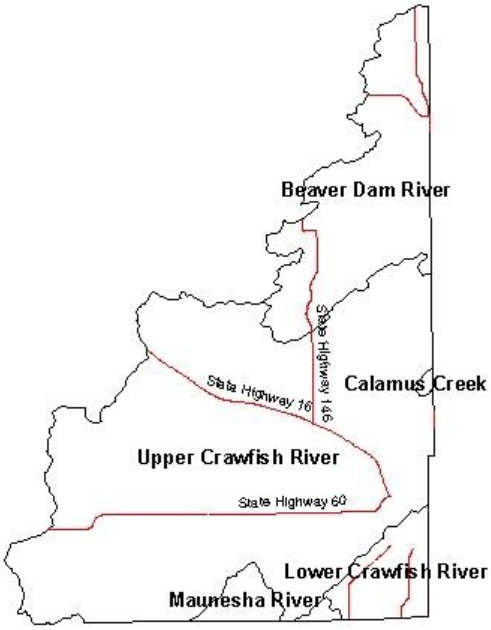
Goose Lake or Goose Pond, as is commonly known, is located in the northern portion of the Yahara River & Lake Mendota Watershed. It is in the townships of Arlington and Leeds and covers about 9.1 square miles. Goose Pond is listed as a subwatershed and because of being internally drained, it does not impact the water quality of the other subwatersheds. Goose Pond is approximately 73 acres in size with a maximum depth of 3 feet. The watershed area that drains to Goose Pond is primarily agriculture, with the land use being dominated by cash grain operations.

Several factors are affecting the water quality of Goose Pond. Goose Pond water levels have fluctuated from normal to low over recent years. Water from the Delmonte plant no longer is discharged into this system. Other factors include destruction of wetlands for agricultural uses, sediment and nutrient loading from agricultural runoff, abundant macrophyte growth and winterkill of fish species.

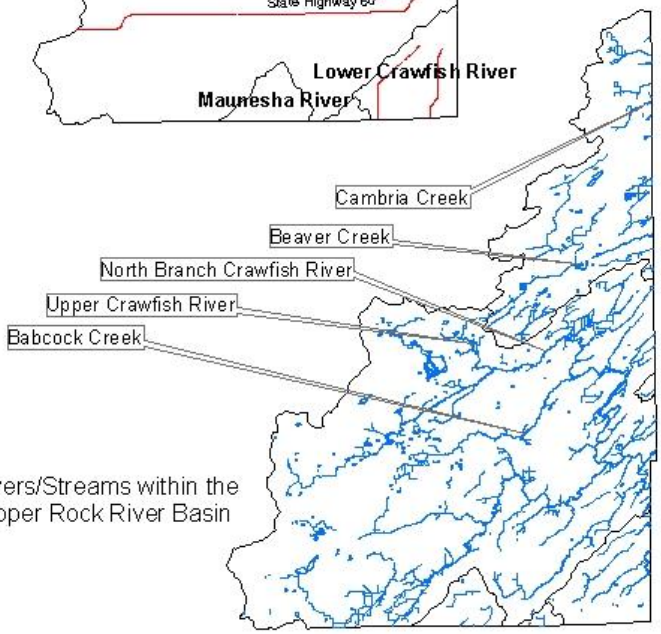
Schoeneberg Marsh: (2,797 ac.)
The marsh is located in the northern part of the Yahara River/Lake Mendota Watershed, in the Township of Leeds and covers about 4.4 square miles. It also is an internally drained subwatershed and does not impair water quality of adjacent subwatersheds. The open water area of this wetland is approximately 120 acres and has a maximum depth of 3 feet. Schoeneberg Marsh is classified as a deep-water marsh. The United States Fish and Wildlife Service has concentrated on establishing grasslands and legume cover around the perimeter of the wetland. The major source of sediment and nutrient loading is from agricultural activities. There is a grassed waterway on the northwest corner of the wetland that is the main source of nutrient loading whereas, the rest of the perimeter is considered well buffered and stable.

North Branch Yahara River:
The North Branch of the Yahara River flows through the southern portion of the watershed in Columbia County and into Dane County. It is located in the townships of Leeds and Arlington and covers about 14.5 square miles in Columbia County. The Yahara River originates in the lower portion of Columbia County and flows southward through Deforest, Windsor and eventually into Cherokee Wetland and Lake Mendota in Dane County. Columbia County's portion of the watershed contains no surface water, only intermittent streams. The major sources of nonpoint pollution are nutrient and sediment loads caused by agricultural practices.

Upper Rock River Basin

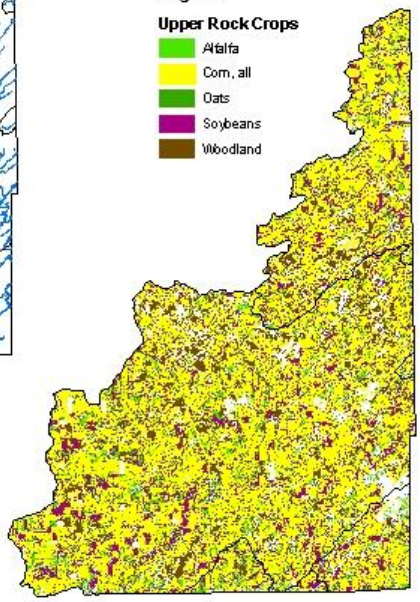


Watersheds in the Upper Rock River Basin
as recognized by the
Wisconsin Department of Natural Resources



Rivers/Streams within the
Upper Rock River Basin

Cropland Data for 2002



Map Created by: Rosalind Breneman
Land & Water Conservation Department
Kurt Calkins, Director

Upper Rock River Basin

Upper Crawfish River Watershed

General Characteristics:

The Upper Crawfish River Watershed is located in the southeastern corner of Columbia County with 160 square miles located in Columbia County and 9 square miles in Dane and Dodge Counties. Columbia County's portion of the watershed is located in the townships of Otsego, Fountain Prairie, Leeds, Hampden and Columbus. The villages of Doylestown, Fall River and the City of Columbus are in the watershed. The major land use in the watershed is farming, mainly dairy, cash crops, or feeder animals. The entire river is classified as a warm water sport fishery.

Note: Assessment Information was compiled from use of current reference materials such as WDNR Basin Plans, Priority Watershed Plans and other current applicable data sources. This information was reviewed and discussed with local WDNR Basin Coordinators and in the field WDNR fisheries staff. We feel, based on this combination of reference sourcing, we are providing a detailed up to date assessment of our current resource conditions.

Assessment of Main Tributary Resources:

North Branch Crawfish River:

Lazy Lake is a 161-acre impoundment reaching approximately 8 feet deep and is on the North Branch of the Crawfish River in and near Fall River. The lake has many problems such as, low dissolved oxygen, excessive alga blooms and submergent aquatic plant growth. Lazy Lake has a very good bass, northern pike and bluegill population. Overall, monitoring indicates polluted agricultural runoff, low levels of dissolved oxygen and low flow problems exist for the North Branch Crawfish River.

Babcock Creek:

Babcock Creek is a tributary to the North Branch of Crawfish River. Despite heavy stream bank pasturing and significant sediment loads in the stream, the stream's water clarity is exceptional. (WDNR 1994)

Upper Crawfish River:

The entire length of this river is classified as a Warm Water Sport Fishery (WWSF). Sedimentation problems with agricultural nonpoint pollution, especially barnyard runoff and cropland erosion, have degraded its quality. Portions of the upper or headwater reaches have been channelized and wetlands have been drained for agricultural production. These activities have resulted in holes formed by rocky substrate being filled and habitats lost in slower flowing portions of the river. The stream has many riffle areas with a rocky cobble bottom, which should provide good habitats above State Highway 16 (WDNR, 1994).

Lower Crawfish River Watershed

General Characteristics:

The Lower Crawfish River Watershed is located in the southeast corner of Columbia County. Most of the 172 square mile watershed is predominately agriculture and is located in Dane, Dodge and Jefferson County with approximately 10 square miles located in Columbia County in the township of Columbus, including a portion of the City of Columbus.

Assessment of Main Tributary Resources:
The Lower Crawfish River Watershed has approximately one mile of the Crawfish River running through Columbia County. An unnamed tributary empties into the Crawfish River in Columbia County.

Beaver Dam River Watershed

General Characteristics:

The Beaver Dam River Watershed is 292 square miles in size with the majority of the watershed located in Dodge County. In Columbia County, 38 square miles are located in the townships of Randolph, Courtland and Fountain Prairie. This area also includes the Village of Randolph.

The Beaver Dam River Watershed was selected as a priority watershed project through the Wisconsin Nonpoint Source Water Pollution Abatement Program in 1990. In 1993, project implementation began with the project now having an ending date of 2005. The primary objective of this project is to reduce nonpoint source pollution to the Beaver Dam River and to enhance and protect the water quality of the streams and lakes in the watershed.

Columbia County's portion of this watershed is primarily agriculture. Sedimentation from row cropping has impacted the habitat and is the main nonpoint source pollution in this watershed.

Assessment of Main Tributary Resources:

Beaver Creek:

Beaver Creek has a considerable amount of wetlands including the Paradise Marsh State Wildlife Area in Columbia County. Numerous drainage ditches feed Beaver Creek and the bottom is primarily silt and muck. The water is occasionally turbid. Cropland runoff accounts for 91% of the upland sediment load to Beaver Creek. Beaver Creek has a severely impacted warm water forage fishery, although the potential for a warm water sport fishery is possible. Cultivation and poor land management practices are extensive in this sub watershed. An intensive nonpoint source management effort is needed to improve the condition of the stream so it can support a warm water sport fishery. The headwater wetlands of this creek provide potential spawning habitat for northern pike in Beaver Dam Lake.

Cambra Creek:

Cambra Creek is a watershed with many small tributaries and extensive wetland areas. The stream bottom is primarily silt and muck and the water is turbid. In stream habitat quality is poor and high nutrient levels exist. Cropland runoff accounts for 96% of the upland sediment load to Cambra Creek. Stream bank erosion appears to be minimal with a majority of the stream well buffered. Some areas along the Cambra Creek are grazed during the summer. Cambra Creek, which feeds Fox Lake, is relatively clear due to extensive filtering and buffering by adjacent cattail-dominated wetlands. However, extensive farming within the sub-watershed is very likely delivering nutrients and sediment to Fox Lake. Carp use the shallow and extensive fringe wetlands adjacent to the stream and lake. This area has excellent potential for widespread wetland restoration to improve water quality and wildlife habitat.

Calamus Creek Watershed

General Characteristics:

Calamus Creek Watershed is located mostly in Dodge County with about one square mile of the watershed in the Township of Fountain Prairie. Calamus Creek's land use is agricultural. Monitoring is needed to determine what, if any, water quality problems exist.

Maunesha River Watershed

General Characteristics:

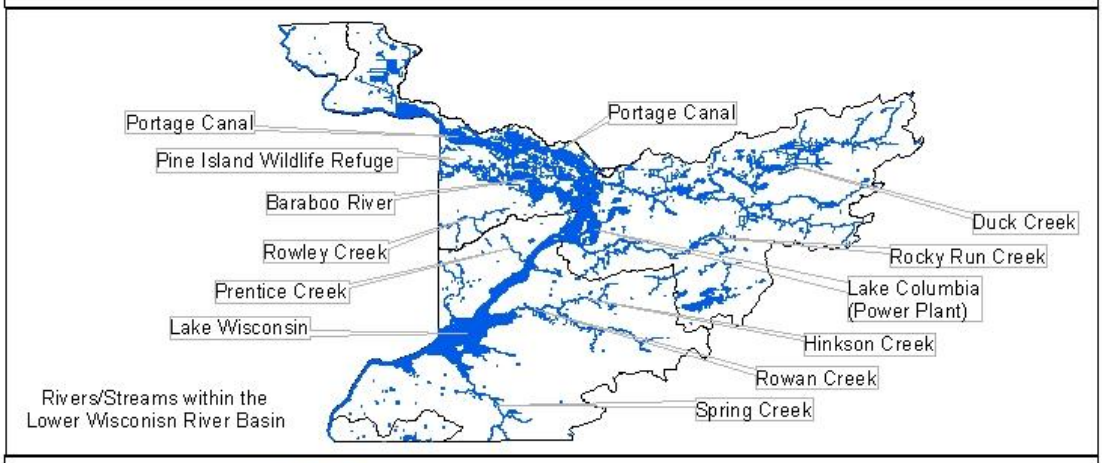
The Maunesha River Watershed is located in Dane, Dodge and Jefferson Counties and about 5 square miles in Columbia County. Columbia County's portion of the watershed is in the southern portion of the townships of Hampden and Columbus. Agriculture is the primary land use in the watershed.

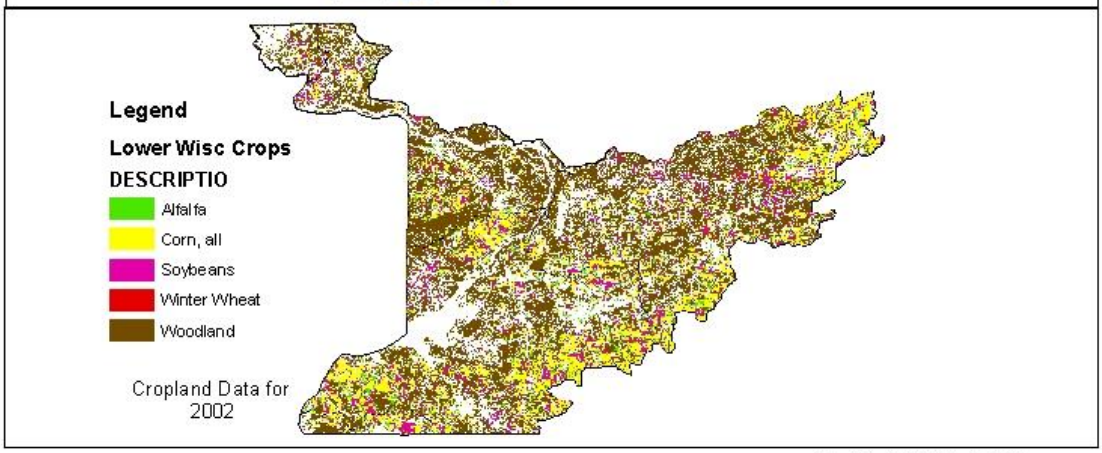
Assessment of Main Tributary Resources:

Maunesha River:

The river flows along the Dane/Columbia County line and easterly through Dane County. The 1990 water quality data indicates the Maunesha River has fairly good water quality. The river carries heavy silt loads due to cropland erosion and there is concern over low dissolved oxygen levels and high bacteria count during the summer. Much of the watershed in Dane County is drained wetland under cultivation. Most of the tributary streams in Dane County have been ditched. The stream is shallow with a low gradient and ditching has occurred in the reach within Deansville Marsh. In 1999, the WDNR conducted baseline monitoring in the river. The water quality, fishery and habitat assessment found the stretch that was evaluated to have a very poor fishery. The habitat Index showed the stream to be in fair to poor condition. Water quality data collected in 1990 indicates the river has fairly good water quality. There is a concern over low dissolved oxygen levels and high bacteria counts during summer. The mean nitrate level in the river has increased during the period between 1976 and 1990 and may be the result of continued and increased use of agricultural fertilizers. The river has had rough fish population problems in the past. Polluted runoff is likely the primary water quality and in-stream habitat problem; the river carries heavy silt loads due to erosion from nearby farm fields.

