FOURMILE / FIVEMILE CREEK WATERSHED (UW10)

WATERSHED SUMMARY

The Fourmile/ Fivemile Creek Watershed (Map UW10) is located in Wood and Portage Counties. This watershed was ranked using the Nonpoint Source Priority Watershed Selection Criteria. Based on available surface and groundwater data, the overall ranking is medium, establishing Fourmile/Fivemile Creek Watershed as a priority for future grant eligibility through the Nonpoint Source Pollution Abatement Program. In 1997, the Fourmile / Fivemile Creek Watershed was up for Priority Watershed Selection. However, due to program restructuring, no more were selected.

Groundwater resources within the watershed are ranked as a high priority for pollution control because of documented nonpoint source groundwater impacts.

Much of the watershed has been ditched to drain Buena Vista Marsh for farming. This has led to heavy streambank and streambed erosion due to high water velocity in the ditches. High-suspended solids, pesticides and nutrients are entering streams and impacting water quality. The Drainage District continues to provide maintenance dredging in order to remove sediment and vegetation from the channel. According to the District, this practice improves drainage of the adjacent agricultural fields. A recent decision by DATCAP requires maintenance dredging to go no deeper than the approved profile. The Department supports this because over-dredging removes critical in-stream habitat for trout and other aquatic organisms, creates deep, low velocity pools, increases sedimentation, increases in-stream habitat recovery time and reduces potential spawning areas.

High livestock concentrations have severely compromised the physical integrity of a number of streambank sites within the Buena Vista Marsh. Unlimited livestock access within these areas has negatively impacted water quality and aquatic habitat. Significant impacts include in-stream sedimentation, the loss of adequate riparian vegetative cover and organic loading. The Portage County Land Conservation Department, Golden Sands RC&D and the Department of Natural Resources have combined efforts to work with grazers within the Buena Vista Marsh area to find alternative methods for livestock watering. Portage County LCD staff will assist these landowners with the technical aspects of implementing a conservation plan that will achieve desired water quality improvements.

Three cranberry marshes exist along the Wisconsin River northeast of Biron. It is unknown whether these marshes are contributing a significant amount of nutrients to the Wisconsin River. Water drawn from ditches reduces stream depth, decreases adult fish cover, reduces spawning areas for trout and likely exposes fish redds, and may result in an increase of water temperatures. Discharges from cranberry marshes can adversely affect water temperatures, deposit sediment, and release nutrients to the ditches. Periodic impounding of the ditches to flood marshes prevents fish migration, increases water temperatures and de-waters downstream reaches.

Much of the watershed lies within the townships of Plover, Buena Vista, and Grant in Portage County. The Portage County Soil Erosion Control Plan (1986) ranked these towns as high priority for erosion control work because of both wind and water erosion.

Golden Sands Resource Conservation and Development Planning Agency studied wind erosion impacts on water quality in the watershed. The study found that wind eroded soil from agricultural cropfields is a source of sediment, nutrients and pesticides to surface waters in the watershed. Much of the agricultural activity includes potatoes and processing vegetable production. Typically, these farming activities result in smooth, flat seedbeds that are free of residues and are susceptible to wind erosion. Winter, late fall and early spring are critical wind erosion periods.

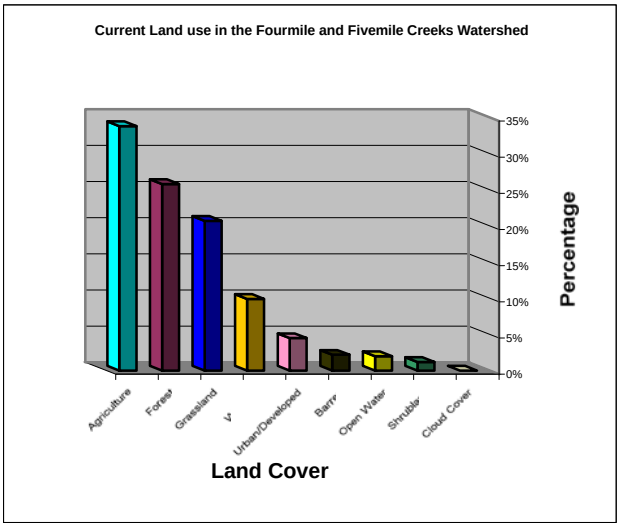
The study recommends several practices that could be installed to protect the soils from being eroded by wind and thereby protect surface water quality. Some of these practices include; crop rotation,

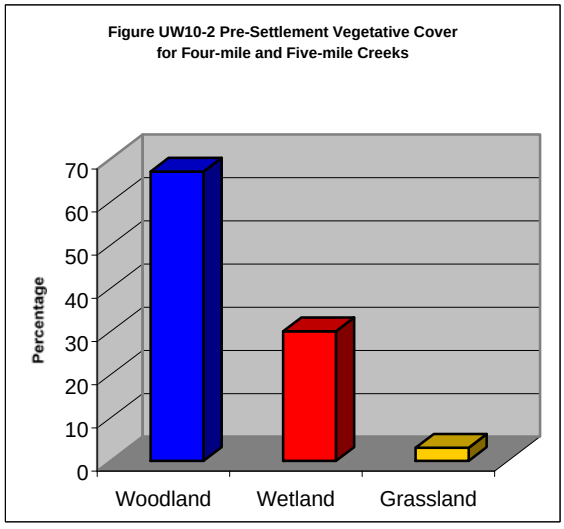
conservation tillage, cover crops, field windbreaks, nutrient management, pest management, and crop residue management and wind barriers. These practices and others are explained further in Wind Erosion Impacts on Water Quality in the Sand Plain of Central Wisconsin, 1993.

POPULATION DEMOGRAPHICS

The Fourmile and Fivemile Creek Watershed has the largest population of any watershed in the Central Wisconsin River Basin (Appendix J). The expectations for the watershed population are consistent with the majority of the basin. An estimated growth of about 2.5 percent increase every year is predicted (North Central Wisconsin Regional Planning Commission, 2000; Wisconsin Department of Administration, 2000).

The watershed was mainly forested during the pre-settlement era (Figure UW10-2). As farming began taking place, a large quantity of the wetlands and forests were drained and cleared. Agriculture, forest, and grassland make up 81% of the current land use (Figure UW10-1). The urban developed areas are comprised of Port Edwards, Wisconsin Rapids, Biron and the Village of Plover, (Enterprise Information, 1998).





WATERSHED STREAMS

A summary of watershed streams is listed in Table UW10-1. Figure UW10-3 indicates total number of stream miles in the Fourmile/Fivemile Creek Watersheds.

Buena Vista Creek/Ditch 2

Buena Vista Creek is classified as a Class I and II trout stream. The upstream portion of the stream has been ditched and is now referred to as Ditch No. 2. The upper reach is characterized by moderate brook trout densities with natural reproduction and is limited by sedimentation, lack of adult fish cover, and shallow stream depth. The lower meandering portions of Buena Vista Creek are stocked with brown trout and have low densities of brook trout. Sedimentation, high water temperatures, and high phosphorus concentrations impact this stretch. Stream bank erosion is a source of sediment in the lower portion of Buena Vista Creek generating from just above CTH F down to Lake Wazeecha (Kruger). Unfortunately, it is not feasible or practical to control streambank erosion and sediment bed load movement in this section of Buena Vista Creek. This is due to limited access and the expense for riprapping, and structures to control bed load movement will not work in the low wide flood plain (Kruger). Further investigations are recommended for a complete understanding of the local land use effects and remedies.

The Upper Buena Vista Creek Watershed is a source of nutrients, particularly nitrates, because of the large percentage of irrigated farmland. Sediments tend to settle out in the upper ditches of the watershed

and are not considered major nonpoint sources of pollution to Buena Vista Creek (Kruger, 1986). Nitrate values approaching 4 ppm have been detected in Buena Vista Creek. Pesticides have also been detected.

Biotic index sampling results indicate excellent, good, fair and poor water quality depending on location and the time sampled.

Figure UW10-3. Total number of stream miles in the Wisconsin Rapids Watershed.

Exceptional Resource Waters = 17.1
(ERW or Cold I)

Outstanding Resource Waters = 29.7
(ORW or Cold II)

Cold III = 11.2

Warm Water Sport Fishery = 35.1
(WWSF)

Warm Water Forge Fishery = 1.2
(WWFF)

Limited Forage Fishery = 0.0
(LFF)

Limited Aquatic Life = 0.0
(LAL)

Unknown Classification = 41.2
Total of Stream Miles =135.5
Number of Streams / Ditches= 35

Isherwood Lateral

The Isherwood Lateral is a two mile tributary of Buena Vista Creek and is managed as a Class I trout stream. Based on topographic maps, the ditch was constructed through a wetland where a natural stream had flowed. Limiting factors include sedimentation, shallow channel depth, and lack of adult fish cover. The ditch has moderate brook trout densities that are mostly young of the year. Based on survey results from 1997, the ditch has favorable habitat conditions for brook trout reproduction. The shallow channel depth and lack of adult fish cover probably limits growth of larger trout. Continuous temperature monitoring results indicate that water temperatures spent the majority of the time above the optimal temperature range for brook trout and other cold water species.

Ditch No. 1

Ditch No. 1 is a fourmile tributary to Buena Vista Creek and has two stream classifications. The upper three miles are classified as Class I trout water and the lower mile is Class II. The ditch has moderate brook trout densities with natural reproduction likely occurring in upstream tributaries. The ditch has a good baseflow, coldwater temperatures and abundant fish cover provided by aquatic plants. Limiting factors of the stream include sedimentation, channel ditching, nutrification and organic loading. The HBI rating suggests organic loading to the ditch is significant and continuous dissolved oxygen monitoring found oxygen levels in the ditch as low as four ppm. The ditch has abundant aquatic plant growth and subsequently, chemical treatment occurs during some summers. Plant respiration and/or decomposition of plant material may impact dissolved oxygen concentrations in the ditch.

Unnamed Ditch 15-3

Unnamed Ditch 15-3 is a coldwater two-mile tributary to Buena Vista Creek. Surveys found one fingerling brook trout and forage species in low numbers. Sedimentation, shallow channel depth, low flow discharge, ditching and the lack of fish cover impact the stream.

Unnamed Ditch 21-5

Unnamed Ditch 21-5 is a two-mile tributary of Buena Vista Creek and is classified as a class I trout stream. Based on surveys completed in 1997, the proposed classification was Class I trout stream. The ditch has low trout densities with some natural reproduction. Limiting factors of in-stream habitat include sedimentation, ditching, cropland run-off and the lack of pools.

Unnamed Ditch 5-16

Unnamed Ditch 5-16 is a two-mile cold water tributary to Ditch No. 1 and is classified as a Class I trout stream. The ditch has moderate adult brook trout densities with high levels of natural reproduction. This ditch probably provides both spawning and nursery areas for reproducing trout in Ditch No.1. The ditch is relatively deep and narrow with apparent coldwater temperatures and abundant fish cover. The

streambanks are densely vegetated and a stable grassy buffer exists between the ditch and cultivated croplands.

Ditch 3

Ditch 3 is an eight-mile tributary to Fourmile Creek and is classified as a class I and II trout stream. The classification of the lower reaches was unknown, however, surveys completed in 1997 suggest the stream supports a Class II trout fishery. Brook trout are found throughout the ditch with the highest densities in the upper reaches. In-stream habitat is limited by sedimentation primarily from wind erosion, lack of fish cover, ditching and elevated water temperatures at downstream reaches. The ditch was likely over-dredged in the past creating wide and deep channels with sluggish current velocity. Nitrate concentrations have been as high as 6 ppm.

Fivemile Creek

Fivemile Creek is an eleven-mile stream that flows into a cranberry reservoir south of Wisconsin Rapids. The lower portion is classified as a warm water sport fishery with the remaining upper reaches classified as Class I, II and III trout fisheries. Fishery surveys, completed in 1997, found very low densities of trout. Moderate streambank erosion, excessive fine sediments and the lack of suitable fish cover, pools and riffles limit in-stream habitat. Extensive in-stream habitat improvement would probably greatly improve carrying capacity for trout. In-stream nitrate values have approached 4 ppm and pesticides have been detected.

Fourmile Creek/Ditch 4

Fourmile Creek is a 20-mile tributary to the Wisconsin River. The stream is impounded at two locations creating Wazeecha and Nepco Lakes. The upper 11 miles of the stream have been ditched and is now called Ditch No. 4. The lower eight miles supports a warm water sport fishery and the upper 12 miles including Ditch No. 4 are classified as Class I trout water. Cattle pasturing, streambank erosion, sedimentation and the lack of pools, riffles and fish cover impact the habitat of the non-ditched portion of the stream.

Ditch No. 4 has higher densities of brook trout than the lower reaches known as Fourmile Creek. Land use surrounding the ditch is dominated by cranberry marshes, irrigated cropland and state owned prairie chicken land. Limiting factors of in-stream habitat include channel ditching, sedimentation primarily from wind erosion, and the lack of pools and riffles. Overhanging vegetation, submerged macrophytes and some undercutting of the streambanks provides fish cover. Three of the cranberry operations utilize ditch water for cultivating cranberries. Continuous temperature monitoring found higher water temperatures in the ditch below the discharges of the marshes. Streamflow monitoring was completed in 1997 above and below these marshes during the fall harvest. During this time, streamflow decreased below these marshes by 60%. The water drawn from a ditch impacts in-stream habitat by reducing stream depth, decreasing the amount of fish cover and may increase water temperatures. Water removed from the ditches during the fall harvest reduces water levels and may impact(s) the spawning success of trout. The reduction of water levels can reduce spawning areas and may expose fish redds causing mortality of eggs or larval fish.

The steep grade in the lower portion of Fourmile Creek, below CTH F, has led to streambank and streambed erosion. It is believed 65 to 75 percent of the sediment entering Lake Wazeecha is from Lower Fourmile Creek (Kruger). High concentrations of phosphorus are found in the sediment. Grade control (drop) structures and riprap are possible means for controlling bed load sediment movement and streambank erosion.

The Upper Fourmile Creek Watershed is a source of nutrients in the creek and lake. In-stream nitrate values as high as 4.5 ppm have been detected. The nutrients come from wetland drainage, wind erosion and streambank pasturing. Lower gradients permit sediments to settle out and not constitute a large percentage of the total Fourmile Creek sediment reaching Lake Wazeecha (Kruger, 1986).

Twomile Creek

Twomile Creek is an eleven-mile warm water fishery that flows through a cranberry marsh and the city of Wisconsin Rapids before emptying into Nepco Lake. Land use in the upper drainage area is primarily irrigated croplands. Factors limiting habitat include streambank erosion, weak baseflow, low velocity, channel ditching, sedimentation, the lack of fish cover and storm water. During the winter months, lower reaches of the stream occasionally stop flowing leaving small pockets of water in the stream channel. Substrate compositions at the habitat sites were different above and below the cranberry operation. The substrate below the marsh was predominately silt and detritus while above the marsh substrate was dominated by sand. Discharges from the cranberry operation may have contained sediment that deposited in the ditch channel. In-stream nitrate values have been as high as 5.1 ppm. Pesticides have also been detected.

Onemile Creek

Onemile Creek has three miles of warm water fishery that flows through the City of Wisconsin Rapids and empties into Nepco Lake. In-stream habitat is poor and is limited by the lack of fish cover, riffles, pools, and coarse substrate and low stream flow. Storm water from Wisconsin Rapids carries sediment and other pollutants to the stream and delivers large volumes of water that scour the streambed and erode streambanks. Local residents have placed dams on several locations and the stream is intermittent during parts of the year.

Harvey Creek

Harvey Creek is a two-mile warm water stream that travels from the upstream cranberry operation to the Wisconsin River. The stream fishery consists of forage fish with a few game fish that migrate up from the Wisconsin River. Limiting factors of habitat include the lack of pools, coarse substrate, riffles and fish cover. The stream HBI was good indicating some organic loading to the stream.

Quinnell Creek

Quinnell Creek is a warm water forage fishery tributary to the Wisconsin River. The upper reaches of the streams have been reported as dry during some years. In-stream habitat is poor and limited by weak baseflow, and the lack of pools, riffles, coarse substrate and fish cover. Small dams and control structures throughout the river create small impoundments on the creek.

Bloody Run Creek

Bloody Run Creek is a seven-mile stream that flows into Nepco Lake. The lower three miles of the stream supports a Class I brook trout fishery and is classified as an exceptional resource water. The classification of the remaining four miles is unknown. Trout have been reported in the upstream reaches when water is present. The lower stream reach has moderate brook trout densities with natural reproduction. Limiting factors to in-stream habitat include streambank erosion, shallow channel depth and the lack of pools, riffles, coarse substrate and fish cover. During low precipitation years, baseflow of the stream is reduced and the furthest upstream reaches are sometimes dry.

Streamflow of Bloody Run Creek has been impacted by a Municipal well located adjacent to the stream. In 1991, the City of Wisconsin Rapids installed a well within 1,500 feet of Bloody Run Creek to supply water for the city. Prior to the well pumping, the stream would experience weak baseflow conditions. After the well began pumping in 1991, the stream has been reported dry on several occasions and frequently has no flow. A hydrologic study completed in 1991 predicted that by the well pumping during that year, streamflow near the well location was reduced on average by approximately 70%. Streamflow was also reduced by approximately 45% on average at downstream reaches. A 45% reduction of streamflow can impact aquatic life by decreasing the amount of “living space” for organisms thus reducing spawning areas and increasing water temperatures of coldwater communities. The Department is currently working with the Wisconsin Rapids Water Utility, Town of Grand Rapids and local citizens to reduce the impacts of the well and find solutions that will maintain appropriate water levels in the stream that will be adequate for aquatic life.

Ditch 8
Ditch 8 is nine-mile tributary of Ditch 3 and is classified as a Class I trout stream. Limiting factors of habitat include moderate streambank erosion, channel ditching, warmer water temperatures at downstream reaches, beaver dams and the lack of riffles, pools, coarse substrate and fish cover.

WATERSHED LAKES

There are two sizeable lakes in the Fourmile and Fivemile Creek Watershed, Lake Nepco and Wazeecha (Table UW10-2). Both lakes are impoundments located on Fourmile Creek that is connected to an extensive network of ditches and creeks draining the Buena Vista Township. Both of these lakes are used heavily for recreational proposes throughout the entire year. The Buena Vista Marsh is scattered with pivot irrigation systems occurring in and around a network of ditches and creeks draining nutrient rich surface waters and soils into Fourmile Creek. Everything in Fourmile Creek flows into Lake Wazeecha and Nepco creating weed, sedimentation and algae problems. Because the land surrounding both Lake Nepco and Wazeecha is not privately owned, a Lake District or a partnership group does not exist. With no groups supporting either lake, there is little chance of a management plan being created for these water bodies. These two lakes make up 75% -by area- of the lakes located in this watershed. The creation of a water quality management plan to protect these recreational lakes in the Four and Fivemile Creeks Watershed is recommended.

WISCONSIN POLLUTION DISCHARGE ELIMINATION SYSTEM PROGRAM (WPDES)

Table UW10-3 summarizes the WPDES in the Fourmile and Fivemile Creeks Watershed.