Lower Wisconsin Basin





Map Created by: Rosalind Breneman
Land & Water Conservation Department
Kurt Calkins, Director

The State of Lower Wisconsin River Basin Report completed July 2002 (Pub WT-559-2002)

The following are some of the highlights found in the most current WDNR Lower Wisconsin River Basin Report.

WDNR Basin Recommendations and Priorities:

- Promote Citizen Based Monitoring Programs
- Assist wide range of citizen based resource groups in securing funding to support their efforts
- Increase cooperation between partners to improve recreational opportunities
- Develop and improve canoe trails within Basin
- Increase public access to quality streams, rivers and land for recreation
- Evaluate streams in regards to trout or other game fish possibilities
- Promote hunting and fishing opportunities within basin
- Develop and maintain swimming beaches
- Identify areas were implementing a no-kill fishery would improve fishery
- Implement baseline monitoring program for streams
- Monitor and access declining trends in fish populations within basin
- Develop an assessment strategy to evaluate streams and watersheds that do not have a known nonpoint source priority rank
- Protect spring heads and headwater streams
- Assess the impacts of removal of dams on the Baraboo River
- Conduct sediment monitoring on select lakes in Basin
- Develop grassland buffers, grassed waterways to trap sediment and nutrients.
- Promote watershed protection programs such as CREP
- Utilize TRM grant program efforts in Basin
- Identify priority areas in need of streambank protection
- Seek federal and state sources for cost sharing to install BMP in watersheds in Basin
- Greater use of Nutrient Management Plans in Basin
- Address streambank grazing in basin
- Develop and implement stormwater Management and erosion control ordinances in Basin
- Develop and implement construction site erosion control ordinances
- Promote and develop wellhead protection plan in basin
- Promote proper abandonment of unused wells

Lower Wisconsin River Basin

Lower Wisconsin River:

General Characteristics:

The Lower Wisconsin River makes up part of the boundary between Sauk and Columbia Counties and flows through Columbia County developing the boundary between Caledonia and Lewiston, Pacific and Dekorra townships. The Lower Wisconsin River is classified as supporting a balanced warm water fish and aquatic life community. More than 3,000 acres of wetland adjoin the river. Pine Island Wildlife Area, along with other areas, makes for excellent waterfowl habitats.

Overall, the water quality monitoring stations indicate generally good water quality. The Wisconsin River is not only a natural resource asset to Columbia County, but also has historical significance with the Portage Canal between the Fox River and Wisconsin River. Canoes and outboard motorboats heavily use the Wisconsin River.

Lake Wisconsin Watershed

General Characteristics:

Lake Wisconsin Watershed is located in Dane, Sauk and the central portion of Columbia County. Of its 199.5 square miles, approximately 148 square miles are located in Columbia County. Caledonia, West Point, Lodi, Dekorra, Lowville, Arlington and Leeds townships, the Village of Poynette, the City of Lodi and lakeshore development areas of Harmony Grove and Okee have land within the Lake Wisconsin Watershed boundaries.

<u>Note</u>: Assessment Information was compiled from use of current reference materials such as WDNR Basin Plans, Priority Watershed Plans and other current applicable data sources. This information was reviewed and discussed with local WDNR Basin Coordinators and in the field WDNR fisheries staff. We feel based on this combination of reference sourcing, we are providing a detailed up to date assessment of our current resource conditions.

Assessment of Main Tributary Resources:

<u>Rowan Creek</u>:

Rowan Creek is classified as a trout stream for 12 miles of its length with some natural reproduction of brown trout. About 4 miles are Class I trout waters and designated as exceptional resource water (ERW), and 8 miles are Class II. The stream has been known as one of the best trout streams in southern Wisconsin. Surveys conducted in 1998, found the stream to have fair to good fish community health and good to excellent habitat quality. There are nonpoint source pollution problems in its upper end due to cattle access, bank erosion and cropland erosion. In addition, new housing developments are springing up, which has resulted in problems with storm water runoff including increasing water temperature. A River Planning grant, sponsored by Columbia County, has been granted to help examine current and potential storm water issues along Rowan Creek. The grant will help with future storm water planning and management to control this prospective source of pollution.

As a result of the threat from nonpoint sources and the streams potential to support a healthy and fishable population of trout, the stream has been ranked as a high priority for nonpoint source pollution and would benefit as a nonpoint source pollution reduction project. The Friends of Rowan Creek have also received a River Planning Grant. The grant will be used to facilitate educational and outreach activities in the watershed and will also help the group to address problems and issues that affect the overall health of the watershed.

Hinkson Creek:
Hinkson Creek is a small, low gradient, coldwater, Class II, tributary to Rowan Creek. Despite impoundments and a heated discharge from a canning factory in the headwaters, the stream is capable of supporting brook trout. Natural reproduction occurs in the upper stream while the lower half depends on stocking. Surrounding wetlands buffer the stream from adjacent land uses. Some cattle are present in the stream corridor on the lower end. Dense tag alder growth along some sections and beaver dams are the biggest management problems. Surveys conducted in 1998 found the fish community to be of good condition. Habitat quality was determined to be from fair to good.

Spring Creek (Lodi Creek): Spring Creek flows into Lake Wisconsin in Columbia County. It is a Class II brown trout stream and the 4 miles of Class II in Dane County are considered an exceptional resource water (ERW). The stream flows through the Lodi Marsh State Wildlife Area above Lodi, thus is fairly well buffered from agricultural impacts. Significant spawning occurs in the riffles within the city limits. The stream has been straightened and lacks suitable hiding cover for fingerling fish. The WDNR has made efforts to address this problem and have completed a total of about one mile of stream habitat improvement work on different sections of the stream. In addition, a 15" minimum size limit has increased the number of 12" to 14" and 15" fish on the lower section of the stream. Additional habitat improvement along the stream on village parklands would help to improve numbers of larger size trout. Soil loss in the town of Lodi has been estimated at 6.1 tons per acre per year. This addition of soil to the stream, combined with sedimentation due to bank erosion and inputs from nearby barnyards can potentially cause more problems in the stream. One further threat to the creek is the result of the tremendous growth in the Town and City of Lodi. Housing and industrial development has increased in the past 5 years. This development contributes a large volume of storm water to the stream and is a major source of nonpoint source pollution and thermal impact. Spring Creek receives point source discharge from both a municipal and industrial source. The City of Lodi has recently renovated their treatment plant.

The Friends of Scenic Lodi Valley are interested in protecting the stream and have proposed a citizen stream-monitoring program. Monitoring was conducted in 1999 and 2000, to collect some baseline data for this project. Fisheries surveys found several coldwater indicator species in the creek and a few pollution intolerant species, but overall, there were more pollution tolerant species (white suckers and creek chubs) than other species. Similarly, macro invertebrates collected were indicative of good quality water, yet below the city, the macro invertebrates collected were indicative of stream disturbance, which could potentially be attributed to urban storm water runoff from the City of Lodi. To assist them with their efforts to protect and improve Spring Creek, the Friends of the Scenic Lodi Valley have received a River Planning Grant. The grant will help them to organize a stream-monitoring network. The monitors will gather valuable information that will help to evaluate the overall health of the stream. The Friends plan on using the grant to conduct a watershed assessment to identify potential pollution sources and inventory land use near the stream. The grant is a cooperative project between the City of Lodi, the WDNR, Trout Unlimited, Lodi Canning and the Friends of the Scenic Lodi Valley.

Prentice Creek:

Prentice Creek, north of Highway 78, is a Class I trout stream. Prentice Creek headwater begins in Sauk County and flows through the township of Caledonia in Columbia County, into Lake Wisconsin.

Lake Wisconsin:

Lake Wisconsin is a large impoundment of the Wisconsin River created by the hydroelectric dam at Prairie du Sac. It has a good sport fishery and is used extensively for recreation. Because it is an impoundment, sedimentation and nutrient loading to the lake and toxic substance accumulation in bottom sediments, are concerns. The nutrient loading impacts the lake by fostering algae blooms and affecting dissolved oxygen levels. Low levels of mercury and high levels of PCBs have been detected in sturgeon from the lake. A fish consumption advisory for PCBs has been issued for the lake's sturgeon. Contaminated sediment sites exist in Grubers Grove Bay, an arm of the lake near the Badger Army Ammunition Plant (BAAP). Grubers Grove Bay received process wastewater from the BAAP wastewater treatment facility in the past. Sediment samples were found to have extremely high mercury concentrations as well as high levels of lead and ammonia. In response to this, a major dredging project was conducted to remove the contaminated sediment, but it has been determined that additional dredging is needed. There are plans to restore the aquatic habitat in the Bay through the planting of rooted aquatic plants and shoreline trees as well as fish crib deployment.

The Harmony Grove Lake Protection and Rehabilitation District recently received a Lake Planning Grant to conduct a sediment study on the sediment in the bay. Harmony Grove Bay is located on the Columbia County side of Lake Wisconsin north of Pine Bluff.

Wisconsin Power & Light Company, owner of the Prairie Du Sac Dam, as part of the Federal Energy Regulatory Commission (FERC) relicensing process conducted water quality, algal, fisheries and sediment contaminant studies during 1992. Continuous dissolved oxygen monitoring at the dam tailrace showed the water quality standard of 5 mg/l was violated more hand half of July, a good portion of August and a few days in September, 1992. The worst 2-day period occurred July 27-28, when the maximum dissolved oxygen was 3.6 mg/l, the minimum 1.7 mg/l. The suggested cause of the problem is a combination of the existence of the dam and the high nutrient loads in the river. This leads to excessive algae growth in Lake Wisconsin. When the algae die off, they deplete oxygen near the dam. Nutrient loading can come from barnyard runoff and other forms of nonpoint source pollution. One dairy farmer has been found to have multiple manure discharges to the lake. These sources of pollution need to be addressed and curtailed to help improve the health of Lake Wisconsin. In addition, fluctuating water levels below the Dells and Prairie du Sac dams remain a major concern on the Wisconsin River. Fish passage at all dams on the Wisconsin River is important to the fish communities and the river ecosystem as a whole. In 2004, a federal court of appeals ordered Alliant Energy to install safe upstream and downstream fish passage. This will be the first such facility in the State of Wisconsin. In addition, long-term database studies are in progress to look at walleye and sturgeon reproduction. A no harvest 20-28" slot regulation is proposed to improve fishing for larger size walleye. Sturgeon harvest has been curtailed by implementing an alternating season size limit of 50" and 70". The lake sturgeon resource in the lake and river both up and downstream needs to be carefully managed. This is a rare and long-lived fish of which there are few remaining fisheries in North America. Efforts are underway to expand the fishery upstream to its original home range. Pollution had eliminated it upstream from the Kilbourn Dam at Wisconsin Dells. A significant shovelnose sturgeon fishery also can be found in the lower Wisconsin River below the Prairie du Sac dam.

Duck/Rocky Run Creek Watershed

General Characteristics:

Duck/Rocky Run Creek Watershed is approximately a 147.5 square mile watershed located in central Columbia County. The villages of Cambria, Wyocena, Rio and areas of Pardeeville and Friesland are located in the watershed. The watershed has 2 main tributaries, Duck Creek and Rocky Run Creek, both of which flow directly into the Wisconsin River. Approximately 7,149 acres of public land are within the watershed boundaries.

Assessment of Main Tributary Resources:

Rocky Run Creek:

Rocky Run is a popular trout stream in Columbia County that begins at Mud Lake and flows to the Wisconsin River. From Highway 22 west to Highway 51 the stream is trout water and 6 miles are Class II while another 2 miles are Class III. In warmer years however, the trout waters begin further downstream of Highway 22. Beaver activities continue to cause ongoing problems. A rare aquatic species has been found in the creek in past surveys. Manure management and cattle access to the stream are problems in the upper reaches below the Mud Lake State Wildlife Area. The creek has been impounded on the upper end to create the Mud Lake State Wildlife Area. Portions of the upper reach above Highway 22 have been ditched. There is also a private impoundment above Highway 22 that warms the water. There are 1 to 2 miles of trout waters have been lost due to increased water temperatures. There are not really any impacts on the trout section of the stream although irrigation permits may cause a problem during periods of low flow.

Rocky Run receives point source discharges from Alliant/WI Power and Light and a tributary to the stream receives discharge from the Rio wastewater treatment plant. The creek has been ranked as a high priority for nonpoint source pollution and would benefit from a nonpoint pollution reduction project.

Duck Creek:

Duck Creek is a tributary to the Wisconsin River. The creek runs through Wyocena and has been impounded at the junction of the North and Middle Branches of Duck Creek to create Wyona Lake in Wyocena. The creek supports a warm water sport fishery, although it has become dominated by Carp. The creek receives point source discharges from Unimin, Chaquita Processed Foods and Grande Cheese.

Jennings Creek:

Jennings Creek is a tributary to Duck Creek. The stream supports a Class II trout fishery. Although the creek is fairly well protected by wetlands, there are still in-stream habitat and water quality issues. Straightening of the stream has resulted in poor in-stream habitat in some locations. In addition, a campground diverts a portion of the stream flow to form a lake. The lake acts to warm the water and once the water is discharged back to the stream, it has an increased temperature and can cause water quality and habitat problems. Beavers cause ongoing problems in Jennings Creek.

Middle Branch of Duck Creek:

Middle Branch Duck Creek joins with North Branch Duck Creek at Wyona Lake to form the main stem of Duck Creek. The creek is a Class III trout stream for 2.5 miles of its length. Water quality in the upper reaches of the stream, above muck farms, has good water quality. Portions of the creek have been channel zed, as have some of the unnamed tributaries. The stream carries a heavy sediment load, particularly from some muck farms adjacent to the stream. The owner of a muck farm has applied for federal funding through the Wetlands Reserve Program (WRP), to restore the land back to a wetland. This would most likely help to improve the water quality within the stream. Public access to the stream could be improved.

North Branch of Duck Creek:

The North Branch of Duck Creek rises in northeastern Columbia County. Tributaries to the stream have been extensively modified. The stream does not support a balanced sport fishery and bank and adjacent farm field erosion are thought to be problems. Manure storage and management are also an issue of concern. The North Branch Duck Creek receives point source discharges from Del Monte Foods and the Cambria wastewater treatment plant. A small impoundment, which washed out in 2003 is being reconstructed on the stream in Cambria to reestablish Lake Tarrant.