Del-Monte
Del Monte is vegetable canning operation located on the intersection of County Trunk Highway B and I39 in the Village of Plover. It processes snap beans, and some root crops like small potatoes, beets and carrots. The plant discharges about 120 million gallons of water over a six-month period. Process water from the canning operation is spray irrigated in the Town of Plover on approximately 190 acres of cropland located south of CTH B and west of Eisenhower Avenue. A mixture of grasses is grown and removed as forage for cattle. There is a groundwater monitoring system around the spray irrigation fields to determine any groundwater impacts. There are groundwater impacts up gradient of the spray irrigation field. Alternative concentration limits based on the up gradient impacts are used for the permit. By – products are either land spread on approved fields or used as cattle feed.

Foremost Foods
Foremost Foods dries and blends whey products to produce baby formula and other dried whey products. It is located on Foremost Road off of Wisconsin State Highway 54 on the west side of the Village of Plover. The treatment plant treats about 0.350 MGD of wastewater with an organic load of 16,000 pounds of BOD per day. The treatment consists of a selector tank, two aerated tanks, a secondary clarifier, dissolved air floatation basin, sludge storage, and an emergency by-pass lagoon. The facility has limits for BOD, suspended solids, and phosphorous. They are currently working on a method to reduce their phosphorous discharge levels. Treated wastewater is discharged to the Biron Flowage of the Wisconsin River at river mile 217.3 Sludge and high strength waste are land applied on approved fields.

Basic American
Basic American Foods processes potatoes and pinto beans. Potatoes are dried and turned to powder to make instant mashed potatoes for the service industry. Pinto beans are processed to make refried beans for the service industry also. The facility is located on Wisconsin State Highway 54 and Hayes Avenue in the Township of Plover west of the Village of Plover. The plant discharges about 0.450 MGD to a spray irrigation system. The spray irrigation system consists of eleven center-pivot irrigators each on forty-acre parcels. A mixture of grasses are grown for forage as animal feed. Potato waste and bean waste is either land applied on approved fields or used as cattle feed.

Plover WWTP

The Village of Plover built a treatment plant in 1986 with upgrades in 1998. The plant is located at 4496 Coolidge Avenue on the West Side of the Village of Plover. The plant is designed to handle 1.8 MGD of wastewater with an organic load of 5300 pounds of BOD per day. The treatment plant consists of fine screen, pista grit system, an oxidation ditch modified for biological phosphorous removal, final clarification, chlorination, de-chlorination, gravity belt press for sludge thickening, final clarification, chlorination, de-chlorination, sludge holding tanks, gravity belt thickening for sludge, auto thermal aerobic sludge digesters, belt press, and cake sludge storage building. Treated wastewater is discharged to the Biron Flowage of the Wisconsin River at river mile 214.3. Sludge is land applied seasonally to approved fields.

McCain Foods

McCain Foods is a potato processor. They make french fries, tator tots and other potato products for the retail and service industries. The facility is located on Wisconsin State Highway 54 and 110th Street in the Town of Plover west of the Village of Plover. The plant treats on average 2.6 MGD. The wastewater treatment consists of screening, liming, primary settling tanks, anaerobic treatment tanks with gas recovery, selector tanks, anaerobic, anoxic, aerobic biological phosphorous removal, final clarification, effluent pumping, and sludge belt presses. Effluent is discharged through a force main to the Biron Flowage of the Wisconsin River at river mile 212.0 The facility has limits for BOD, suspended solids, ammonia and phosphorous. The limits for BOD, suspended solids, and ammonia are water quality based limits from May through October. Sludge is land applied on approved fields and potato waste is used as cattle feed.

Mirant

This is a proposed facility that has been issued a permit but is not yet constructed. The facility, if built, will be at the intersection of Hayes Avenue and Wisconsin State High way 54 in the Town of Plover west of the Village of Plover. The proposed facility is a gas fired turbine with steam heat recovery for the generation of electricity. The discharge is proposed to the Biron Flowage of the Wisconsin River at approximately river mile 214.

City of Wisconsin Rapids

Wisconsin Rapids Wastewater Treatment Facility lies in Wood County in the Fourmile and Fivemile Creeks Watershed (UW10). The treated wastewater discharges directly to the Wisconsin River. The preliminary engineering plan was approved 1992, and major improvements were done in 1993 with a design life until 2013. With a population of 18,245 residents the average daily design flow for wastewater entering the plant is 5.16 millions gallons a day. The average BOD load for the wastewater treatment plant is 8,927 (#/day).
Treatment types: Activated Sludge

Domtar

Domtar Corp. manufactures bleached kraft and sulfite pulps, and writing and specialty papers at their Nekoosa and Port Edwards Mills. Both mills discharge process wastewaters to the Domtar Corporation's Wastewater Reclamation Center. The Wastewater Reclamation Center's treated effluent is discharged to the Wisconsin River (approximately 30 million gallons per day). The Wastewater Reclamation Center is located on the East Side of the river in the NW 1/4 of Section 2, Town of Saratoga.

GROUNDWATER

The Fourmile and Fivemile Creek Watershed contains the municipalities of Biron and Wisconsin Rapids. The Village of Biron has two fairly new shallow sand and gravel wells serving their community. The water is of very good quality but the pH is naturally low. The water is therefore aerated to raise the pH and then chlorine, fluoride and a polyphosphate are added to the water. The wellfield is located on the western edge of what is known as the Central Sands Region, but has not shown the nitrate and pesticide

problems that are known to exist to the east. The latest nitrate concentrations in Wells 2 and 3 are 2.69 ppm and 0.21 ppm respectively. Municipal Water Supply summary is found in Table UW10-4 including NPS groundwater ranking and well descriptions.

A comprehensive wellhead protection program was developed for these wells but implementation is difficult as the area of contribution for the wells is outside of the village jurisdiction.

The City of Wisconsin Rapids pumps all of their water from four Ranney Collector Wells located east of the City in the Town of Grand Rapids. The iron and manganese concentrations are very high and the water is transmitted to a central lime softening plant before it is distributed to the customers.

The water is injected with chlorine at each well to begin the oxidation process. Once the water reaches the plant, alum, lime and flocculent enhancing polymers are added in a mixing chamber. The flocculated particles are settled out in the clarifier units and the decanted water is routed to sand filters and discharged to clear wells where it can be pumped to the customers. Fluoride is added prior to the filters and chlorine can also be supplemented to maintain a protective residual within the distribution system. The combined nitrate concentration of all four wells is 0.72 ppm and all other parameters tested under the Safe Drinking Water Act are well within limits.

A wellhead protection program is in the development stage, but it is difficult to implement a program in areas where the City does not have zoning jurisdiction. Wood County has not been very proactive in establishing wellhead protection guidelines. Public education efforts are relied upon to promote protection of the groundwater resource.

A complication for the City has been the impact of their groundwater withdrawals from Well 4 on a nearby trout stream (Bloody Run Creek) and impacts to private wells in the immediate vicinity of this well. With the rapid rate of urban sprawl and the density of shallow groundwater fed trout streams, developing additional water sources for the future will become increasingly difficult.

The Central Wisconsin Groundwater Center of the University of Wisconsin-Stevens Point conducted 1160 well water samples for nitrates in the Fourmile / Fivemile Creek Watershed. Of all the wells tested 12.7 percent of them were over 10 parts per million in nitrate concentrations. The Department of Health sets the safe drinking water standards for the State of Wisconsin. Of the 12.7 percent that is over 10 parts per million, 5.3 percent of the wells has a nitrate concentration of 20 parts per million or greater, which is 2.7 percent higher than the basin average.

Of the 195 wells tested for triazine in the Fourmile / Fivemile Creek Watershed, 1.0 percent of the wells tested had concentrations at 1.1 parts per billion or greater of triazine. None of the wells sampled were over 3.0 parts per billion. Since triazine can not be used to set standards for drinking water limitations, it is strongly recommend that if a test result comes back above 1 parts per billion of triazine, the well should be tested further for total concentrations of atrazine.

WATERSHED RECOMMENDATIONS

1. Fish and Aquatic Habitat Staff should conduct baseline monitoring on Love Creek, Green Lateral and Holiday Creek to determine the existing biological use classification.

2. Fourmile / Fivemile Creek Watershed should be considered a priority for future grant eligibility under the State Nonpoint Source Pollution Abatement Program.

3. Continue to work with the City of Wisconsin Rapids to minimize impacts from groundwater extraction on Bloody Run Creek.

4. Basin staff will strive to improve fisheries and aquatic habitat within the Buena Vista Marsh area by furthering partnership efforts with landowners to limit livestock access within sensitive stream corridor areas.

5. Watershed staff, in cooperation with Portage County Land Conservation Department and Central Wisconsin Windshed Partnership, should continue to work with local farmers to encourage wind erosion best management practices.

Table-UW10-1 Fourmile / Fivemile Creek Watershed, Portage and Wood Counties. Square Miles: 211 Stream Miles: 135.5
NPS Stream Rank: Medium

Stream Name	Length (miles)	Codified Use	Biolgical Use (Existing)	Biological Use Potential	SUPPORTING USE FULLY-PART-NOT-THR/MILES	303d Listed Water	Assess. Categ. M E U	Tren	Integ Indic	Integ Stat.	Data Level[i]	PROBLEMS SOURCE//IMPACT	COM N R	REF.
Bloody Run Creek T22NR06ES33 WBIC: 1390600	7.0	ERW DEF	Cold I/0-3.2[b] UNK/3.20-7e	Cold (I)3.2 UNK/3.8	PART/3.2 PART/3.8	No	M 1997	U	IBI = 80 HBI = 4.26	G VG	P,B,H	HAB,SED,FLOW/ MUN,SB		153,109, 3,161
Boundary Lat.. T22NR08ES19 WBIC: 1394300	5.0	ERW	Cold(I)/0-5.0[e]	Same	UNK	No		U				NPS/SED		153,28
Buena Vista Creek/Ditch No. 2 T22NR07ES19 WBIC: 1391300	15	Cold Cold ERW	Cold (II)/0-8[eb] Cold (I)/8-13[eb] Cold (I)/13-15[B]	Cold (II)/8 Cold (I)/5 Cold (I)/2	PART/8 PART/5 PART/2	No	M 1997	U	IBI = 50-90 HBI = 3.63-3.77	F - E VG	P,B,H	HAB,TEMP,SED,NUT/ DCH,IRR,WD,CL,SB		153,109, 28,136, 114,18, 161
Ditch #1 T22NR07ES13 WBIC: 1391600	4.0	DEF Cold	UNK 0-2[e] Cold (I)/2-4.0[b]	UNK Same	UNK PART/2	No	M 1997	U	IBI = 100 HBI = 7	E VP	P,B,H	HAB,NUT,SED,DO/ DCH,IRR,WD,CL		153,28, 161
Ditch #3 T22NR07ES13 WBIC: 1393300	8.0	Cold ERW	Cold (II)/0-5.4[eb] Cold (I)/5.4-8[b]	Same Same	PART/5.4 PART/2.6	No	M 1997	U	IBI = 50-90 HBI = 5.03	F - E G	P,B,H	HAB,TEMP,SED,NUT/ DCH,IRR,WD,CL		153,28, 114,161
Ditch #8 T22NR07ES27 WBIC: 1393400	9	Cold	Cold (I)/0-9[eb]	Same	PART/9	No	M 1997	U	IBI = 60-90 HBI = 3.55	G - E VG	P,B,H	HAB,TEMP,SED,NUT/ DCH,SB,BDAM,IRR, WD,CL		28,114, 161
Duck Creek T1721NR08ES01 WBIC: 1395500	2.0	ERW	Cold (I)/0-2[b]	Same	PART/2	No	M 1997	U			B	HAB,SED,FLOW/ BAS,WD,IRR,CE,DCH		153,28, 161
Fivemile Creek T21NR08ES01 WBIC: 1388600	11.0	DEF Cold Cold	WWSF/0-2.1[e] Cold II/2.1-3.7[b] Cold III/3.7-5.2[b]	Same Same Same	Fully/2 PART/1.6 PART/1.5	No	M 1997	U	IBI = 50 HBI = 5.11	F G	P,B,H	HAB,SED,TEMP, TURB,FLOW/SB,CM, BAS		109,136, 184,3,18 161
Fourmile Creek/Ditch No. 4 T22NR05ES01 WBIC:1389600	20.0	DEF Cold	WWSF/0-8[e] Cold (I)/8-20[eb]	Same Same	PART/8 PART/12	No	M 1997	U	IBI = 55-100 HBI = 2.3-4.2	F - E E -VG		HAB,SED,TEMP,NUT, FLOW/SB,HM,PSB,BY DCH,WD,CM,CL,IRR		109,28, 136,114, 172,3, 161
Green Lat. T22NR8ES23 WBIC:1393800	1.0	DEF	Cold /0-1.0[e]			No								
Green Lat. T22NR8ES23 WBIC:1394700	1.0	DEF	Cold /0-1.0[e]			No								
Halladay Creek T23NR7ES25 WBIC:1401800	1.0	UNK/1.0	UNK/0-1.0			No								
Harvey Creek T22NR5ES02 WBIC:1388400	2.0	DEF	WWSF/0-2.0[e]	Same	Fully/2	No	M 1997	U	IBI = 37 HBI = 4.86	F G	P,B,H	CM,SB/HAB,SED		161
Unnamed Ditch 5-16 /Llateral #3 T22NR8ES05 WBIC:1392100	2.0	Cold	Cold (I) /0-2.0[e]	Same	PART/2	No	M 1997	U	IBI = 90	E	P,B,H			
Unnamed Ditch 15-3 / Lateral #1 T22NR8ES15 WBIC: 1390600	2.0	DEF	Cold /0-2.0[e]	UNK	UNK	No	M 1997	U	IBI = 30	F	P,B,H	DCH,IRR,WD,CE,BAS /HAB,NUT,SED,FLOW		28,161

Stream Name	Length (miles)	Codified Use	Biolgical Use (Existing)	Biological Use Potential	SUPPORTING USE FULLY-PART-NOT-THR/MILES	303d Listed Water	Assess. Categ. M E U	Tren	Integ Indic	Integ Stat.	Data Level[i]	PROBLEMS SOURCE//IMPACT	COM N R	REF.
Love Creek T23NR7ES26 WBIC: 141000	1.0	DEF	WWSF/0-1.0[e]			No								28
Onemile T22NR6ES30 WBIC: 1390000	3.0	DEF	WWFF/0-3.0[e]	Same	PART/3	No	M 1997	U	IBI = 5	VP	P,B,H	DCH,URB,BAS,SB/ HAB,SED,FLOW		109,161
Quinnell Creek T22NR6ES08 WBIC: 1396300	5.0	DEF	WWSF/0-0.5[e] WWFF/0.5-5[e]	Same Same	PART/.5 PART/4.5	No	M 1997	U	IBI = 35	F	P,B,H	BAS,SB,URB/HAB, SED,FLOW		109,161
Ischerwood Lat. WBIC:	1.5	ERW	Cold I/0-1.5[b]	Same	PART/1.5	No	M 1997	U	IBI = 80 HBI = 3.94	G VG	P,B,H	DCH,IRR/HAB,SED		153,28, 161
Twomile Creek T22NR6ES30 WBIC: 1389900	11.0	DEF	WWFF/O-11[e]	Same	PART/11	No	M 1997	U	IBI = 29-40	P-F	P,B,H	SB,URB,CM,DCH,BAS /HAB,SED,FLOW		109,149, 161
UN Creeks-Jeske Lat.	2.0	ERW	Cold I/0-2.0[b]			No								
Unnamed Creek 21-5 T22NR7ES21 WBIC: 1391400	2	COLD	Cold (I)/0-2[eb]	Same	PART/2	No	M 1997	U	IBI = 80	G	P,B,H	DCH,IRR,WD,CE/ HAB,NUT,SED		161
4 Unnamed Creeks	4.0													
10 Unnamed Ditch	14.0													

Table-UW10-2 Fourmile / Fivemile Creek Watershed, Portage and Wood Counties. NPS Lake Rank: Medium

Lake Name	Fishery Use	Access	Area (acres)	Max/Mean Depth (Feet)	Lake Type	Watershed Drainage	Phos. Class	TSI Range	Fish Advis.	LMO	Impair Source/Impact	Aquatic Plant Data	Exotics	Self-Help Monitoring	Recom.
Nepco Lake T22NR06ES31 1389800	Panfish LM Bass N. Pike	BR	494.0	29/10	DG	111.0	2A	50.6	NT	No	NPS/Sed URB/Nuts		EWM		
Wazeecha Lake T22NR06ES26 1391200	Panfish LM Bass N. Pike	BR	148.0	20/8	DG	100.0	2B	54.7	NT	No	NPS/Sed URB/Nuts	1997	EWM	SECCHI	
Tamarack Lake 10217000 T22N09ES33		No			SE		1C			No					
Patterson Lake 1009700 T22N09ES33		No	3		SE		1C			No					
Unnamed Lake T21NR06ES06 1388800		No	25.0		DG	6.83	2C		NT	No					
Unnamed Lake T21NR06ES06 1389500		No	26.0		DG	6.99	2C		NT	No					
Unnamed Lake T23NR07ES32 1398300		No	47.0	6/2	DG	3.34	2C		NT	No					
8 Unnamed Lakes			55.0												

Table-UW10-3 WPDES Point Sources for Fourmile / Fivemile Creek Watershed, Portage and Wood Counties.

Facility	Permit No./ Expires	Industrial Or Municipal	Receiving Stream/ Classification G = groundwater	Q710 of Receiving Stream	Design Flow (MGD)	Variances	Phosphorus Limit	Facility Plan Candidate? Y/N	Waste Load Allocation	Recommendations
Del Monte	3/31/05	I	Ground Water	NA	NA	NA	NA	NA	No	
Foremost Foods	12/31/05	I	Wisconsin River FFAL	1160	NA	No	8 mg/L	NA	No	P limit will be reduced in permit term to level that is achievable
Basic American Foods	3/31/2006	I	Ground Water	NA	NA	NA	NA	No	No	
Plover WWTP	3/31/2007	M	Wisconsin River FFAL	1160	1.8 MGD	No	1.7	No	No	Recently upgraded treatment plant
McCain Foods	3/31/03	I	Wisconsin River FFAL	1160	NA	WQBEL limits	6 mg/L	Does Not Apply	No	
Mirant	6/30/2007	I	Wisconsin River FFAL	1160	NA	No	NA	No	No	
Wisconsin Rapids Wastewater Treatment Plant	0025844 30-Sep-03	M	Wisconsin River WWSF	Q90,10 = 1630 cfs	5.16	No	1.0 mg/L	No	Yes	none
Georgia-Pacific Corp.	0003620 30-Jun-99	I	Wisconsin River WWSF	Q90,10 = 1630 cfs	32.4	No	1.5 mg/L	No	Yes	None

Table UW10-4 Municipal Water Supply Wood & Portage Counties. NPS Groundwater Rank: High.