South Branch Duck Creek (Roelke Creek):

The South Branch of Duck Creek is a small tributary to the Duck Creek system. The stream is pretty much protected by wetlands. The creek has been classified as a Class I trout stream and an exceptional resource water (ERW). There is a muck farm on the creek that has caused some problems in the past. One of the impacts has been that the stream has left its channel and follows the drainage ditch created by the muck farm. The owner of the farm had applied for federal funds through the Wetlands Reserve Program, (WRP), to restore the land to wetland. This restoration will help put stream back in its original channel and improve water quality. Public access to this stream could be improved.

Columbia Lake:

Lake Columbia is the manmade cooling impoundment of the Columbia Generating Station. It was constructed by building a dike around 500 acres of wetlands adjacent to the Wisconsin River in the 1970's. The plant went on line in 1977. A lake depth of seven feet is fairly uniform throughout. A center dike allows water to circulate around the lake from the hot discharge to the cooler intake. Typically there is a 25 F degree difference between the discharge and intake with 15-20 F degree dissipation occurring on the hot side of the lake. Cooling towers operate during summer months and/or when power generation heats the lake intake above a certain temperature. Water loss from evaporation and seepage through the dike requires make-up water to be pumped into the lake from the Wisconsin River. The hot water creates a harsh aquatic environment. Entire lake temperatures from May–November exceed 90 F degrees. Aquatic vegetation, which typically supports aquatic invertebrates, which in turn provide forage for fish, cannot survive these extreme temperatures. Fish species which have adapted to this environment are large and smallmouth bass, bluegill, bullheads, channel catfish and gizzard shad. Many of the smaller fish are in poor condition. When the predator species become larger, i.e. bass greater than 14 inches and catfish greater than 16 inches, they can utilize the larger gizzard shad and gain weight. Hybrid striped bass are stocked to provide a unique fishery and control the shad population. Since the lake doesn't freeze, it provides anglers with an open water fishing opportunity

throughout the winter. The lake receives treated discharges of domestic sewerage from the power plant and the acidic runoff from the coal pile.

Tarrant Lake:
Tarrant Lake is an impoundment that was constructed in 2007 after a dam failure on the North Branch of Duck Creek in Cambria. The lake is 25 acres and shallow. The pond is turbid and experiences problems with nonpoint sources of pollution. This has led to a fertile, turbid condition and the lake experiences algae and weed problems. The lake will be restocked with bluegill, bass and Northern Pike.

Wyona Lake (Wyocena Millpond):
The lake is a manmade 93-acre lake in the village of Wyocena and has a maximum depth of 12 feet. The lake's fishery is northern pike, largemouth bass and pan fish. The lake experiences some problems as a result of algae growth and carp.

Lower Baraboo River Watershed

General Characteristics:

The Lower Baraboo River watershed is in Sauk, Adams and the western portion of Columbia Counties within the township boundaries of Caledonia. Of the 144 square mile watershed, 60 square miles are in Columbia County.

Predominant land use is agriculture, with a significant cultivation on moderate to steep slopes. Major forested areas occur in lowlands along the river and uplands in the Baraboo Hills Range.

Assessment of Main Tributary Resources:

Baraboo River:
The Baraboo River water quality impacts from point sources are generally small. Nonpoint impacts on the Baraboo River are substantial. Extensive row cropping and stream bank erosion have resulted in turbidity and sedimentation in the Baraboo River. The river is generally turbid and extensive flooding occurs in the spring. An estimated 824 acres of wetland adjoin the river. Waterfowl is common. Wood ducks especially utilize the bank trees and in stream snags. Recently a dam removal project was completed on the Baraboo River, removing dams and restoring natural flows.

Rowley Creek:
Rowley Creek is a small, high gradient stream, draining from high in the Baraboo Hills Range in Caledonia Township, westward into Sauk County and the Baraboo River. Lost Lake intermittently is the headwaters due to seepage of groundwater and farther downstream, several springs sustain summer flow. This stream sustains a trout population and fluctuating ground water conditions regulate stream flow, which affects the trout habitat.

Corning Lake:
Corning Lake is a shallow bog lake with a maximum depth of 4 feet in large marshy deposits. The lake is adjoined by 53 acres of wooded swamp. A channelized stream connects Corning Lake to the Wisconsin River.

Roxbury Creek Watershed

General Characteristics:

The Roxbury Creek Watershed is 67 square miles; mostly in Dane County with about 6 square miles of the watershed located in southwestern Columbia County in the Township of West Point.

The majority of the Columbia County portion drains to Crystal Lake (an internally drained lake) in Dane and Columbia Counties. Some areas drain to Fish Lake in Dane County with a small portion draining directly to the Wisconsin River.

Crystal Lake:

Crystal Lake is a 527-acre shallow, eutrophic, seepage lake, which up until the mid 1980s, was a marsh. Hydrologic changes of the ground water has caused the lake level to increase dramatically, thereby allowing its fishery to change from a winterkill plagued bullhead and minnow lake to one of the best bass and pan fish producing waters in the state. Dense, aquatic plants grow in some near shore areas and a mid to late summer algal bloom occurs. Dead timber lines the shoreline as a result of the recent rise in water level. Rising water has been an ongoing challenge for system. A pumping project has been utilized with some short term success, in lowering water elevations. The long term viability of pumping is still and ongoing discussion. Access on the lake is inadequate. A fishery survey was conducted on the lake in 2000.

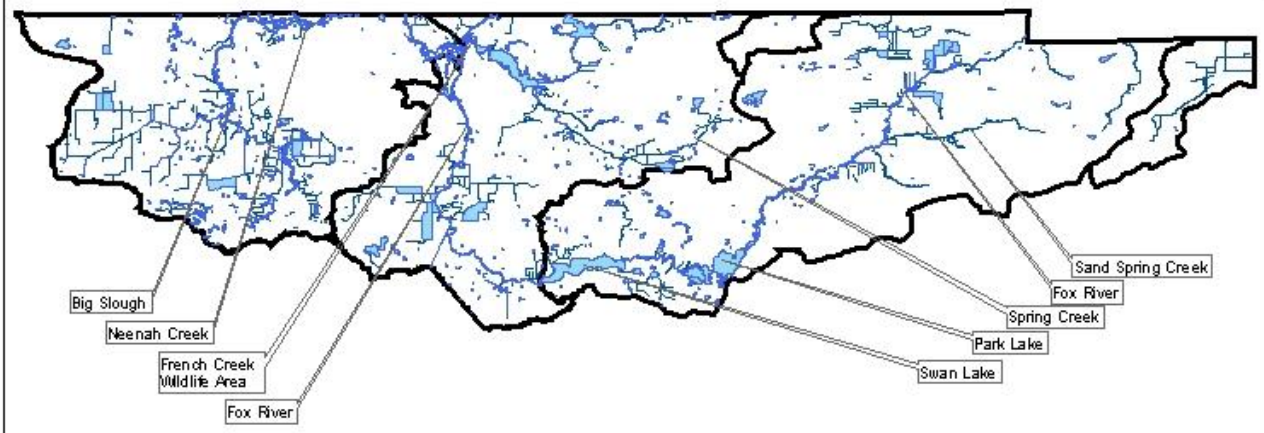
Duck Creek Watershed

General Characteristics:

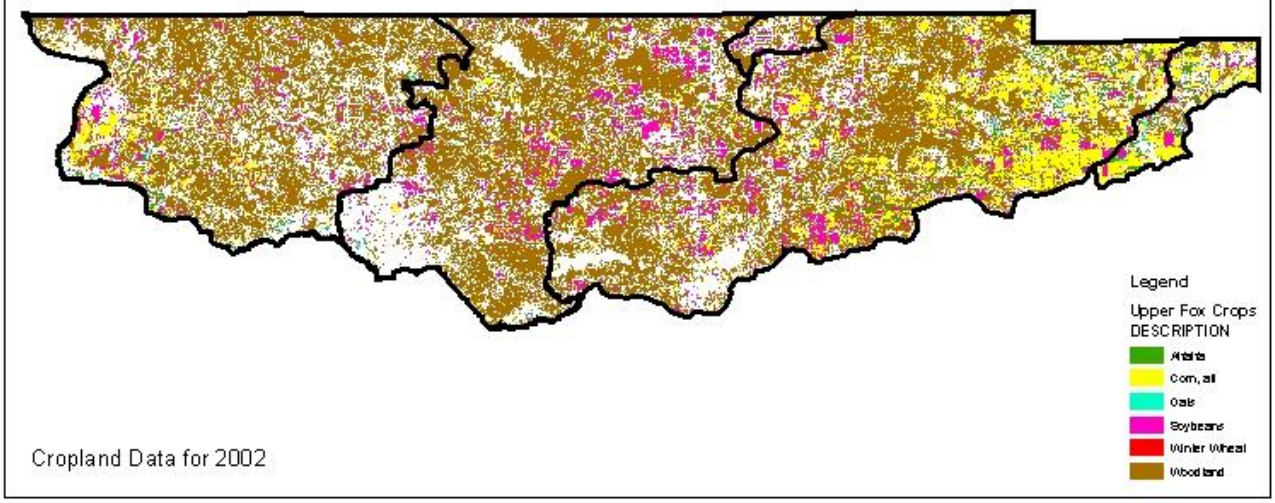
Duck Creek Watershed is 182 square miles, most of which is located in Adams County. An estimated 9 square miles are located in Newport Township of Columbia County. Part of the City of Wisconsin Dells is in the Columbia County part of Duck Creek Watershed. A portion of the Wisconsin River is in the Duck Creek Watershed and has an area 3.6 miles long below the Wisconsin Dells dam and a one-mile portion immediately above the dam is known as the Dells, an important scenic attraction. Companies control extensive river frontages in this area capitalizing on the scenic attractions. The Dells area, below the dam, also experiences large fluctuations of water levels for the tour boat operation. These daily fluctuations are very detrimental to fish and aquatic life.

Upper Fox River Basin

Watersheds in Upper Fox River Basin as recognized by Wisconsin Department of Natural Resources



Rivers/Streams within the Upper Fox River Basin



Cropland Data for 2002

Map Created by: Rosalind Breneman
Land & Water Conservation Department
Kurt Calkins, Director

The State Fox River Basin Report completed Oct 2001 (Pub WT-665-2001)

The following are some of the highlights found in the most current WDNR State of Fox River Basin Report.

WDNR Basin Recommendations and Priorities:

- Pursue ecologically sound water level management on shallow lakes
- Provide information and education to the public on the importance of shallow lake ecology
- Pursue strategies to reduce carp induced destruction of aquatic plan communities and water quality impacts
- Provide information and education on the impact of shoreline development on aquatic and terrestrial ecology
- Pursue restoration of shoreline habitat on the Winnebago Pool and other lakes
- Provide information and education on habitat loss and impacts on fish and wildlife populations
- Continue monitoring shallow lakes to document changes in water quality
- Provide information and education for lake management organizations and local officials to help them identify critical wetlands and sensitive areas that should be protected.
- Provide educational programs for local governments and agencies on proper management and permitting of shoreland activities
- Protect littoral zone habitat
- Limit nutrient, sediment and organic loading to waterways from point and nonpoint sources
- Provide information and education on animal waste management to the Ag industry
- Participate in Smart Growth with local governments
- Properly regulate land spreading of septage
- Reduce discharge of untreated stormwater to waters of the state
- Provide information and education to the construction industry on sediment control techniques and requirements
- Provide information and education on aquatic exotic species that currently exist in the basin as well as those that may be introduced in basin
- Provide information and education on arsenic, nitrates and bacteria to the public and local governments
- Ensure the public has a safe, secure source of potable water
- Nutrient and Pest Management
- Proper abandonment of unused wells
- Problem assessment monitoring of private wells

Upper Fox River Basin

Neenah Creek Watershed

General Characteristics:

Neenah Creek Watershed is a 169 square mile watershed that covers parts of Adams, Columbia and Marquette Counties. The watershed covers 50.7 square miles within Columbia County. Land use within the watershed is approximately 42% agriculture, 27% forested, 14% wetlands, 9% roads, ditches, etc., 6% developed and 2% lakes. The Columbia County portion of the watershed is comprised entirely of rural unincorporated areas immediately northwest of the City of Portage. The watershed encompasses portions of Fort Winnebago, Lewiston and Newport townships.

Neenah Creek Watershed was selected as a Priority Watershed Project in 1992 and is scheduled to be completed in 2005. The purpose of the project is to reduce nonpoint source pollution delivered to the surface water and groundwater within the watershed area.

Note: Assessment Information was compiled from use of current reference materials such as WDNR Basin Plans, Priority Watershed Plans and other current applicable data sources. This information was reviewed and discussed with local WDNR Basin Coordinators and in the field WDNR fisheries staff. We feel based on this combination of reference sourcing; we are providing a detailed up to date assessment of our current resource conditions.

Assessment of Main Tributary Resources:

Big Slough:

The Big Slough, an 8-mile tributary with several unnamed tributaries, flows into the Neenah Creek and drains approximately a 37 square mile area. Big Slough is a warm water fishery with a potential for improvement. Factors impacting water quality include: sediment and nutrient loading from agricultural runoff, barnyard runoff, low dissolved oxygen, channelization of streams and large tracts of wetlands converted to cropland.

Lower Grand River Watershed

General Characteristics:

The Lower Grand River Watershed covers parts of Marquette, Green Lake and a small portion of Columbia County. The Lower Grand River Watershed is an approximate 120.3 square mile watershed that encompasses about 20.2 square miles in Columbia County. The watershed covers small areas of Marcellon, Scott and Randolph townships. Columbia County's portion of the watershed has no significant water resources within the county. Primary water quality problems in the watershed include: nonpoint source pollution, hydrologic modifications (particularly the drainage of wetlands) and excessive carp populations.

Swan Lake Watershed

General Characteristics:

The Swan Lake Watershed is an 81 square mile watershed that includes the headwaters of the Fox River. It is located in north central Columbia County and a small part of southern Green Lake County. The watershed encompasses parts of Randolph, Scott, Marcellon, Fort Winnebago, Pacific, Wyocena and Springvale townships. Pardeeville is the only village in the watershed. Agriculture is the dominant land use in the watershed with approximately 78% of the land being cropped or pastured.

The Fox River is the principal tributary in the watershed that flows through Pardeeville and Park Lake. It then resumes flow to Swan Lake.

Assessment of Main Tributary Resources:

Fox River:

Water quality information for the Fox River is limited. Nonpoint source pollution is a serious problem due to intensive agriculture. Nonpoint source pollution created from agriculture includes: animal waste management problems, stream bank trampling and sediment, nutrient and pesticide loading from agricultural runoff.

Park Lake:

Park Lake at 312 acres is the uppermost impoundment on the Fox River. Agricultural impacts have contributed sediment and nutrients to the lake causing siltation and vegetation growth. Macrophytes were chemically treated in the 1980's. Carp and gizzard shad now dominate a once excellent bass, northern pike and pan fishery. Heavy predator stocking efforts by the Lake District and WDNR are being attempted to control shad. The strong 1997-year class of carp are declining naturally.

Park Lake subwatershed encompasses approximately 95% of the Swan Lake Watershed and was scheduled for formal designation as a Nonpoint Source Priority Watershed Project in August of 1999. The closer of the Priority Watershed Program has forced us to look at alternate scenarios for watershed management projects and funding for this watershed. Currently the LWCD is working in cooperation with the Park Lake Management District on this endeavor. Several years of inventory work have been completed and TRM grants and Lake Planning grants have been applied for.

Swan Lake:

Swan Lake is a natural 406-acre impoundment of the Fox River downstream from Park Lake. It contains a good fishery of bass, northern pike, catfish, pan fish and stocked musky and walleye. It too has recently become plagued with gizzard shad. It differs from Park Lake by being very deep 60' to 80', thus water quality and shad abundance are partially masked by it volume.

Spring Lake:

Spring Lake is a small, deep, natural lake immediately downstream from the electric powerhouse discharge of Park Lake. A variety of fish species exist with good sizes of bass, northern pike, catfish and pan fish are present. The peaking operation of the electric turbine may be causing dewatering of fish spawning areas.

Buffalo Lake and Lake Puckaway Watershed

General Characteristics:

The Buffalo Lake and Lake Puckaway Watershed is a 232 square mile watershed that covers parts of Columbia, Green Lake and Marquette Counties. The watershed covers approximately 56.8 square miles of land in Columbia County and is located northeast of Portage encompassing a portion of the City of Portage and the townships of Fort Winnebago, Lewiston, Marcellon and Pacific. There are two state wildlife areas within the watershed in Columbia County, French Creek and the Swan Lake Wildlife Area.

Assessment of Main Tributary Resources:

Fox River:

The Fox River is the principal tributary in the watershed. This portion of the Fox River is a warm water sport fishery that has a fish consumption advisory for certain types of fish due to the PCB's and/or pesticides found in fish tissue samples. Factors impacting water quality include: sediment and nutrient loading from agricultural runoff, excessive rough fish population, habitat destructions, decreased levels of dissolved oxygen, elevated levels of bacteria and toxic pollutants.

French Creek

French Creek is approximately a 12-mile creek. The creek originates in Marquette County and feeds into the Fox River in Fort Winnebago Township. Largely wetlands and Spring Creek feed the creek. The Department of Natural Resources (WDNR) manages approximately 2,025 acres along the creek in Columbia County. The WDNR operates two impoundments on the creek that they use to manipulate water levels to manage wildlife. Another privately owned impoundment (Dates Mill Pond) is also beneficial to wildlife and provides a good fishery.

NR 151 Performance Standard Implementation

Wisconsin's rules to control polluted runoff from farms, as well as other sources, went into effect October 1, 2002. The State legislature passed the rules to help protect Wisconsin's lakes streams and groundwater.

WDNR Administrative Rule NR 151 sets performance standards and prohibitions for farms. It also set urban performance standards to control construction site erosion, manage runoff from streets and roads and manage fertilizer use on large turf areas.

DATCP Administrative Rule ATCP 50 identifies conservation practices that farmers must follow to meet performance standards in NR 151. ATCP 50 also sets out the requirements for nutrient management plans.

What does this mean to Columbia County and our Land and Water Conservation Department? The LWCD has long been recognized as the primary tool to bring these water quality performance standards into the field. The Land and Water Conservation Departments will have the primary responsibility for the implementation of the agricultural runoff standards. ***The major transition found in NR 151 is that it truly moves the majority of NPS water quality work in Wisconsin from a mostly voluntary program to a program based largely on landowner participation through the option of regulation. NR 151 lays the foundation for minimal expectations in regards to land use and management practices within the Agricultural landscape. Many of the issues we have identified and worked through in the past are now part of this rule which sets out the opportunity for regulation in minimum levels of implementation are not reached.***

A component of the plan requirements for the approval of this plan is the inclusion of a local strategy for the implementation of NR 151. But first, let's review some of the main points associated with the current set of agricultural performance standards in found in NR 151.

For farmers who grow agricultural crops:

1. Must meet tolerable soil loss ("T") on all cropped fields
2. Follow a nutrient management plan designed to limit entry of nutrients into state waters (ground water and surface water) *NPM plan must be in place by Jan. 1,2005 for high priority waters (303d, outstanding/exceptional) and Jan. 1, 2008 for all others*
3. Requiring a tillage setback of 5 feet on farm fields adjacent to surface water
4. A phosphorus index (PI) of 6 is established for all cropland

For farmers who raise, feed or house livestock:

1. Prevent direct runoff from feedlots or stored manure into state waters
2. Limit livestock access to state waters to avoid high concentrations of animals and maintain adequate or self-sustaining sod cover along waterways
3. Follow a nutrient management plan for manure application

For farmers who have or plan to build, a manure storage structure:

1. Maintain structures to prevent overflow (no overflow)
2. Repair or upgrade any failing or leaking structures that pose an imminent health threat or that violate groundwater standards
3. Close abandoned manure storage structures according to accepted standards
4. Meet technical standards for newly constructed or substantially altered structures

For farmers with Land in a Water Quality Management Area *(300 feet from a stream, 1000 feet from a lake, or in areas susceptible to groundwater contamination)*:

1. Do not stack manure in unconfined piles
2. Divert clean water away from feedlots, manure storage areas and barnyards located within this area

Nutrient Management Plans for Livestock and Crop Farmers:

1. Plans can be developed by a certified agronomist or prepared by the farmer through a DATCP-approved training course
2. Plans must rely on soil nutrient test from a DATCP-certified laboratory
3. Comply with current NRCS Nutrient Management Standard 590
4. Follow the recommendations for nutrient applications in the Soil Test Recommendations for Field, Vegetable and Fruit Crops, UWEX publication A 2809.

Regulatory Considerations Regarding Storm Water and Erosion Control

Under subchapter III of NR 216, Wis. Adm. Code, a notice of intent shall be filed with the DNR by any landowner who disturbs one or more acres of land. This disturbance can create a point source discharge of storm water from the construction site to waters of the state and is therefore regulated by DNR. Agriculture is exempt from this requirement for activities such as planting, growing, cultivating and harvesting of crops for human or livestock consumption and pasturing or yarding of livestock as well as sod farms and tree nurseries. Agriculture is not exempt from the requirement to submit a notice of intent for one or more acres of land disturbance for the construction of structures such as barns, manure storage facilities or barnyard runoff control systems. (See s. NR 216.42(2), Wis. Adm. Code.) Furthermore, construction of an agricultural building or facility must follow an erosion and sediment control plan consistent with s. NR 216.46, Wis. Adm. Code and including meeting the performance standards of s.

NR 151.11, Wis. Adm. Code. An agricultural building or facility is not required to meet the post-construction performance standards of NR 151.12, Wis. Admin. Code.

Financial Considerations Within NR 151

Many farmers voluntarily install many conservation practices on their farms to help improve water quality and wildlife habitat and to help prevent soil erosion. Cost share dollars will still find priority with landowners looking to voluntarily implement BMP on their lands. Columbia County will continue to offer voluntary cost sharing as program funds and priorities become available.

The agricultural performance standards and prohibitions found in NR 151 require 70% cost sharing be offered to change an existing cropland practice or livestock facility to bring them into compliance with the new standards. The opportunity exists for an increase to 90% cost sharing if economic hardship is proven.

The cost sharing requirements for compliance applies to sites not found to be in compliance prior to October 1, 2002. This excludes Nutrient Management which has its own timeline related to geographical location, which was covered earlier in this section. Farmers who are in compliance on or after that date do not have a right to cost sharing if they later fall out of compliance. Farmers who establish new facilities may be eligible for cost sharing, but cost sharing is not required for compliance. Those farms covered under a WPDES permit are not eligible for state cost sharing to meet performance standards and prohibitions required under their permits.

Local Implementation Consideration and Process

The Columbia County Land and Water Conservation (LWCD) will take the lead role in the implementation of NR 151. We will be working in close cooperation with the Wisconsin Department of Natural Resources (WDNR) and other agencies towards a practical implementation process that serves all involved. *Regulatory and enforcement activities described under this section will be completed utilizing the following; NR 151, ATCP 50, Columbia County Animal Waste Management Ordinance (Title 15) and Columbia Counties Soil and Water Conservation Standards for the Farmland Preservation Program. As a portion of the partnership with DNR, the County may look to DNR to provide regulatory support under the state enforcement process. It is anticipated that the majority of enforcement action will take place in a pro-active manner designed to bring landowners into compliance. Currently Columbia County does not have an official MOU with DNR regarding enforcement of NR 151. In the event that Columbia County can't achieve compliance through voluntary proactive landowner participation and or local ordinance enforcement, DNR will be utilized as the next step in this process. In the future Columbia County may request a more formal MOU with DNR be developed.*

PLEASE NOTE: *The Implementation of each component of the Columbia County Land and Water Conservation Departments strategy to implement the NR 151 Performance standards is dependent on the LWCD receiving adequate funds to cover both staff resources and cost sharing resources. It is anticipated that WDNR and DATCP will be the major financial resources we will look to for partnership in this process.*

Local Process Components

Definition of a Priority Farm:

For the purpose of this document a **"Priority Farm"** will be defined as a farm lying within the Water Quality Management Area (WQMA) and having one or more issues of non-compliance with the Water Quality Performance Standards found in WDNR Administrative Code NR 151.

Information and Educational Activities:

The LWCD realizes the implementation of the Performance Standards will require a large amount of emphasis in regards to "Getting the Word Out" to landowners within Columbia County. The LWCD will distribute information and educational material from various sources such as WDNR, DATCP and LWCD to affected landowners. We will use a series of public meetings, direct mailings, workshops, newsletters, news media and on-site visits as our avenue for information distribution.

Our educational materials will be designed to accomplish the following:

1. Educate landowners about Wisconsin's agricultural performance standards and prohibitions, county ordinances, applicable conservation practices and funding opportunities;
2. Promote voluntary implementation of conservation practices necessary to meet standards and prohibitions;
3. Inform landowners of requirements and compliance procedures and the role the LWCD will have within those procedures;
4. Make landowners aware of expectations for compliance and consequences for non-compliance;

Evaluation and Compliance Status:

The LWCD has begun the process of staging a before and after October 1, 2002 scenario for all parcels within Columbia County. The Columbia County Land Information System and our Geographical Information System (GIS) will be the foundation for this process. We are building a GIS layer that will associate levels of compliance for all provisions found in NR 151. Our current database includes current conservation plans and BMP's implemented. This growing database will allow us to track projects in compliance on or before the implementation date. In the future we hope to be able to work out a process to easily gain access to NRCS files and data sharing so we can include the extent of their BMP and conservation planning efforts in this database.

The GIS digital ortho photos from 2002 will be used as the base map. We also have access to an ongoing high altitude flight that the LWCD has been completing since the early 1980's.

Along with the creation of a NR 151 compliance layer, the GIS system will be used to begin and continue the process of investigating and searching out non-compliant parcels within Columbia County. Using the combined data, layers can be developed to identify "potential problem areas" within the Water Quality Management Area. Early identification of livestock operations within these areas would be defined as high priority. The process of using the various data layers available to us through our GIS

system and easy access to parcel mapping information and addressing information will allow us to easily create mailing lists to target these areas through I/E and on site visits.

Our GIS system will be used as a database which tracks conservation plans, nutrient management plans, installed BMP's, cost share agreements and various county permits. This system will assist staff and landowners in monitoring progress towards the goals of our LWRM Plan. Monitoring and modeling information will be used to direct staffing efforts to accomplish implementation of the work plan and evaluate plan success.

On Site Farm Visits:

On site farm visits will be the next step in the process of utilizing our GIS layer development as mentioned above. Priority Farms that fall within the Water Quality Management Area will be reviewed through a systematic onsite review process. This onsite review process will begin with an informational mailing. The informational mailing will include materials related to the process, performance standards and prohibitions and anticipated results. The process for onsite will include one on one visits with landowners to go over and discuss the utilization of our NR 151 status review form.

The number, frequency and location of the on site farm visits will strongly hinge on the current and future level of staff funding and cost sharing resources that will be available to the LWCD and potentially affected landowners.

On site visits will conclude with the determination and documentation as to the extent of current compliance with each of the performance standards and prohibitions. Where non-compliant, determine costs and eligibility for cost sharing and discuss timelines.

Note: Cost share requirements are based upon whether or not the evaluated cropland or livestock facility is new or existing and whether or not corrective measures entail eligible costs. See NR 151.09(4)(b-c) and 151.095(5)(b-c).

Documentation and NR 151 status report:

Following completion of GIS work and on-site evaluation, prepare and issue an NR 151 status report to affected owners of the evaluated parcels. The status report will include at a minimum the following information:

1. Current status of compliance of parcel with each of the performance standards and prohibition
2. Corrective measure options and rough cost estimates to comply with each of the performance and prohibitions for which a parcel is not in compliance.
3. Status of eligibility for public cost sharing
4. Grant funding sources and technical assistance available from Federal, State and Local government and third party service providers.
5. An explanation of conditions that apply if public cost share funds.
6. A timeline for completing corrective measures, if necessary.
7. Signature lines indicating landowner agreement or disagreement with report findings.
8. Process and procedures to contest evaluation results to LWCC
9. (Optional) a copy of performance standards and prohibitions and technical design standards

Note: A cover letter signed by the LWCD describing the ramifications and assumptions related to the status report will be attached

Maintaining Public Records and Landowner Notification:

The compliance records and related information related to specific parcels will remain public record. In an effort to ensure that subsequent landowners are made aware of (and have access to) NR 151 compliance on their property we will continue to work on a long-term notification process. This process will include the partnership of the Land Information Department and the development of the programming capabilities that would tie our GIS data layers to the counties land records system and information related to parcel transactions. This relationship would allow the LWCD to be notified through the land records system when a parcel with relationships to NR 151 compliance would change ownership through the Register of Deeds office. Discussion with LIO and the process to accomplish this are ongoing and we hope to be able to utilize this process within the next couple of years.

Technical Assistance and Cost Sharing To Install BMP's (Conservation Practices):

Voluntary Participation (Cooperative):

1. Receive request for cost-share and/or technical assistance from landowner
2. Confirm cost-share grant eligibility and availability of cost-share and technical assistance.
3. Develop and issue cost-share contract listing BMP's to be installed or implemented, estimated costs, project schedule and notification requirements under NR 151.09(5-6) and/or 151.095(6-7).

Non-voluntary component (Non-Cooperative)

In the event that a landowner chooses not to install corrective measures either with or without cost sharing, the landowner will be issued notification per NR 151.09(5-6) and/or 151.095(6-7).