Municipal Water Supply Data

Biron — Sanitary Survey Date 1997 — Population 932 — PWSID 77201718 — Ave. Day Use 175,000 Gallons

Well	Entry Point	Unique Well No.	Well Const. Report	Geology	Well Depth	Casing Length	Screened Interval	Capacity (gpm)	Nitrate (ppm)	Treatment	Wellhead Protection	Calculated Fixed Radius	Flood Plain	Wetland
2	2	II207	Yes	Sand & Gravel	60.5'	35.5'	35.5'-55.5'	470	2.69	Cl, Fl, PO4	Yes	1221'	No	No
3	3	LK020	Yes	Sand & Gravel	62'	45'	45'-62'	500	0.21	Cl, Fl, PO4	Yes	<1200'	No	No

Wisconsin Rapids — Sanitary Survey Date 1996 — Population 18,690 — PWSID 77201080 — Ave. Day Use 3 MGD

Well	Entry Point	Unique Well No.	Well Const. Report	Geology	Well Depth	Casing Length	Screened Interval	Capacity (gpm)	Nitrate (ppm)	Treatment	Wellhead Protection	Calculated Fixed Radius	Flood Plain	Wetland
1	200	BH574	Yes	Sand & Gravel	61'	61'	4 laterals	1000	0.72	Cl, L	No	1300'	No	No
2	200	BH575	Yes	Sand & Gravel	62'	62'	4 laterals	1010	0.72	Cl, L	No	1300'	No	No
3	200	BH576	Yes	Sand & Gravel	63'	63'	4 laterals	1100	0.72	Cl, L	No	1300'	No	No
4	200	DN700	Yes	Sand & Gravel	70'	63'	5 laterals	1800	0.72	Cl, L	No	1325'	No	No

MILL CREEK WATERSHED (UW11)

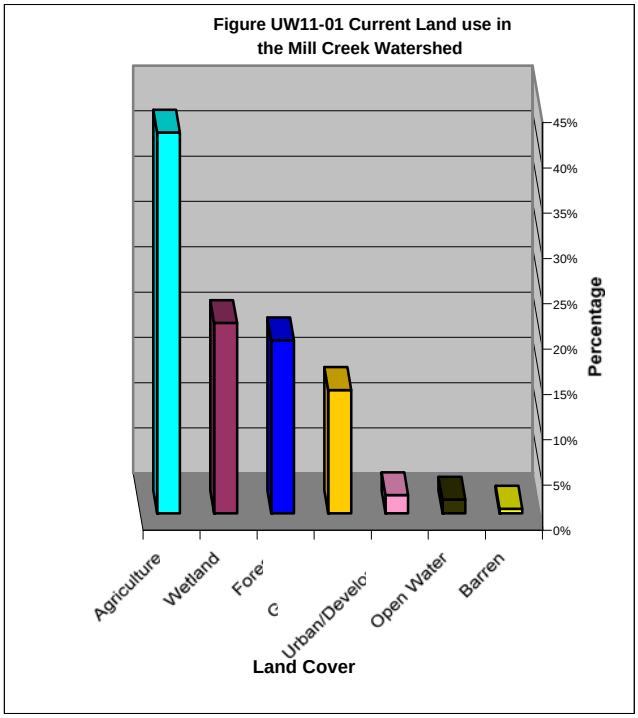
WATERSHED SUMMARY

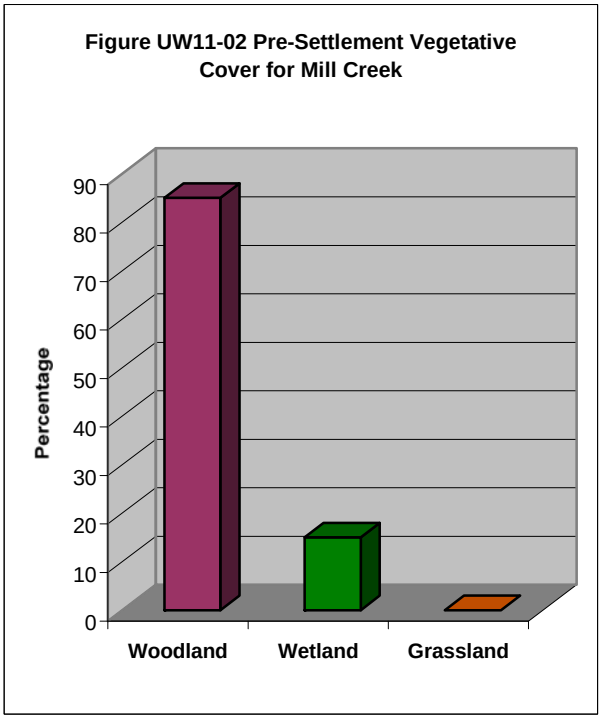
The Mill Creek Watershed (Map UW11-1) is located in Portage and Wood Counties. The watershed incorporates the western portion of Stevens Point and extends westward to Marshfield. The Mill Creek Watershed was ranked using the Nonpoint Source Priority Watershed Selection Criteria. Based on available surface and groundwater data, the overall ranking is high, establishing Mill Creek as a priority for future grant eligibility through the State Nonpoint Source Pollution Abatement Program.

The Upper Wisconsin River 208 Task Force (1979) identified the lower portion of the watershed as having both intense and widespread nonpoint source problems, mainly from large livestock populations along the creek. High densities of cattle along streambanks can destroy stream habitat. Wood County conducted a general survey in 1985, finding 18 barnyards within 1,000 feet of Mill Creek with approximately 900 head of cattle. The Portage County Animal Wastewater Pollution Control Plan ranked the Mill Creek Watershed third priority of 12 watersheds for NPS control of animal waste. Five municipal wastewater treatment plants (WWTPs), Marshfield, Blenker-Sherry, Junction City, Hewitt and Milladore, discharge effluent to the upper reaches of Mill Creek or its tributaries.

POPULATION DEMOGRAPHICS

The Mill Creek Watershed has a current population of 19,141 people. In the next 15 years, the population is predicted to increase by 2%. One of the main reasons for the predicted slow population growth is the current land use (North Central Wisconsin Regional Planning Commission, 2000, Wisconsin Department of Administration, 2000). The pre-settlement era land use consisted of woodlands and some wetlands (UW 11-2). Development of the area resulted in the clearing of woodlands for agriculture. Some farms were unproductive due to the high water table in this watershed and the land slowly converted into lowland marshes. With the increase in agriculture and wetlands, there is a marginal amount of land in the watershed that can be developed (UW11-1) (Enterprise Information, 1998).





WATERSHED STREAMS

A summary of watershed streams is listed in Table UW11-1. Figure UW11-3 indicates total number of stream miles in the Mill Creek Watershed.

Figure UW11-3. Total number of Stream miles in the Mill Creek Watershed.

Exceptional Resource Waters = 0.0 (ERW or Cold I)

Outstanding Resource Waters = 0.0 (ORW or Cold II)

Cold III = 0.0

Warm Water Sport Fishery = 52.0 (WWSF)

Warm Water Forge Fishery = 4.0 (WWFF)

Limited Forage Fishery = 0.0 (LFF)

Limited Aquatic Life = 16.0 (LAL)

Unknown Classification = 33.0
Total of Stream Miles = 105.0
Number of Streams / Ditches= 29

Hayden Creek

According to the Surface Water Resources of Portage County Handbook (1972), Hayden Creek watershed land use is predominately agricultural. Streambank pasturing has impaired much of the riparian cover thus allowing agricultural runoff to further lessen stream water quality.

Mill Creek

Mill Creek is a 47-mile tributary of the Wisconsin River. The stream originates in the City of Marshfield and has minimal streamflow in the upper reaches. The Marshfield WWTP discharges to the headwaters of Mill Creek and contributes more than 90% of the streamflow at the point of discharge. The upper 14 miles of the stream is listed in NR 104 as a Limited Aquatic Life variance stream and the lower 33 miles is classified as Fish and Aquatic life waters. Mill Creek is also listed as an impaired waterbody on EPA's 303d list for low dissolved oxygen, which required the Department to develop a TMDL for the stream. The stream is impacted by stormwater run-off from Marshfield, sedimentation, barnyard and cropland run-off, flashy streamflow, channel ditching, streambank erosion, ammonia toxicity and nutrient enrichment. Large volumes of stormwater scours streambeds, erode streamsbanks, and carries sediment, nutrients, and other pollutants to surface waters. August 2000 HBI results suggest there is a significant organic loading to the stream. Water samples collected in the winter of 2000 (before the new treatment plant was built) found ammonia concentrations high enough to cause chronic toxicity to aquatic life based on EPA criteria. Since Mill Creek is currently classified as Limited Aquatic Life, the WWTP in Marshfield has no ammonia limit.

In-stream nitrate values have been as high as 3.0 ppm. Mill Creek is affected by animal waste run-off, particularly in the lower sections of the watershed; livestock density is high in this area (Victor, 1986). Multiple point source discharges to Mill Creek occur in the upper one half of the watershed.

Unnamed Creek (T24N, R5E, S.12, NW¼, NE¼)

Biotic index sampling in spring of 1990 indicated good water quality in this creek. The village of Milladore discharges its WWTP effluent to this creek.

Unnamed Creek (T24N, R6E, S.11, SE¼, NE¼)

The Junction City WWTP discharges effluent to this unnamed creek.

WATERSHED LAKES

Very few lakes exist in the Mill Creek Watershed (Table UW11-2). Man-made ponds were created in Wildwood Park by impounding the headwaters of Mill Creek. Discharges from these ponds may be impacting water quality of the stream.

WISCONSIN POLLUTION DISCHARGE ELIMINATION SYSTEM PROGRAM (WPDES)

Table UW11-3 summarizes the WPDES in the Mill Creek Watershed.

Junction City

The Village of Junction City built a treatment plant in 1989. The plant is located 800 Center Avenue in Junction City. The plant is designed to treat 0.108 MGD of wastewater with an organic load of 145 pounds of BOD per day. The treatment plant consists of a bar screen, influent pumps, two-ring oxidation ditch, final clarifier, and sludge storage tank. The plant discharges to a dry run that enters Mill Creek. Sludge is hauled by a local farmer who land applies it on approved fields.