The notification will include the following information:

1. If eligible costs are involved, this notification shall include an offer of cost sharing.
2. If no eligible costs are involved, then notification will not include offer of cost sharing and will explain justification why cost sharing does not apply.
3. A description of the performance standard and prohibition being addressed.
4. The compliance status determination of which best management practice or other corrective measures are needed and which, if any, are eligible for cost sharing.
5. An offer to provide or coordinate technical assistance.
6. A compliance period for meeting the performance standard or prohibition
7. An explanation of possible consequences if the owner or operator fails to comply with provisions of the notice.
8. An explanation of local appeals procedures.

If cost sharing is involved, the LWCD will draft a program specific cost share agreement including a schedule for installing or implementing BMP's. Potential practices and cost share rates can be found in ATCP 50.

The LWCD will provide technical assistance and oversight for all conservation practices as staff time allows.

These technical services include:

1. Provide conservation plan assistance
2. Provide engineering design assistance
3. Review engineering designs provided by other parties
4. Provide construction oversight
5. Evaluate and certify installation of conservation practices

Note: *The LWCD will not provide NPM 590 Plan Development. We will provide assistance with conservation planning, critical spreading areas and other information we regularly provide. Landowners will be directed to work with Certified Crop Consultants or self-certification program for Nutrient Management Plan development.*

Re-evaluate Parcel for Compliance:

After corrective measures are applied, conduct an evaluation to determine if parcel is now in compliance with relevant performance standard(s) or prohibition(s).

If site is compliant, update "NR 151 Status Report" and issue "Letter of NR 151 Compliance."

Note: *A letter of NR 151 compliance serves as official notification that the site has been determined to now be in compliance with applicable performance standards and prohibitions. This letter would also include an appeals process if a landowner wishes to contest the findings.*

If not compliant, seek non-regulatory remedies or initiate enforcement action.

Enforcement Action:

If a landowner refuses to respond appropriately to official notice of non-compliance or is in breach of a cost share contract, the LWCD will prepare and issue a "Notice of NR 151 Violation" letter. This Notice will be pursuant to processes outlined and authorities obtained in the Columbia County Animal Waste Management Ordinance (Title 15).

Note: *Enforcement begins with this letter. It will be pursued in circumstances where:*

(1) A breach of contractual agreement has occurred including failure to install, implement or maintain BMP's and

(2) Non-regulatory attempts to resolve the situation have failed

Process for Appeal of Non-Compliance Decision:

Landowners wishing to appeal a notice of NR 151 Non-Compliance may do so to the Columbia County LWCC. This process will be spelled out in detail within the anticipated revision of the Columbia County Animal Waste Management Ordinance (Title 15). Details related to the appeal process will be forwarded to all landowners receiving a notice of non-compliance.

Where Does Implementation Start and how do we set Inter- Departmental Priorities?

The Implementation process related to the performance standards and prohibitions found in NR 151 can and will be a large and very time-consuming task. So it's realistic to evaluate and set priorities within Columbia County.

Currently the LWCD has begun the process of utilizing GIS and on-site visits to begin the inventory of several watersheds within Columbia County. It is likely that based on the shortage of staff and cost sharing resources that we will utilize information gathered through those inventories to continue our implementation process. It is likely some watershed based emphasis will take place in regards to implementing NR 151 on priority farms. Much of this emphasis will likely relate to available staff and cost sharing resources that become available. The future direction of WLI (FPP) and the revised TRM Grant Program may allow a more refined and focused approach to inventory and installation of BMP to correct sites.

Due to the fact that workloads are at an all time high with LWCD and staff funding is not keeping up with the workload, we will be continuing to search out collaborative funding endeavors with other entities throughout Columbia County. These collaborative funding avenues and potential access to cost share implementation dollars will likely guide our priority setting over the next 5 to 10 years.

If an increase in staff support and cost sharing availability becomes a reality, we will adjust our implementation schedule accordingly.

Response to Public Complaints Alleging Noncompliance:

The LWCD will respond to complaints by investigating allegations with a file review, on-site visit. If the review demonstrates significant violation of Agricultural Performance Standards, the LWCD will proceed with a strategy for compliance. This process will include the above discussions found within the NR 151 implementation strategy.

Note: Follow-up, on-site visits and access to cost share funding will all be dependent on current availability of local and state financial resources. Inadequate staff time and lack of adequate cost sharing resources could result in slower than normal enforcement and follow up.

Ongoing Evaluations to verify Ongoing Compliance:

The LWCD will develop a long-term plan to balance workload relating to servicing new NR 151 non-compliant issues and spot-checking existing on-going compliance issues. It is likely that a combination of spot-checking, self-certification forms and other in-field evaluation tools will be used to maintain a long-term monitoring plan to assure ongoing compliance.

CAC Priority Resource Issues and Concerns

The following is a list of priority resource issues and concerns developed during the development of the 2006 version of this plan. These LWRM Citizen Advisory Committee priorities represent the information gathered through the nominal group process and the related main points of citizen input. These points are provided as background information to the plan. The goals and objectives found further into this document were developed based on philosophies and themes uncovered during this process. These philosophies and themes were related to the functionality of programs, services and opportunities that exist within the Land and Water Conservation Department. The goals, objectives and action items were then developed as realistic approaches to address priority issues brought forth by the CAC. During the 2011 update process to the plan our survived input/feedback we received told us that these issues are still a priority going into 2011. During our 2011 CAC input process, we had the opportunity to update and include additional priorities that were brought forward during the process.

1. **Groundwater Quality And Quantity**
    a. Groundwater Recharge and Wellhead Protection
    b. Groundwater Flow model for Columbia County

2. **Agricultural Preservation**
    a. Preserve Prime Soils
    b. Use Smart Growth Planning and Zoning as our updated tool
    c. Increased use of Zoning to maintain Agricultural land
    d. WLI (Farmland Preservation Program) County participation should be a priority tool to assist in preservation and economic support for Agriculture in Columbia County

3. **Information And Education On Natural Resource issues**
    a. Holistic watershed management
    b. Land use impacts on natural resources
    c. More media coverage to carry message
    d. Increase development and value of web page

4. **Storm water And Erosion Control Impacts**
    a. Development of County wide Storm water and Erosion Control Ordinance
    b. Staff and resources to implement new regulations
    c. Concerns over Future development impacts
    d. Correction of existing development storm water problems
    e. Promote infiltration of storm water

5. **Financing Of Land And Water Resource Management Plan**
    a. Increased County recognition and financial commitment to Conservation
    b. Increased State and Federal long range funding

6. **Non-Native Invasive Species Control**
    a. Maintain funding mechanism and program to control Gypsy Moth Outbreaks

b. Eurasian Milfoil/Buckthorn/Purple loostrife-Information/Education on programs, needs and resources
c. Concerns related to EAB
d. County can continue to serve as venue for I/E and program cooperator as need arises to implement state and federal programs

7. Increased Inter-governmental Cooperation On Natural Resource Issues

a. Local/state/federal partnerships and better understanding of local needs

8. Co-location Of Columbia County LWCD With NRCS And FSA

a. Get LWCD and Federal Government back in same office for better service to landowners and more financial and staff resource opportunities
b. Separation from NRCS/FSA impacts Columbia Counties LWCD ability to communicate with Landowners on a regular walk in basis

9. Development Of A Stream And Lake Water Quality Monitoring Process

a. LWCD provides leadership and management
b. Lodi Spring Creek very important
c. Lake Wisconsin/WI River water quality impacts

10. Drained Agricultural Lands

a. Value of use as farmland or wetlands
b. Information and education to citizens related to how drainage districts function and there applicability in certain areas and not in others.

11. Promotion And Preservation Of Livestock Operations In Columbia County

a. Discuss and promote the value that livestock brings to the agricultural industry in Columbia County
b. Livestock provides long-term agricultural land preservation
c. Need to work with manure handling issues to provide long term growth

12. Soil Erosion

a. Provide staff resources to update Conservation Plans
b. Increase use of grassed waterways (regulation)
c. Use of buffer strips along all waterways
d. Transition to cash crops potential for loss of waterways and increased soil erosion

13. Lakeshore And Shoreline Development Issues

a. Information/Education in regards to commercial fertilizer use
b. Restriction in phosphorous use?
c. Native shoreline buffers

14. Animal Waste Management And Nutrient Application Management Impacts On Water Quality

a. Develop manure management work group
b. Implementation of NR 151 AWAC Prohibitions

c. Update and implement County's Animal Waste Management Ordinance
d. Connection of livestock producers to cash crop growers
e. Concerns over frozen ground manure application
f. NMP Implementation a priority along with compliance monitoring

15. Large Animal Unit Farms

a. Location/Odor/Acres/Nutrient and Pesticide Management
b. Proper land use planning to address potential conflicts and the future of growing livestock farms in Columbia County

16. Septic Systems

a. Process to monitor and correct failing septic systems
b. Emphasis on systems located near water bodies

17. Air Quality

a. Burning of refuse materials
b. County should continue to support disposal opportunities and programs for landowners to deal with Ag related waste that may end up being burned (Silage bags etc)

18. Increased Enforcement Power For Columbia County LWCD

a. Implementation process, citations…etc…
b. Ordinance enforcement

19. Recreational/Natural Area Infrastructure Improvements

a. Public access to waterways fish/swim/boat
b. Create more partnerships
c. Create a true Park Program in Columbia County and take advantage of and improve on the resources and opportunities we have
d. Need for a Public Shooting Range (Abandoned Quarry)
e. Public access Town of West Point

20. Preservation Of Natural Areas And Open Space

a. Creation and utilization of Land Trust
b. Land Acquisition Program
c. Keep important tax delinquent properties if deemed necessary
d. Purchase of Development Rights (PDR)
e. Support State and Federal programs that provide opportunities for landowners to participate in conservation easements

21. Forestry

a. Forestry health and repopulation for future
b. Promote good forestry practices
c. Maintain and support Tree Sales Program
d. Increased use of necessary forestry resources to promote good forestry
e. Fight Gypsy Moth
f. Fight other invasive forest problems

22. Increase And Promote Awareness Of Wetland Restoration Efforts And Opportunities

a. Protect existing wetland areas

23. **Columbia County Board Buy In And Support For Local Natural Resource Protection Programs**
    a. Make long term water quality and natural resource protection a top priority for Columbia County

24. **Surface Water Resource Quality And Impacts Associated With Degraded Quality**
    a. Watershed management
    b. Create partnerships for future funding
    c. Phosphorous loading
    d. Sedimentation
    e. Inventory of non-point source impacts on surface waters

25. **Information And Education Related To The Columbia County Deer Population**
    a. Provide increased marketing to general public in regards to detrimental impacts of a large deer herd on agriculture, reforestation, tree planting, natural forest regeneration, public highway travel/safety and the overall heath of the deer herd

26. **Water Quality Improvement Project Funding**
    a. Promote opportunities that exist at local, state and federal level to use nutrient trading from urban to agricultural. Cost effectiveness of shifting the funding may help as a way to offset increasing costs associated with P based water quality work

27. **Land Spreading Of Waste**
    a. Growing concerns related to accountability associated with all source waste being land applied on agricultural lands, this includes septage, industrial and agricultural inputs. There needs to be better accountability for all parameters associated with these land application practices

28. **Sustainability For Columbia County**
    a. Columbia County needs to be looking at and thinking about things such as carbon trading, green energy, wind and bio fuels as we move forward over the next decade. What role can Columbia County have related to these issues

29. **Property Tax Implications Associated With Conservation Practice Adoption**
    a. There is a growing disconnect associated with preservation of forest land, wetland and cropland related to our current property tax structure. The current structure in many cases can actually encourage a landowner to move away from conservation practice adoption

30. **Flooding Issues**
    a. I/E to citizens and local units of government related to flooding issues/high groundwater issues throughout Columbia County.
    b. Provide venues for people to better understand long and shorter potential impacts associated with runoff events and help them understand what storm water management planning does provide and does not provide

31. **Partnerships To Further Conservation**

a. Look at opportunities that may exist to partner with private entities and or business partnerships that may assist in funding conservation programs and policies

32. <u>Conservation Directory</u>

a. Develop a conservation directory that could help citizens find resources available

Work Plan
Goals/Objectives/Action/Staff /Budget

This work plan is a 10 year work plan that will be updated as necessary with annual work plan adjustments made and submitted to DATCP as necessary

Note: <u>Bold</u> Objectives/Actions are Priority Activities

Goal: NATURAL RESOURCE PROTECTION RELATED TO LAND USE CHANGES AND GROWTH

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Proper utilization and implementation of storm water and erosion control standards	Continue to pursue the development of a county wide storm water management and erosion control ordinance	On-going Until Action Complete	LWCD will work with Planning/ Zoning and Towns, Cities and Villages on potential Ordinance	2,000 hrs $60,000	
Attain staff funding and resources to provide for implementation and development of storm water and erosion control ordinance	Work with LWCC and County Board to demonstrate need and demand for staff resources and secure funding resources	On-going Until Action complete	LWCD	150 hrs $4,500	
Provide a venue to assist landowners and units of government in understanding challenges and potential solutions surrounding flood/increased rain event issues and impacts in Columbia County	Provide technical and I/E assistance to landowners and units of government to help them understand scenarios that could assist them with reducing impacts associated with increased rain events/runoff/flooding	On-going	LWCD, Towns, Villages and Cities, landowners, Columbia County Planning and Zoning	250 hrs $7,500	

Implement Non-Agricultural Performance Standards and Prohibitions and Encourage BMP's	Develop county wide storm water management ordinance to include provision of NR 151	2006-07	LWCD	500 hrs $15,000	
Use Land Use Planning and Incentive Based Programs to Preserve Agricultural Lands and Opens Space	**Promote Farmland Preservation Program Under the WLI to landowners and Columbia County**	2011-2012 On-going	LWCD Landowners Planning and Zoning Department	500 hours $17,000	

Goal: PROTECT AND ENHANCE GROUNDWATER QUALITY/QUANITY

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Proper abandonment of unused groundwater wells	**Provide technical assistance and cost sharing to close 5 to 10 wells per year**	Ongoing	LWCD	100-200 hrs $8,000	$5000 LWRMP DATCP
Understand Groundwater resources to the fullest extent possible	**Complete Phase 2 and Phase 3 of Columbia County groundwater survey and flow model development in cooperation with WGNHS**	2011-2013	LWCD WGNHS	4,500 hours WGNHS $140,000	Some matching grant funds through Fed Gov't
Educate general public about groundwater related issues, impacts and concerns	Provide media and I/E efforts targeted at groundwater in Columbia County	Ongoing	LWCD/UWEX	100 hrs $3,000	

Goal: PROTECT AND ENHANCE THE QUALITY OF OUR SURFACE WATER, GROUNDWATER AND SOILS RESOURCES

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Implement NR 151 Runoff Management Standards	**Continue to implement departmental process to implement Ag Standards, including tracking and data management associated with compliance**	Ongoing	LWCD	500 hrs $15,000	
Continue inventory of high priority livestock operations for NR 151 compliance within WQMA of targeted watersheds	**Utilize GIS to locate and create data base of potential livestock operations within WQMA in targeted watersheds**	Ongoing	LWCD	1,000 hrs $30,000	
Notify identified landowners of NR 151 status and identify problems and associated BMP's needed	**Follow up on NR 151 inventory results with 10 to 15 landowners per year inventory work will be used for searching out cost share mechanisms if needed (TRM, LWRM)**	Ongoing	LWCD	400 hrs $12,000	
Require compliance through NR 151 notification of non-compliance and make offer of cost sharing	**Work with 3 to 5 livestock owners per year to achieve compliance with NR 151 Standards, the number of projects actually implemented through this process will be extremely dependent on cost share availability**	Ongoing	LWCD	1,000 hrs $30,000	DATCP-LWRM, TRM, Priority Watershed $50,000 to $150,000 minimum needed
Implement Farmland Preservation Program (WLI) conservation compliance requirements	Make landowners aware of conservation requirements associated with existing and new participants set up schedule of compliance with existing participants and completing required status reviews annually	Ongoing	LWCD	2,500 hrs $75,000	

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Implement NMP 590 Standards In NR 151, with livestock operations being high priority	**In the absence of limited GPR dollars to provide cost sharing to landowners to implement the NMP 590 standards found in NR 151 we will do the following; Encourage landowners to sign up for EQIP, require plans through local manure storage ordinance, require compliance with FPP(WLI) standards and conduct landowner self certification training for 590 plan development. Despite dedicated funding we would like to target 5000 to 8,000 acres as a goal per year**	Ongoing	LWCD UWEX and NRCS	500 hrs $15,000	DATCP, NRCS $100,000 to $250,000
Update local policies and procedures related to Animal Waste Management	**Revise and update current Animal Waste Management Ordinance to include Water Quality Management and incorporate policies and procedures to implement most current revisions to NR 151 and ATCP 50.**	2011 to 2013 As staff time and resources allow	LWCD	1,000 hrs $30,000	
Continue the promotion of rotational grazing within Columbia County	Continue to use GLCI Grazing Grants to access funds associated with technical time to continue current upswing in rotational grazing use in Columbia County. Make staff technical resources available to service landowners need BMP and or grazing plan development. Annual target of working with 5 landowners and a goal of revising or planning 250 acres per year	Ongoing	LWCD	300 hrs $10,000 GLCI grant for staff support , DATCP-SWRM	EQIP and LWRM for cost share dollars $20,000
Abandon existing unused non conforming manure storage structures	**Locate and properly abandon 2 existing non used non conforming manure storage structures annually**	Ongoing	LWCD	500 hrs $15,000	$10,000 to $20,000 DATCP LWRM
Monitor new and existing NMP 590 plans	**Implement a long-term strategy to monitor utililization and compliance with NMP 590 plan through the use of self-certification annual review process**	Ongoing	LWCD	100-200 hrs $6,000	

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Develop local strategies for dealing with Manure Management issues in Columbia County	The LWCD in cooperation will WDNR will continue to use a local manure user group to discuss and tackle local issues and trends related to manure management in Columbia County	Ongoing	LWCD WDNR	100 hrs $3000	
Revisit the value of grassed waterways as a "must have" tool for erosion control	The LWCD will continue to market the value of grassed waterways through information and education with local landowners. Implementation of the FPP (WLI) conservation compliance standards will be used as one tool in this process. We will work towards the installation of a minimum of 5 new or replacement grassed waterways per year	Ongoing	LWCD	350 hrs $10,500	DATCP-LWRM, EQIP $25,000

Goal: CONTROL INVASIVE AND EXOTIC SPECIES IN COLUMBIA COUNTY

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Control Gypsy Moth outbreaks in Columbia County	**Maintain participation in WDNR Gypsy Moth Suppression Program and create and maintain local funding mechanism**	Ongoing	LWCD	250 hrs $7500	Columbia County-Local match WDNR Suppression Program State Match $ from Trees - Local Tree Program
Control of all invasives	Provide program opportunities and I/E to public concerning invasive control of all existing and new invasive exotics	Ongoing	LWCD	200 hrs $6,000	

Goal: PROMOTE THE PRESERVATION OF AGRICULTURE AND LIVESTOCK OPERATIONS IN COLUMBIA COUNTY

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Preserve prime agricultural soils	Strive to an active part of the Smart Growth Planning Process working to preserve our most productive soils for Ag use	Ongoing	LWCD, Planning and Zoning, Towns, Cities and Villages	150 hrs $4,500	
Promote the value of livestock agriculture in Columbia County	Continue to work with the public to educate them on the value of livestock agriculture to the community, provide I/E about the changing face of livestock and its role in Columbia County.	Ongoing	LWCD, UW Extension Planning and Zoning	75 hrs $2,250	

Goal: IMPROVE RECREATION OPPORTUNTIES AND PRESERVATION OF NATURAL AREAS WITHIN COLUMBIA COUNTY

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Create a parks program in Columbia County	The LWCD/LWCC will work within the framework of Columbia County government to evaluate the opportunities to increase the value of a parks department within Columbia County	Ongoing	LWCD, LWCC, Columbia County Board of Supervisor, Highway Dept	100 hrs $3000	
Increase availability and quality of public access to waterways within Columbia County	The LWCD will work through state and local partnerships to identify and look for resources to improve boat landings and public access points within the County	Ongoing	LWCD, WDNR, Columbia County, Cities, Villages, Towns	50 hrs $1,500	

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Provide a local avenue for landowners who would like to see their land preserved through either outright donation or long term easement	The LWCD will work with other interested parties to research the value and opportunities of creating a local land trust, land acquisition program or the retention of important tax delinquent properties or some local mechanism for Natural Area Preservation.	Ongoing	LWCD, Columbia County Board, Planning and Zoning, WDNR	100 hrs $3,000	Columbia County other potential outside resources

Goal: PROVIDE INCREASED LAND AND WATER CONSERVATION SERVICE TO LANDOWNERS AND CITIZENS OF COLUMBIA COUNTY

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Increased customer service and conservation program implementation through the co-habitation of the LWCD with the NRCS and FSA office	The LWCD/LWCC will look into the feasibility of making this partnership a reality again. We will provide information and education to the Columbia County Board in regards to the necessity of such an arrangement.	Ongoing	LWCD NRCS FSA	75 hrs $2,250	

Goal: DEVELOP AND RETAIN LOCAL WATER QUALITY MONITORING DATA

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Develop a local surface water quality monitoring program within Columbia County	**The LWCD will work in cooperation with WDNR to continue to identify surface water resources that would benefit from the development of a local watershed based monitoring program. These programs and the data collected will be use to help the LWCD along with other resources managers better understand current watershed impacts and understand potential impacts within the watershed. This will allow LWCD to focus limited resources on focused areas with an updated foundation of current conditions.**	Ongoing	LWCD WDNR UWSP WAV	250 hrs $7,500	Columbia County and various State and Federal Grant Programs

Goal: PROVIDE INFORMATION AND EDUCATION TO USERS OF OUR RESOURCES TO STRENGTHEN NATURAL RESOURCE UNDERSTANDING AND RECOGNITION

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Increase information and education related to land use impacts on natural resources within Columbia County	Increase value and presence of LWCD within media, web page, workshops, newsletters etc.	Ongoing	LWCD	150 hrs $4,500	

Goal: INCREASE LOCAL AND STATE RECOGNITION AND VALUE OF LAND AND WATER CONSERVATION ACTIVITIES WITHIN COLUMBIA COUNTY

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Increase County Board awareness and value of land and water conservation activities	The LWCD will continue to market the value of local land and water conservation through discussion, presentations and participation in our annual fall conservation tour.	Ongoing	LWCD	100 hrs $3,000	
Increase awareness and value of land and water conservation actives to Columbia County Senators and State Representatives, LWCB and other State agencies and governing boards	The LWCD will increase its relationships and interactions with legislators and other important state boards to increase awareness and financial support for land and water conservation in Columbia County	Ongoing	LWCD	100 hrs $3,000	

Goal: PROMOTE LONGTERM SUSTAINABLE FORESTRY IN COLUMBIA COUNTY

Objectives	Actions	Year	Who	Staff Resources	Cost Share Resources
Provide tree, shrubs and planting equipment to promote tree planting in Columbia County	The LWCD will continue to develop and grow its annual tree sales program and continue to provide and maintain tree planters for the citizens of Columbia County	Ongoing	LWCD WDNR	250 hrs $7500	

Utilization of Existing LWRMP Program Cost Share Dollars

Current and future funding levels to fund implementation of cost sharing components of this plan are unknown. It is the hope that the LWRMP program funds to implement BMP's through this plan will increase in the future. It will be the policy of the LWCD to utilize a percentage-based breakdown of existing LWRM cost sharing dollars each year. This breakdown will be streamlined internally through departmental policy but will likely result in a split of 60% for voluntary participation and 40% for enforcement and regulatory activities related to this plan. Flexibility will be utilized depending on the demands and specific site needs.

It is also the intent of the LWCD to encourage utilization of funds from CREP, EQIP and other federal and state programs as they become available. It is also the intent of the LWCD to utilize the WDNR Targeted Runoff Management (TRM) grant program as an avenue to target specific enforcement and voluntary activities related to NR 151 and other applicable standards. We will also be looking to utilize Lake Protection Grant program funds in areas where we have cooperatively been working in the realm of Lake Planning grants to help implement needed BMP's.

Targeting of Specific Geographical Locations within Columbia County

The question of where we begin implementation of specifics within this plan will be addressed by departmental policy. This policy will likely reflect some level of priority status for areas in the 303(d) listed watersheds. The emphasis on other areas will largely depend on our ability to partner and gain access to increased levels of cost share dollars and staff dollars to carry out the work we need to do in regards to BMP implementation in Columbia County. Overall, implementation of NR 151 will concentrate on areas within the Water Quality Management Area (WQMA) throughout Columbia County. We do anticipate opportunities to combine 2011 changes to the TRM grant program into our watershed approach. Water quality monitoring data will also be used to help focus implementation areas.

Monitoring and Evaluation

The evaluation and long term monitoring of this plan will include several approaches. Many of the goals and objectives will be easily measurable within a given time frame. Evaluation of things such as the number of Nutrient Management Plans written or grassed waterways installed are all things that can be measured and used in evaluation of the effectiveness of this plan. The LWCD will meet regularly with the LWCC and will annually update the committee and CAC on current issues and trends related to meeting our LWRMP objectives. This along with annual reports submitted to DATCP during our application/report process will serve as a monitoring mechanism. These tangible measurements and their successes and or failures will be discussed and reviewed fully. In the event that resources are not available to meet goals and objectives the LWCD will work with DATCP, LWCC and CAC, to evaluate resources needed and make adjustments as necessary. It is likely that through our implementation process, issues will come up in regards to availability of resources and yearly work plan adjustments will be made through updated work plans.

It is the goal of the Columbia County LWCD to develop a strong water quality monitoring program. In the summer of 2005, we began this process. Working with folks like WAV, Rock River Coalition,

WDNR and UWSP we are currently completing monitoring programs within the Park Lake, Lazy Lake and Tarrant Lake watersheds. It is our hope to learn and gain the resources needed to expand this process to other surface water systems within Columbia County. This data gathered through these efforts will be yet another tool we will use to monitor the long term benefits of many of the programs and initiatives we are working on.

The use of nonpoint source inventories will also be used in monitoring and evaluating our plan and future plan objectives and goals. The LWCD continues to conduct an annual Transect Survey looking at cropland erosion trends; we will continue to use this as a measurement tool. Numerous other inventory data sets are and will continue to be utilized. Things such as NRI land use information and Land Sat Photos for land cover will be utilized as needed.

The utilization of our GIS system and its data sets and corresponding layers will be our main tool for monitoring and evaluation. We will be tracking inventory data related to the NR 151 Performance Standards and all other program related BMP installations. The ability to inventory and return for review and status using GIS will prove to be the most important management tool we have to evaluate the overall status of resource needs within Columbia County.

Monitoring the effectiveness of information and educational goals and objectives within this plan will prove to be challenging. The ability to make direct connections with these types of iniatives will need to be accepted through increased measurements in other areas of program responsibility. Although the value of information and education is often overlooked and tough to measure, the LWCD believes good connections can be made to other measurable program goals and objectives.

Acronym Guide

DATCP	WI Department of Agriculture, Trade and Consumer Protection
CAC	Citizen Advisory Committee
WDNR	WI Department of Natural Resources
LWCD	Columbia County Land and Water Conservation Department
NRCS	Natural Resource Conservation Service
FSA	Farm Service Agency
LWRM	Land and Water Resource Management
GIS	Geographical Information System
FPP	Farmland Preservation Program
TMDL	Total Maximum Daily Load
WRP	Wetland Reserve Program

CWD	Chronic Wasting Disease
BMP	Best Management Practice
WWSF	Warm Water Sport Fishery
NMP	Nutrient Management Plan
NR 151	WDNR Administrative Rule 151
AWAC	Animal Waste Advisory Committee
WQMA	Water Quality Management Area
WAV	Water Action Volunteers
UWSP	University of Wisconsin Stevens Point
CREP	Conservation Reserve Enhancement Program
EQIP	Environmental Quality Incentive Program
TRM	Targeted Runoff Management Program
ATCP 50	DATCP Administrative Rule 50
BMP	Best Management Practice, interchangeable with conservation practice

Glossary of Terms

303(d) WATERS:
A list submitted to the U.S. Environmental Protection Agency, which identifies waters that do not meet water quality standards for specific substances or the designated use. This list is required under the Clean Water Act and determined by the WDNR.

ALGAE:
Microscopic, photosynthetic water plants. Algae give off oxygen during the day as a product of photosynthesis and consume oxygen during the night as a result of respiration. Therefore, algae affect the oxygen content of water. Nutrient-enriched water increases algae growth.

ANIMAL WASTE MANAGEMENT:
A group of practices including barnyard runoff management, nutrient management and manure storage facilities designed to minimize the effects of animal manure on surface and groundwater resources.

BASIN WATER QUALITY MANAGEMENT PLANS:
A plan to document water quality conditions in a drainage basin and make recommendations to protect and improve basin water quality. Each Wisconsin basin must have a plan prepared for it, according to Section 208 of the Clean Water Act.

BEST MANAGEMENT PRACTICE (BMP):
The most effective, practical measures to control non-point sources of pollutants that run off from land surfaces.

BUFFER STRIPS:
Strips of grass, shrubs, trees and other vegetation between disturbed areas and a stream, lake or wetland

CHAPTER 92:
The portion of Wisconsin Statutes detailing the soil and water conservation, agricultural shore land management and animal waste management laws and polices of the State.

COST-EFFECTIVE:
A level of treatment or management with the greatest incremental benefit for the money spent.