Stora-Enso WRC

Stora Enso in Stevens Point makes specialty coated and calandered papers for packaging and Stora Enso in Whiting is a thermo mechanical pulp and paper mill that makes coated paper for print communications. Both plants pump process wastewater to a treatment plant located at 2690 West River Drive, Stevens Point, Wisconsin. The plant receives on average 6.7 MGD of wastewater from the two facilities. The treatment plant consists of lime addition, primary clarification, activated sludge basins, final clarification, and sludge belt presses. The treated wastewater is discharged in the tailrace of the Whiting Dam at the head of the Biron Flowage of the Wisconsin River at river mile 219.8. Sludge is either land spread on approved fields or placed in their adjacent landfill.

City of Marshfield

Marshfield lies in Wood County in the Mill Creek Watershed (UW11). The Wastewater Treatment Plant discharges to Mill Creek. The Marshfield wastewater treatment plant was rebuilt in 2000 with a design life until the year 2020. The treatment plant has a design flow of 4.63 million gallons a day with an 11,000 (#/day) of BOD along with 11,000 (#/day) SS Load. The Marshfield Wastewater Treatment Plant is one of the most advanced wastewater treatment facilities in the state of Wisconsin. On give days throughout the year, the treated wastewater discharge into Mill Creek can make over 96% of the total in-stream flow. The treatment plant is designed for population up to 29,370 residents / transient workforce.

Hewitt Sanitary District

Hewitt Sanitary District lies in Wood County in the Mill Creek Watershed (UW11). The wastewater treatment plant discharges to Mill Creek. The preliminary engineering plan was approved in 1992 and major improvements were conducted in 1994, with a design life until 2014. The wastewater design flow is 148,000 gallons a day.
Treatment types: Oxidation ditches

Blenker Sherry Sanitary District

Blenker Sherry Sanitary District lies in Wood County in the Mill Creek Watershed (UW11). The Wastewater Treatment Plant discharges to Mill Creek. A preliminary engineering plan was approved in 1998 and major improvements were conducted in 1998 with a design life until 2018. The design flow of the facility is 28,000 gallons a day with a BOD Load of 67.8 (#/day)
Treatment types: Oxidation ditches

Village of Milladore

Milladore Wastewater Treatment Facility lies in Wood County in the Mill Creek Watershed (UW11). The Wastewater treatment plant discharges to Mill Creek. The preliminary engineering plan was approved in 1999, with major improvements conducted in the year 2000 with a design life until the year 2020. The design flow is 140,000 gallons a day with a BOD Load of 135 (#/day) and a SS Load of 147 (#/day)
Treatment types: Recirculating sand filter

Foremost Farms USA Cooperative - Marshfield

The Foremost Farms facility is located at 1511 East Fourth Street, Marshfield, Wisconsin (Wood County). The cheese factory takes in approximately 1,800,000 pounds of milk per day to make American

cheese (180,000 pounds per day). The whey (1,620,000 pounds per day) from the cheese making operation is further processed by membrane separation and condensing to form additional dairy products. The dairy cleaning and sanitation wastewater is pretreated in a company owned activated sludge treatment system to reduce the dairy wastewater strength to a level similar to municipal wastewater. The pretreated dairy wastewater is then discharged to the city of Marshfield Wastewater Treatment Plant. The factory bathroom wastewater is also discharged to the Marshfield Wastewater Treatment Plant. The average flow to the Marshfield Wastewater Treatment Plant is 230,000 gallons per day.

Non-contact cooling water and water evaporated from the whey is authorized to be discharged to a tributary ditch to Mill Creek. These clear waters are currently reused in the factory, but any excess volumes may be discharged to the tributary. In the last five years, the facility did not need to discharge to the creek. The permit also authorizes the spreading of waste biosolids from the Foremost pretreatment system on DNR approved farm fields. Currently, about 16,000 gallons/day of sludge biosolids are landspread on area fields. At times, Foremost may also thinly spread whey or dairy wastewaters on DNR approved spreading sites.

GROUNDWATER

The Village of Junction City has a history of not having enough water. They depend on two wells that are drilled into the granite bedrock. The Village drilled an emergency well for some temporary relief, but need to develop additional source capacity. A new well is being constructed northeast of the Village but yield from this well is also poor at around 40 gpm. Municipal Water Supply summary is found in Table UW11-4 including NPS ranking for ground water and well description.

Water is so difficult to find in this area that the Department allowed the village to construct a chlorine contact reservoir to treat bacteriologically unsafe water. Wells 3 and 4 have had a history of problems with total coliforms and sometimes-fecal coliforms identified in the raw water. The chlorine contact reservoir provides for 3-log inactivation of Giardia cysts. The village also feeds a polyphosphate after the reservoir to sequester manganese to reduce the brown water complaints. The nitrate concentrations are low at 0.3 ppm and all other Safe Drinking Water Act parameters are well within limits. The village was picked for a federally funded wellhead protection study and does have an active program and ordinance.

The eight wells located on the south side of Marshfield are within the Mill Creek Watershed. These wells are not routed through Marshfield's main water treatment plant and therefore contribute a limited percentage to the City's water usage. All eight wells are shallow sand and gravel wells that are tapped into limited sand and gravel lenses running through the glacial till on top of the granite bedrock. The wells are generally low yielding, with production capabilities anywhere from 40 gpm to 500 gpm.

Two separate wellfields discharge into two separate ground storage reservoirs. All of these wells are old (drilled in the 1940's and 50's) and very little information is known about the well construction. They are also located in low-lying areas with surface drainage routed very near the well buildings. Many of these wells have a history of total coliform detects in the raw water. Treatment at Wells 1 – 6 consists of chlorination, fluoridation and pH adjustment with sodium hydroxide. The City of Marshfield is a member of the Groundwater Guardians, which emphasize the importance of public education in Wellhead Protection.

The water from Wells 8 and 10 is run through a bubble type aerator before chlorine, sodium hydroxide and fluoride is injected. The bubble aerator is used to reduce the volatile organic compounds that are found in Well 10 and to increase the pH through removal of carbon dioxide. Nitrate levels are low at 1.1–2.6 ppm.

The Central Wisconsin Groundwater Center of the University of Wisconsin-Stevens Point conducted well water sampling on 371 wells located throughout the entire Mill Creek Watershed for nitrate concentrations. Of all the wells tested, 8.3 percent had nitrate concentrations greater than 10 parts per

million. Of the 8.3 percent, 0.8 contained nitrate concentrations 20 parts per million or greater. The drinking water standards set by the Department of Health stated that 10 parts per million is the maximum parts per million of nitrates that is considered to be safe by the Wisconsin groundwater enforcement standards (ES) in the state of Wisconsin.

Of the 147 wells tested for triazine in the Mill Creek Watershed, no wells tested had concentrations between 1.1 and 3.0 parts per billion of triazine. Although .7 percent of the wells sampled had concentrations over 3.0 parts per billion. Since triazine can not be used to set standards for drinking water limitations, it is strongly recommend that if a test result comes back above 1 parts per billion of triazine, the well should be tested further for total concentrations of atrazine.

WATERSHED RECOMMENDATIONS

1. Fish and Aquatic Habitat Staff should conduct baseline monitoring on Bear, Hayden and Rocky Run Creeks.

2. Mill Creek Watershed should be considered a high priority for future grant eligibility under the Nonpoint Source Pollution Abatement Program grant program.

3. Watershed Staff should conduct a water quality standards review on Mill Creek.

4. Watershed Staff should conduct a water quality standards review of the unnamed creek (T24N, R5E, S12, NW ¼, NE ¼) receiving Milladore WWTP discharge.

5. Watershed staff should conduct a water quality standards review of the unnamed creek (T24N, R6E, S11, SE ¼, NE ¼) receiving the Junction City WWTP discharge.

6. Junction City should be encouraged to operate the WWTP for ammonia removal.

7. Watershed Staff should conduct a point/nonpoint source assessment on Mill Creek to include a nutrient loading study to assess the need for a wasteload allocation for point sources and a loading allocation for nonpoint sources.

8. City of Marshfield should develop and implement an Erosion Control and Stormwater Management Ordinance to improve water quality and habitat within Mill Creek.

9. The Portage and Wood County Land Conservation Departments should continue their efforts to form a citizen lead watershed improvement organization.