ECOSYSTEM:
The interacting system of a biological community and its non-living surroundings.

ENVIRONMENTAL PROTECTION AGENCY (US EPA):
The federal agency responsible for enforcing federal environmental regulations. The Environmental Protection Agency delegates some of its responsibilities for water, air and solid waste pollution to state agencies.

EROSION:
The wearing away of land or soil by wind or water.

EUTROPHIC:
Refers to a nutrient-rich lake. Large amounts of algae and weeds characterize a eutrophic lake (see also "oligotrophic" and "mesotrophic").

EUTROPHICATION:
The process of nutrient enrichment of a lake leading to increased production of aquatic organisms. Eutrophication can be accelerated by human activity such as agriculture and improper waste disposal.

GEOGRAPHICAL INFORMATION SYSTEM (GIS):
A computer system used to organize data geospatially by mapping and creating layers of information that are geographically in place. Allows users to visualize data for analysis and decision-making.

GLOBAL POSITIONING SYSTEM (GPS):
A system, which uses satellites to determine the exact location of a site, which can then be downloaded onto a computer for mapping and tracking purposes.

GROUNDWATER:
Underground water-bearing areas generally within the boundaries of a watershed, which fill internal passageways of porous geologic formations (aquifers) with water that flows in response to gravity and pressure. Often used as the source of water for communities and industries.

HABITAT:
The place and environmental conditions under which a plant or animal will naturally live and grow.

HERBICIDE:
A type of pesticide that is specifically designed to kill plants and may be toxic to other organisms.

IDENTIFIED FARM:
A critical site found to be in violation of NR 151.

MITIGATION:
The effort to lessen the damages from a particular project through modifying a project, providing alternatives, compensating for losses, or replacing lost values.

NONPOINT SOURCE POLLUTION:
Pollution whose sources cannot be traced to a single point such as a municipal or industrial wastewater treatment plant discharge pipe. Nonpoint sources include eroding farmland and construction sites, urban streets and barnyards. Pollutants from these sources reach water bodies in runoff, which can best be controlled by proper land management.

NR 151
State Administrative code that establishes runoff pollution performance standards for non-agricultural facilities and transportation facilities and performance standards and prohibitions for agricultural facilities.

NUTRIENT MANAGEMENT PLAN:
A guidance document that provides fertilizer and manure spreading recommendations for crop fields based upon soil test results and crop needs. Plans are sometimes referred to as NRCS 590 plans for the Natural Resources Conservation Service Standard that guides their preparation.

OLIGOTROPHIC:
Refers to an unproductive and nutrient-poor lake. Such lakes typically have very clear water (see also "eutrophic" and "mesotrophic").

PERFORMANCE STANDARDS:
The land management activities or threshold levels necessary to reduce or eliminate negative effects on land and water resources.

PESTICIDE:
Any chemical agent used to control specific organisms, such as insecticides, herbicides, fungicides, etc.

PHOSPHORUS:
A nutrient that, when reaching lakes in excess amounts, can lead to over-fertile conditions and algae blooms.

POINT SOURCES:
Sources of pollution that have discrete discharges, usually from a pipe or outfall.

POLLUTION:
The presence of materials or energy whose nature, location, or quantity produces undesired environmental effects.

PRIORITY FARM
A farm identified by the county for having excessive soil erosion and/or manure runoff resulting in existing or potential water quality problems.

PRIORITY WATERSHED:
A drainage area selected to receive state money to help pay the cost of controlling non-point source pollution.

PRODUCTIVITY:
A measure of the amount of living matter which is supported by an environment over a specific period of time. Often described in terms of algae production for a lake.

PROHIBITIONS:
Land management activities that are not allowed by local or state regulatory processes.

REDUCED TILLAGE:
Planting row crops while only slightly disturbing the soil so that a protective layer of plant residue stays on the surface and erosion rates decrease.

RIPARIAN:
Belonging, living, or relating to the bank of a lake, river, or stream.

RIPRAP:
Broken rock, cobbles, or boulders placed on the bank of a stream to protect it against erosion.

RUNOFF:
Water from rain, snowmelt, or irrigation that flows over the ground surface and returns to streams and lakes. Runoff can collect pollutants from air or land and carry them to receiving waters.

SEDIMENT:
Soil particles suspended in and carried by water as a result of erosion.

SEPTIC SYSTEM:
Sewage treatment and disposal for homes not connected to sewer lines. The system usually includes a tank and drain field. Solids settle to the bottom of the tank. Liquid percolates through the drain field.

STORM SEWERS:
A system of sewers that collect and transport rain and snow runoff. In areas that have separated sewers, such storm water is not mixed with sanitary sewage.

SUSPENDED SOLIDS (SS):
Small particles of solid pollutants suspended in water.

TOLERABLE SOIL LOSS:
The tolerable soil loss rate in tons per acre per year, commonly referred to as "T," is the maximum average annual rate of soil erosion for each soil type that will permit a high level of crop productivity to be sustained economically and indefinitely (ATCP 50.01(16)).

TOTAL MAXIMUM DAILY LOADS (TMDL):
The maximum amount of a pollutant that can be discharged into a stream without causing a violation of water quality standards.

TROPHIC STATUS:
The level of growth or productivity of a lake as measured by phosphorus content, algae abundance and depth of light penetration.

TURBIDITY:
Having suspended or stirred up particles, referring to a lack of water clarity. Turbidity is usually closely related to the amount of suspended solids (sediment or algae) in water.

UNIFORM DWELLING CODE:
A statewide building code for communities larger than 2,500 residents specifying requirements for electrical, heating, ventilation, fire, structural, plumbing, construction site erosion and other construction related practices.

UNIVERSAL SOIL LOSS EQUATION:
An equation used to estimate the amount of soil lost annually per acre from crop fields. It takes into consideration the following factors: rainfall, slope, slope length, soil erodibility, crop rotations and crop practices (NRCS Agricultural Handbook 537).

UNIVERSITY OF WISCONSIN-EXTENSION (UWEX):
A special outreach and education branch of the state university system.

VARIANCE:
Government permission for a delay or exception in the application of a given law, ordinance, or regulation. Also, see water quality standard variance.

WASTE:
Unwanted materials left over from manufacturing processes; refuse from places, of human habitation or animal habitation.

WATER QUALITY CRITERIA:
A measure of the physical, chemical, or biological characteristics of a waterbody necessary to produce and maintain different water uses (fish and aquatic life, swimming, etc.).

WATER QUALITY STANDARDS:
The legal basis and determination of the use of a water body and the water quality criteria; (physical, chemical, or biological traits of a waterbody) that must be met to make it suitable for a specified use.

WATER QUALITY STANDARD VARIANCE:
When natural conditions of a water body preclude meeting all conditions necessary to maintain full fish and aquatic life and swimming, a variance may be granted.

WATER Quality Management Area (WQMA):
An area defined as being within 1,000 feet of a lake or 300 feet of a stream, river, creek or tributary.

WATERSHED:
The land area that drains into a lake or river.

WETLANDS:
Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a variety of vegetative or aquatic life. Wetland vegetation requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs and similar areas.

WISCONSIN ADMINISTRATIVE CODE:
The set of rules written and used by state agencies to implement state statutes. Administrative codes are subject to public hearing and have the force of law.

WISCONSIN NON-POINT SOURCE WATER POLLUTION ABATEMENT GRANT PROGRAM:
A state cost-share program established by the state Legislature in 1978 to help pay the costs of controlling non-point source pollution. Also known as the non-point source element of the Wisconsin Fund or the Priority Watershed Program.

List of Best Management/Conservation Practices Commonly Used Towards Addressing Water Quality/Soil Erosion Issues

Access Road
Animal Trails and Walkways
Brush Management
Manure Storage closure
Manure Storage Structures
Contour Buffer Strips
Conservation Tillage
Contour Farming
Critical Area Seeding
Diversion
Forest Stand Improvement
Grade Stabilization Structure
Grassed Waterway
Heavy Use Protection
Nutrient and Pesticide Management
Prescribed Burning
Residue Management
Stream bank and Shoreline Protection
Barnyard Runoff Control
Terrace
Tree/Shrub Establishment
Prairie Restoration
Wetland Restoration
Use Exclusion
Well Abandonment
Prescribed Grazing

Description of Related Regulations

NR 151, Wis. Admin Code: Establishes Water Quality Performance Standards and Prohibitions

ATCP 50, Wis. Admin Code: Establishes NPM and Sheet/Rill Standards, FPP program and conservation compliance standards, technical standards for cost shared practices and cost sharing requirements for existing facilities.

Comprehensive Planning Law, ss 66.1001 and 16.965, Wis. Stats: Defines comprehensive plan and consistency requirements between plan and land use decisions after January 1, 2010.

Columbia County Animal Waste Management Ordinance (Title 15): Adopted under authority by Section 59.02, 59.03, 92.16 and 281.16(3)(a)1.4 Wis. Stats to require permits for manure storage structure construction, operation and abandonment along with various other manure related issues such as NPM, manure stacking and direct runoff from feedlots.

Columbia County Zoning Ordinance(Title 16): Comprehensive Zoning Ordinance controlling Zoning, Land Subdivision, Private Sewage, Floodplain, Shoreland/Wetland Protection and Non-Metallic Mining.

Soil and Water Conservation Standards for the Farmland Preservation Program: Adopted under s 92.105, Stats, sets standards for conservation compliance and program eligibility.

Related Reference Materials:

The State of Lower Wisconsin River Basin, completed in July of 2002 by the Wisconsin DNR. (Publ WT-559-2002)

The State of the Rock River Basin, completed in April of 2002 by the Wisconsin DNR. (Publ WT-668-2002)

The Upper Rock River Watershed Management Plan, Upper Rock River Watershed Appendix, completed in April of 2002 by the Wisconsin DNR(Publ WT-668b-2002)

The State of the Upper Fox River Basin, completed in October 2001 by the Wisconsin DNR.(Publ WT-665-2001)

The Future of Rowan Creek Watershed: Connecting Land Use and Management with Water Quality completed in 2002 by the Gaylord Nelson Institute for Environmental Studies UW-Madison.

Beaver Dam River Priority Watershed Plan (1994)

Yahara-Mendota Priority Watershed Plan (1997)

Neeneh Creek Priority Watershed Plan (1994)

Columbia County Agricultural Preservation Plan updated in 1988.

Soil Survey of Columbia County (1978)

Improving The Water Quality of Park Lake: Recommendations and Options for the Future completed in 2001 by the Gaylord Nelson Institute for Environmental Studies UW-Madison

Appendix A

Executive Plan Summary

Welcome to the Columbia County Land and Water Resource Management Plan. This plan is an update to the 2006 Columbia County Land and Water Resource Management Plan. The process of updating the plan benefited from guidance from the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) and valuable large-scale citizen involvement and input. This revision process began in the spring of 2010 in preparation for a deadline early in the fall of 2010. Existing input derived from a local Citizen Advisory Committee (CAC) that was formed to complete the 2006 revision was used as foundation for this plan. We chose to develop an interactive online survey tool based around the current plan content to gauge citizen input. Following completion of the survey, a CAC meeting was held in late July 2010, to discuss survey results, report LWRMP accomplishments to date and include opportunities to add to the current list of CAC priority resource issues and concerns. This plan was completed, in part, to meet the requirements set forth by the DATCP to remain eligible for state program participation. However, early on it was evident that local staff, agency advisors and our CAC had a vision to make this plan much more than just another "Plan" developed to meet requirements.

It is with this vision that our plan demonstrates a wide range of resource issues, assessments and impacts. The resource concerns range from groundwater quality protection to an overall increase in information and educational efforts on the full scope of Natural Resource issues in Columbia County. Throughout this plan you will see that we have done our best to use current and up-to-date data to provide a clear picture of natural resource management in Columbia County.

The plan begins by providing a detailed review and assessment of all Columbia County's natural resource issues. A review of all our major surface water resources including location, description and assessment is provided. It is clear that there are many trends in different areas and issues in the County that are impacting land and water conservation. This plan also offers suggestions of how to deal with these changing trends and how to integrate resource protection and management effectively.

In October 2002, the state legislature passed rules to help protect Wisconsin's lakes, streams and groundwater resources. Department of Natural Resources (WDNR) rule NR 151 sets performance standards and prohibitions for farms. It also sets urban performance standards to control construction site erosion, manage runoff from streets and roads and manage fertilizer use on large turf areas. As a requirement of this plan, you will find Columbia County's strategy for the implementation of the agricultural standards found in NR 151 and the process used in the identification of priority farms.

In addition to the WDNR rules, the existing CAC input and the survey responses and associated comments we received from 54 citizens were essential in the development of this plan. This group made up of local citizens, elected officials, cooperating agency and local staff provided input and decision-making. Together we identified resource issues and concerns across Columbia County. A detailed summary of those resource issues and priority concerns are included in the plan.

This plan identifies both long and short-range goals for resource protection and enhancement throughout Columbia County. Our goals and action items range from Best Management Practice (BMP) implementation, ordinance development and enhancement, to larger visionary goals such as increasing issue awareness through information and educational activities in the County.

Monitoring the long and short-term effectiveness of this plan will begin with the ongoing use of our existing CAC committee. We plan to continue to utilize our LWCC meeting structure to provide a venue to an annual review process that will allow us to discuss and keep the citizen base abreast of the progress towards implementation of the plan's goals and discuss and or update issues as they present themselves. The development and continued use of our GIS Data Management System and the use of water quality data will also be used.

Columbia County is located in the south central part of Wisconsin. It covers about 774 square miles and has a total land area of about 495,300 acres. It has a population of 54,802(2003). There are 56 lakes totaling 11,982 acres, of which Lake Wisconsin is the largest with a total acreage of 9,000 acres. It also has 50 miles of trout streams and includes 35 miles of the Wisconsin River. Portage is the County seat and largest city with a population estimated at 9,800. There are 4 cities, 10 villages and 21 civil townships are within Columbia County. Agriculture encompasses 296,236 acres or 60% of the county, making it the main land use.

Columbia County continues to be dominated by a mixture of agricultural land, forests and wetlands. Residential development has been primarily located in and around smaller cities and villages. However, the counties relatively close proximity to the Madison metropolitan area and the increasing growth of the area's commuting shed is beginning to put increasing development pressures on the southern portion of Columbia County. This southern area is within easy commuting distance to Madison. Communities such as Lodi and Poynette will continue to see Madison growth pressure. Townships such as West Point, Lodi, Arlington and Leeds, which lie in the southern portion of the County, contain many of our most productive prime soils. Balancing the emerging development values for these areas with their value in agricultural production will continue to be a tough challenge. The LWCD is working closely within the Smart Growth planning process to try and develop an approach that will value all the needs of future growth and agricultural preservation. Columbia County is experiencing rapid population growth. We have experienced a 16% increase since 1990. This compared to the statewide average of 9.6%. Proper land use planning and implementation of that planning will be very important for the future of Columbia County and for sound resource management and conservation.

Farm numbers within Columbia County are on the decline and remaining farms are shrinking in land base each year. Animal numbers related to dairy farms are on the decline opening the door for more cash grain operations. The face of agriculture is changing in Columbia County. Pressures related to low milk prices, tight profit margins, competition for land (agricultural, residential, recreational) and off-farm labor opportunities are all part of the mix.

Columbia County has 1,526 farms with an average size of 228 Acres. There are 211 dairy farms, over 500 beef, sheep and hog farms plus everything from large cash grain operations of 500-1000 acres to 5-10 acre fresh market vegetable producers. Collectively farmers own and manage 348,396 acres of land. Field crops, dairy, cattle and calves, poultry products and vegetables are primary commodities in Columbia County. Horticulture is growing in Columbia County. Sand and muck soils found in the Wisconsin and Fox River systems support commercial vegetable and mint production. High quality prairie soils in the southern and northeastern parts of the County put the area in the top 10 for corn and soybean production. Evidence of this, perhaps, is the efforts of local farmers who organized the United Wisconsin Grain Producers, Inc., to build Wisconsin's fourth ethanol plant near Friesland in the northeast corner of the county. Columbia County currently has 3 livestock operations that exceed 1,000

animal units and are permitted under a ***WDNR*** WPDES permit. They include Blue Star Dairy at 3089 a.u., Pulfus Poultry at 1096 a.u. and UW Arlington Research Station at 1880 a.u.

Wisconsin's rules to control polluted runoff from farms, as well as other sources, went into effect October 1, 2002. The State legislature passed NR 151 to help protect Wisconsin's lakes streams and groundwater. WDNR Administrative Rule NR 151 sets performance standards and prohibitions for farms. It also set urban performance standards to control construction site erosion, manage runoff from streets and roads and manage fertilizer use on large turf areas. The Columbia County Land and Water Conservation (LWCD) will take the lead role in the implementation of NR 151. We will be working in close cooperation with the Wisconsin Department of Natural Resources (WDNR) and other agencies towards a practical implementation process that serves all involved.

Local NR 151 Process Components

Definition of a Priority Farm:

For the purpose of this document a **"Priority Farm"** will be defined as a farm lying within the Water Quality Management Area (WQMA), and having one or more issues of non-compliance with the Water Quality Performance Standards found in WDNR Administrative Code NR 151.

The implementation process within Columbia County will consist of several different approaches that all have a goal of reaching compliance with NR 151 within Columbia County. This process will begin with informational and educational activities focused around creating awareness of NR 151 compliance issues, process and potential regulation. A second component will include the evaluation and compliance status review of all parcels within Columbia County. This will include the continued development our Geographical Information System (GIS). The GIS system will be used to track BMP installation, locate WQMA problem areas and determine compliance prior to October 1, 2002. The third component includes on-site farm visits. These visits will be the next step in process of utilizing our GIS developed information. These visits will conclude with the determination and documentation as to the extent of current compliance with each of the performance standards and prohibitions. Status reports will be issued to effected landowners detailing the findings. Landowners found to be in non- compliance will have the opportunity to participate on a voluntary or non-voluntary basis. Each option will include the offer of cost share if available and applicable. Cost share agreements, contracts and technical designs will be completed as needed. Upon completion of corrective measures, a letter of NR 151 compliance will be issued. If parcel remains non-compliant, landowners will receive a notice of NR 151 Violation and action will be pursuant to processes outlined and authorities obtained in the Columbia County Animal Waste Management Ordinance.

This plan concluded with the development of 11 individual goals related to natural resource management in Columbia.

Plan Goals:

1) *Natural Resource Protection Related to Land Use Changes and Growth*
2) *Protect and Enhance Groundwater Quality and Quantity*
3) *Protect and Enhance the Quality of Our Surface Water, Groundwater and Soils Resources*
4) *Control Invasive and Exotic Species in Columbia County*

5) *Promote The Preservation of Agriculture and Livestock Operations in Columbia County*
6) *Improve Recreation Opportunities and Preservation of Natural Areas within Columbia County*
7) *Provide Increased Land and Water Conservation Service to Landowners and Citizens of Columbia County*
8) *Develop and Retain Local Water Quality Monitoring Data*
9) *Provide Information and Education to Users of Our Resources to Strengthen Natural Resource Understanding and Recognition*
10) *Increase Local and State Recognition and Value of Land and Water Conservation Activities Within Columbia County*
11) *Promote Long-term Sustainable Forestry in Columbia County*

The following is a list of **Priority Actions** as outlined in the plans work plan:

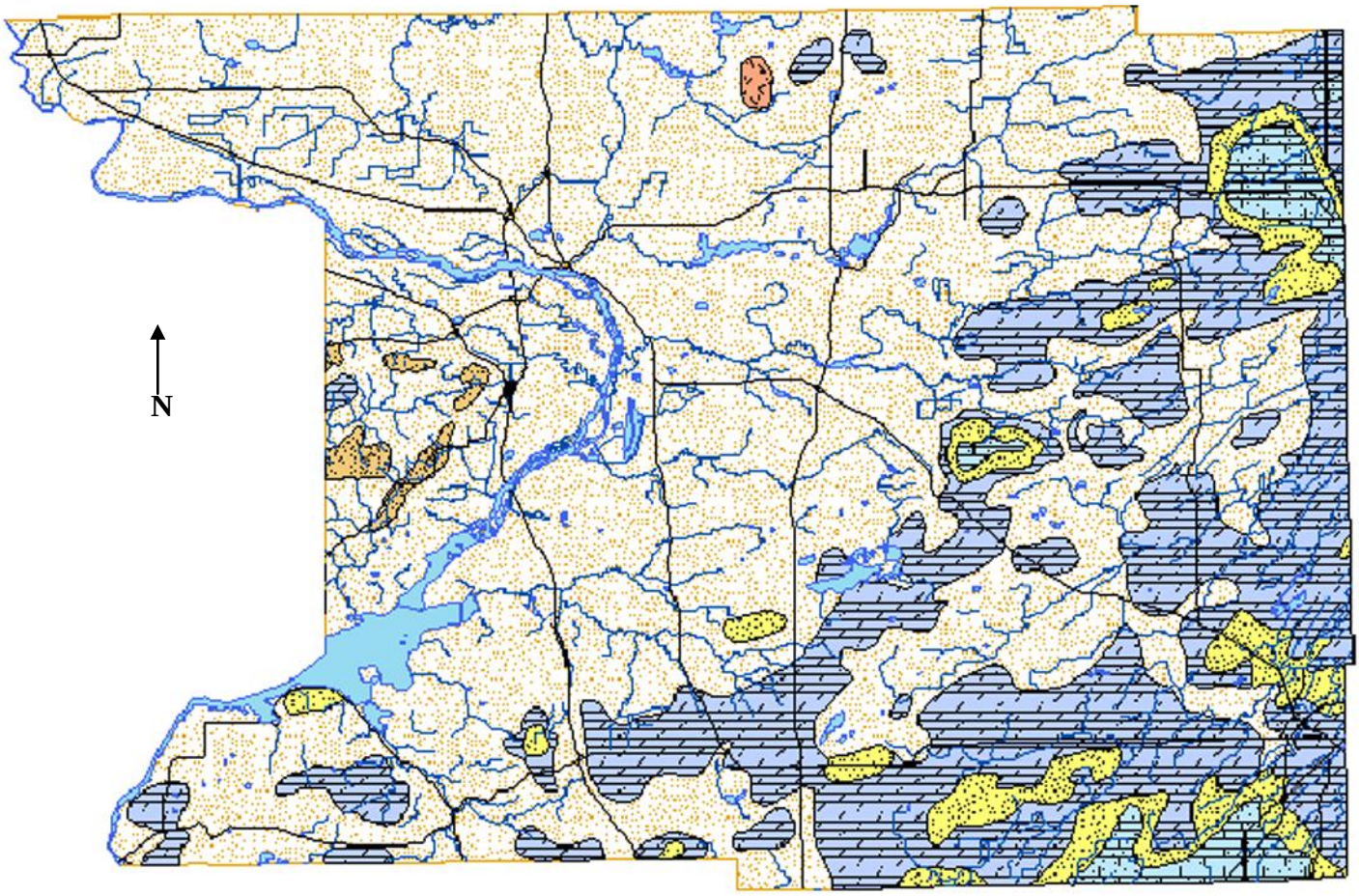
12) *Promote Farmland Preservation Program under the WLI to landowners and Columbia County*
13) *Provide technical assistance and cost sharing to close 5 to 10 wells per year*
14) *Complete Phase 2 and Phase 3 of Columbia County groundwater survey and flow model development in cooperation with WGNHS*
15) *Continue to implement departmental process to implement Ag Standards, including tracking and data management associated with compliance*
16) *Utilize GIS to locate and create data base of potential livestock operations within WQMA in targeted watersheds*
17) *Follow up on NR 151 inventory results with 10 to 15 landowners per year, inventory work will be used for searching out cost share mechanisms*
18) *Work with 3 to 5 livestock owners per year to achieve compliance with NR 151 Standards, the number of projects actually implemented through this process will be extremely dependent on cost share availability*
19) *Make landowners aware of conservation requirements associated with existing and new participants, set up schedule of compliance with existing participants and complete required status reviews annually*
20) *Work with landowners to develop and implement NMP, conduct landowner self certification training for 590 plan development*
21) *Locate and properly abandon 2 existing non used non conforming manure storage structures annually*
    1) *Implement a long-term strategy to monitor utilization and compliance with NMP590 planning*
    2) *Maintain participation in WDNR Gypsy Moth Suppression Program and create and maintain local funding mechanism*
    3) *Develop local surface water quality monitoring program for additional surface water resources as needed*

The evaluation and long term monitoring of this plan will include several approaches. Many of the goals and objectives will be easily measurable within a given time frame. Evaluation of things such as the number of Nutrient Management Plans written or the revision of local ordinances are all things that can be measured and used in evaluation of the effectiveness of this plan. The LWCD will meet at least one time annually with the CAC to discuss current issues and trends related to meeting our LWRMP

objectives. This along with annual reports submitted to DATCP during our application/report process will serve as a monitoring mechanism. These tangible measurements and their successes and or failures will be discussed and reviewed fully. In the event that resources are not available to meet goals and objectives the LWCD will work with DATCP and CAC to evaluate resources needed and make adjustments as necessary. It is likely that through our 5 year implementation strategy issues will come up in regards to availability of resources and yearly work plan adjustments will be made through updated work plans.

Appendix B

Columbia County Bedrock Geology



Sinippee dolomite

St. Peter sandstone

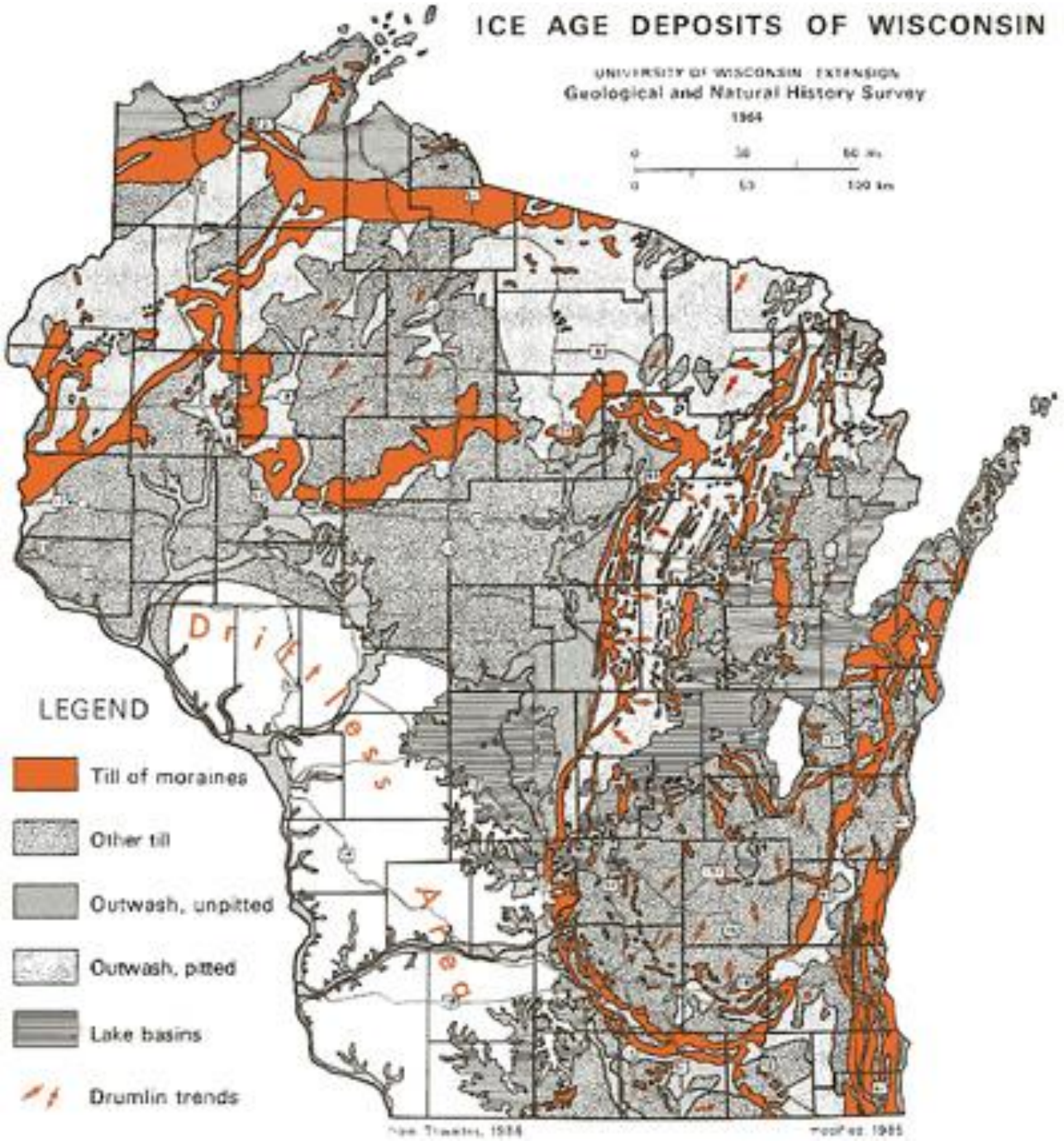
Prairie du Chien dolomite

Cambrian sandstone

quartzite

granite

Appendix C


ICE AGE DEPOSITS OF WISCONSIN
UNIVERSITY OF WISCONSIN EXTENSION
Geological and Natural History Survey
1964
Driftless Area
LEGEND
Till of moraines
Other till
Outwash, unpitted
Outwash, pitted
Lake basins
Drumlin trends

Appendix D

Landforms of Columbia County