Table UW11-1. Mill Creek Watershed, Portage and Wood Counties. Square Miles: 195 Stream Miles: 105. NPS Stream Rank: High

Stream Name	Length (miles)	Codified Use	Biolgical Use (Existing)	Biological Use Potential	SUPPORTING USE FULLY-PART-NOT-THR/MILES	303d Listed Water	Assess. Categ. M E U	Tren	Integ Indic	Integ Stat.	Data Level[i]	PROBLEMS SOURCE//IMPACT	COM N R	REF.
Bear Creek T24NR03ES05 WBIC: 13720700	10.0	DEF	WWSF/0-10.0[e]	Same	PART/10.0	No						CL,BY,PSB,PWL/ NUT,SED		109,28, 197,3
Hayden Creek T24NR06ES20 WBIC: 1399700	4.0	DEF	WWFF/0-4.0[e]	Same	PART/4.0	No						PSB/CL		28
Mill Creek T25NR02ES15 WBIC: 1373200	47.0	FAL LAL	WWSF/0-33.0[ea] LAL/33-47[ac]	Same Same	PART/33.0 PART/14.0	D.O.	M 2000		IBI = 20-62	P - G	B,C,H	SED,HAB,NUT,DO, FLOW,TURB,NH_3,/CL,BY,PSB,PWL, PSM,URB,SB,CE		197,144, 147,131, 142,3, 161
Rocky Run T23NR07ES23 WBIC: 1401100	7.0	DEF	WWSF/0-7.0[e]	Same	PART/7.0	No						CL,BY,PSB,PWL NUT		28,3
Wisconsin Riv. Un. Ch. T23NR08ES16 WBIC: 1402400	1.0	DEF	WWSF/0-1.0[e]	Same		No								197
Wisc. Riv. Un. Ch. T23NR08ES16 WBIC: 1402500	1.0	DEF	WWSF/0-1.0[e]	Same		No								197
Unnamed Ditch T24NR07ES28 WBIC: 1399000	1.0	DEF	UNK/0-1.0	UNK		No								
Unnamed Creek T24NR6ES18 WBIC: 1400000	1.0	LAL	LAL/0-1.0[c]	UNK	FULLY/1.0	No						PSB/ PSM/		75
Unnamed Ditch T22NR03ES23NENW WBIC:1370000	2.0	DEF	UNK/0-2.0	UNK/2.0	UNK/2.0	No	E	U				CM		161
Unnamed Creek T24NR6ES11 WBIC: None	1.0	LAL	LAL/0-1.0[a]	SAME	FULLY/1.0	No						PSM/		74
20 Unnamed Creeks	32.0													

TABLE UW11-2. Mill Creek Watershed, Portage and Wood Counties. NPS Lake Rank: Low

Lake Name	Fishery Use	Access	Area (acres)	Max/Mean Depth (Feet)	Lake Type	Watershed Drainage	Phos. Class	TSI Range	Fish Advis.	LMO	Impair Source/Impact	Aquatic Plant Data	Exotics	Self-Help Monitoring	Recom.
Marshfield Pond #1 T25NR03ES18 1400700			7.0	10/NR	DG	.71	2C		NT	No	No	No	No	No	
Marshfield Pond #2 T25NR03ES18 1400900			19.0	11/NR	DG	.24	2C		NT	No	No	No	No	No	
Anderson Lake T25NR07ES22 1411300	Panfish		12.0	6/NR	DG	.93	2C		NT	No	No	No	No	No	
8 Unnamed Lakes			29.0												

Table UW11-3. Mill Creek Watershed, Portage and Wood Counties. Wisconsin Pollution Discharge Elimination System Program

Facility	Permit No./ Expires	Industrial Or Municipal	Receiving Stream/ Classification G = groundwater	Q710 of Receiving Stream	Design Flow (MGD)	Variances	Phosphorus Limit	Facility Plan Candidate? Y/N	Waste Load Allocation	Recommendations
Junction City WWTP	3/31/05	M	Trib to Mill Creek, Marginal	0	0.108	None	None	No	No	Continue to remove clear water from the collection system
Marshfield Wastewater Treatment Facility	0021024 30-Jun-01	M	Mill Creek LAL	0.03 cfs	3.5	No	1.0 mg/L	No	No	None
Hewitt Sanitary District WWTP	0031275 31-Dec-04	M	Mill Creek LAL	0 cfs + Marshfield effluent	0.148	No	No	No	No	None
Blenker Sherry Sanitary District WWTP	0031950 30-Sep-04	M	Mill Creek WWSF	0.4 cfs + Marshfield effluent	0.028	No	No	No	No	None
Milladore Wastewater Treatment Facility	0022381 31-Dec-04	M	Unnamed tributary to Mill Creek LAL	0 cfs	0.14	No	No	No	No	None
Foremost Farms USA Cooperative – Marshfield	003782 31-Mar-05	I	Unnamed tributary to Mill Creek LAL & G	0 cfs	Minimal amounts of any access clear water (minimal)	No	1.0 mg/L	No	No	None
Stora- Enso Water Renewal Center	12/31/04	I	Wisconsin River FFAL	Q4,3 870	NA	NA	NA	NA	No	No

Table UW11-4. Mill Creek Watershed. Wood & Portage Counties. NPS Groundwater Rank: High

Municipal Water Supply Data

Junction City | Sanitary Survey Date 1998 | Population 506 | PWSID 75001278 | Ave. Day Use 55,000 Gallons

Well	Entry Point	Unique Well No.	Well Const. Report	Geology	Well Depth	Casing Length	Borehole Interval	Capacity (gpm)	Nitrate (ppm)	Treatment	Wellhead Protection	Calculated Fixed Radius	Flood Plain	Wetland
3	200	BG708	Yes	Granite	219'	38'	38'-219'	45	0.3	ClCT, PO4	Yes	<1200'	No	No
4	200	FJ 327	Yes	Granite	300'	40'	40'-300'	36	0.3	ClCT, PO4	Yes	<1200'	No	No

Marshfield | Sanitary Survey Date 1998 | Population 19,991 | PWSID 77201652 | Ave. Day Use 2.15 MGD (MGD = Million Gallons per Day)

Well	Entry Point	Unique Well No.	Well Const. Report	Geology	Well Depth	Casing Length	Screened Interval	Capacity (gpm)	Nitrate (ppm)	Treatment	Wellhead Protection	Calculated Fixed Radius	Flood Plain	Wetland
1	200	BH577	Yes	Sand & Gravel	56.5'	41.5'	41.5'-56.5'	260	2.6	unused	Yes		No*	No*
2	200	BH547	No	Sand & Gravel					2.6	unused	Yes	<1200'	No*	No*
3	200	BH548	No	Sand & Gravel				40	2.6	unused	Yes	<1200'	No*	No*
4	200	BH549	Yes	Sand & Gravel	58'	42'	42'-52'	110	2.6	Cl, FL, pH	Yes	1432'	No*	No*
5	200	BH550	No	Sand & Gravel				500	2.6	Cl, FL, pH	Yes	2159'	No*	No*
6	200	BH551	No	Sand & Gravel				150	2.6	Cl, FL, pH	Yes	1267'	No*	No*
8	300	HJ142	Yes	Sand & Gravel	60'	45'	45'-60'	145	1.1	A, Cl, FL, pH	Yes	1246'	No*	No*
10	300	BH555	No	Sand & Gravel	63'			235	1.1	A, Cl, FL, pH	Yes	1526'	No*	No*

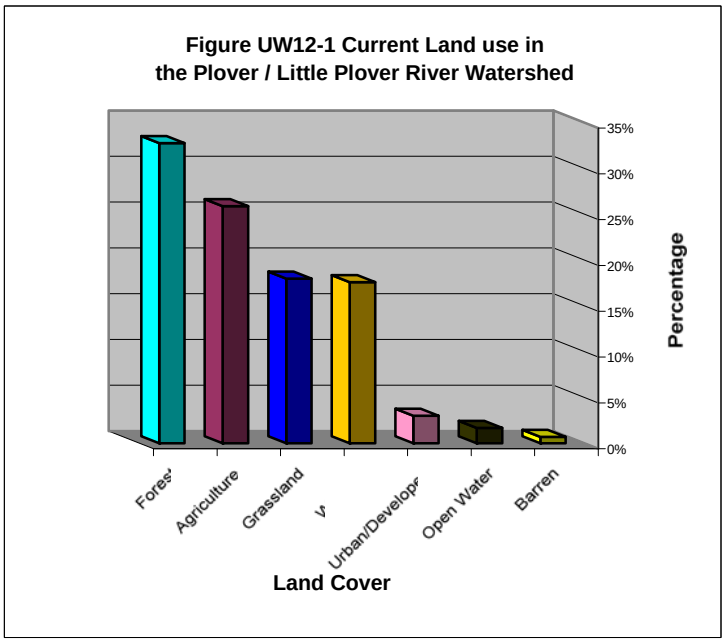
* Area around the wells may have been floodplain or wetland designation, but was filled during construction.

PLOVER/LITTLE PLOVER RIVER WATERSHED (UW12)

WATERSHED SUMMARY

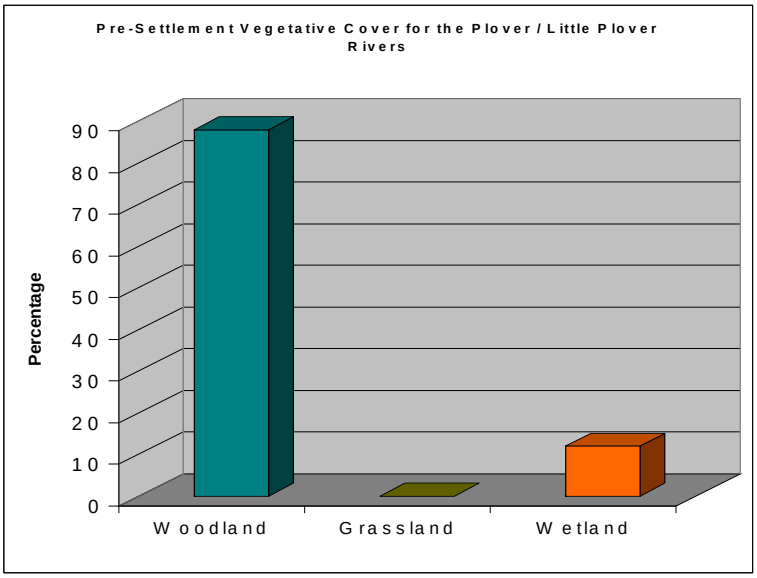
The Plover/Little Plover River Watershed (Map UW12-1) is located in the counties of Portage, Marathon, Langlade and Shawano. The Upper Wisconsin River Task Forces' Nonpoint Source Pollution Management Plan (1979) indicated that the Plover/Little Plover River Watershed is significantly affected by NPS pollution. Several partners and agencies are making efforts to restore in-stream habitat, develop conservation easements and acquire privately owned land adjacent to the streams.

The Plover River / Little Plover River Watershed was ranked using the Nonpoint Source Priority Watershed Selection Criteria. Based on available surface and groundwater data, the overall ranking is medium, establishing a moderate priority for future grant eligibility through the State Nonpoint Source Pollution Abatement Program.



The Portage County Animal Waste Plan ranked the Plover River/Little Plover River Watershed as first priority of 12 watersheds for NPS control of animal waste and sensitivity to groundwater contamination. The watershed was ranked sixth for surface water pollution as well.

The soil erosion control plans for Portage and Marathon Counties indicate that portions of the watershed have high soil erosion rates, particularly in the towns of Stockton (within Portage Co. priority area No.1) and Norrie in Marathon County.



Water quality problems include in-stream sedimentation due to streambank pasturing, high in-stream nitrate and pesticide concentrations due to excess chemical applications. The Plover River Alliance in cooperation with Golden Sands RC&D, Portage and Marathon County LCD's and the University of Stevens Point were awarded a River Protection Grant to study water quality and landuse in the Plover River Watershed. The results of this study will assist Land Conservation Departments in identifying high priority locations that will allow them to focus their efforts on specific sites. Results and management recommendations will be available when the study is complete.

POPULATION DEMOGRAPHICS

The Plover River/Little Plover River Watershed contains eight percent of the entire basins' population making it the third most populated watershed in the Central Wisconsin River Basin. The population has grown by 24 percent in the last 30 years. The 10-year projection estimates the population to increase by 8% but beyond 10 years the population will remain at the average growth rate. One of the reasons for the sharp increase in the watershed's population is the extensive development of sub-divisions (North Central Wisconsin Regional Planning Commission, 2000, Wisconsin Department of Administration, 2000).

Land use before settlement was slightly different from current land use. Woodlands dominated the landscape before the watershed was settled; then woodlands were converted to agricultural fields. Currently, dairy farms and livestock operations are at a decline and urban development is starting to increase outside the city boundaries. The percentage of forested land will most likely decrease in the next 10 years making room for urban and industrial developments (Enterprise Information, 1998).

WATERSHED STREAMS

Streams within the Plover/Little Plover River Watershed support valuable cold and warm water fisheries that give residents an abundance of educational and recreational opportunities. Approximately 27% of the streams within the watershed have been identified as Exceptional Resource Waters (ERW). Nonpoint sources of pollution and residential development within the watershed threaten these valuable water resources. A summary of watershed streams is found in Table UW12-1. Figure UW 19-3 indicates total number of stream miles in the Plover/Little Plover River Watershed.

Aniwa Creek

Aniwa Creek is presently classified as a Class II trout stream. Beaver and beaver dams are affecting this stream. Additionally, streambank pasturing occurs above and below Sportsman's Drive Road, resulting in destruction of fish habitat and stream sedimentation. Overall, limitations to the stream habitat include increased stream temperatures, flashy streamflow, relatively wide stream channel, lack of adult fish cover, sedimentation, and streambank erosion.

Little Plover River

The Little Plover River is classified as a warm water game fishery (Springville Pond) and Class I trout stream. Recent declines in the reproductive success of trout elicit concerns about the causes that are still highly speculative. However, heavy chemical application may be interfering with trout reproduction and trout food sources. Pesticides have been detected in sediments and nitrate concentrations have measured as high as 9.1 ppm. A University of Wisconsin-Stevens Point study determined high-capacity irrigation wells and municipal wells reduce streamflow. Current estimates indicated that agricultural pumping has reduced streamflow by an estimated 10%. A groundwater flow model predicts that by the year 2005, pumping of municipal wells in Plover will reduce the baseflow of the Little Plover by an additional 40%. According to the Portage County Animal Waste Plan, the Little Plover River area is ranked as the most susceptible to groundwater contamination from animal waste sources. This may also hold true for pesticides.

Figure UW12-3. Total number of Stream miles in the Plover / Little Plover River Watershed.

Exceptional Resource Waters = 33.15 (ERW or Cold I)

Outstanding Resource Waters = 20.6 (ORW or Cold II)

Cold III = 14.5

Warm Water Sport Fishery = 35.75 (WWSF)

Warm Water Forge Fishery = 3.0 (WWFF)

Limited Forage Fishery = 0.0 (LFF)

Limited Aquatic Life = 0.0 (LAL)

Unknown Classification = 16.0
Total of Stream Miles = 123.0
Number of Streams / Ditches= 30

Land use in the upper one third of the Little Plover River Valley includes irrigated farming for corn and potatoes. Expanding subdivisions constitutes the lower two thirds. Soil and wind erosion concerns also occur in this portion of the watershed.

Lost Creek
Lost Creek is presently classified as a Class I trout stream. The streambed is heavily silted in the lower sections. Applied agricultural chemicals and cropland erosion are of significant concern to the stream's water quality. This may be the result of farming practices nearing stream banks of the creek. The creek would benefit from in-stream habitat improvement work.
A fish kill occurred in 1973.

Plover River
The Plover River is classified as a warm water game fishery below STH 153 and Class I, II, and III trout waters above HWY 153. Fishery surveys, completed in 2000, found localized low density trout populations below STH 153. Recent surveys also indicated that warm water temperatures and poor habitat conditions impact mid-portions of the river. This section of the river is very wide and shallow, lacking pools, riffles and sufficient fish cover. Excessive nutrients and sediment were also recorded. Portions of the stream are suitable for stream habitat improvement. Trout Unlimited and the Department are proposing to complete in-stream habitat work down to STH 153 within the next ten years.

Biotic index values on samples taken from the Plover River have indicated excellent, good and fair water quality. A stream survey conducted in 1978, indicated cattle were impacting certain sections of the river. Both streambank pasturing and animal waste run-off occurred at that time. The Plover River watershed is also susceptible to both wind and water soil erosion (Shelbrack). The Jordan Project, a hydroelectric project, (FERC No. 10903) is located on the river.

North Creek
North Creek is a six-mile coldwater tributary of the Plover River. The stream is a Class I trout stream, however, a fishery survey in 2000 completed near the mouth found no trout at that site. Additional surveys should be completed to determine if the stream still supports a coldwater fishery. Limiting factors of in-stream habitat, near the mouth, include minimal streamflow and lack of pools and fish cover.

WATERSHED LAKES

The Plover/Little Plover River Watershed contains several natural and some human impoundments. Water quality conditions vary in each lake depending on lake type, localized watershed land use and shoreline development. Over two thirds of the lakes in the watershed are seepage lakes that are generally sensitive to surface and groundwater contamination. Maintaining or creating natural shoreline buffers will help protect in-lake water quality. With the basin being so populated and the surface waters being so heavily used, creating and maintaining surface water management plans should be top priority. A summary of watershed lakes is found in Table UW12-2.

WISCONSIN POLLUTION DISCHARGE ELIMINATION (WPDES) PROGRAM

Kimberly Clark
Kimberly Clark is a paper mill that makes fine grade papers. The mill and treatment plant is located at 3243 Whiting Road in the Village of Whiting. The treatment plant treats about 2.4 MGD on average. The plant consists of a bar screen, primary clarification, activated sludge basins, final clarification, and rotary drum sludge thickening. The permit has seasonal water quality based effluent limits for BOD and suspended solids from May through October. Treated wastewater is discharged to the Biron Flowage of the Wisconsin River at river mile 218.7. Sludge from the treatment is hauled to a facility where it is burned as fuel for generating electricity.

Stevens Point WWTP

The City of Stevens Point upgraded portions their treatment plant in 1996. The plant is located at 301 Bliss Avenue in the City of Stevens Point. The plant is designed to treat 5.23 MGD of wastewater with an organic load of 8200 pounds of BOD per day. The plant consists of bar screens, pista grit system, primary clarification, biological phosphorous removal using anoxic and aerobic basins, final clarification, ultra violet light disinfection, dissolved air floatation sludge thickening, anaerobic sludge digestion, rotary drum sludge thickening, and sludge storage. The plant discharges to the area known as the Stevens Point Flowage between the Stevens point Dam and the Whiting Dam at river mile 222.2. Sludge from the treatment plant is seasonally applied to farm fields.

Whiting WWTP

The Village of Whiting upgraded a portion of their treatment plant in 1998. The plant is located at 2500 Strange Street in the Village of Whiting. The plant was designed to treat 0.31 MGD of wastewater with an organic load of 530 pounds of BOD per day. The plant consists of a comminutor, influent pumps, flow dampening chamber, primary clarification, anoxic/aerobic biological phosphorous removal, final clarification, ultra violet light disinfection, aerobic sludge digestion, anaerobic sludge digestion, rotary sludge thickening, and covered sludge drying beds. The plant discharges down a long out fall to the Stevens Point Flowage of the Wisconsin River between the Whiting Dam and the Kimberly Clark Dam at river mile 219.4. Sludge from the treatment plant is seasonally land applied to approved fields.

Village of Hatley

The Village of Hatley operates a wastewater treatment facility that consists of a sequencing batch reactor with a 40,000-gallon aerobic digester (Table UW12-3). Effluent is decanted to three different seepage cells in series. The current plant is experiencing compliance problems (nitrates in the ground water). A new plant is being designed and funding is being sought. The design life of the Wastewater Treatment facility is the year 2012. Major improvements occurred in 1993 and it is currently receiving 38,000 gallons of effluent a day. The treatment types: sequential batch reactor (SBR), seepage pond and aerobic digestion.

GROUNDWATER

The Plover and Little Plover River's Watershed is a long, narrow watershed extending from the glacial moraines in southwestern Langlade County to the central sand plains near Stevens Point. Four municipal water systems extract all their water from this watershed. Municipal Water Supply summary is found in Table UW12-4 and additionally, the NPS ranking for ground water and well descriptions.

Hatley, near the north end of the watershed, has a single well supplying the drinking water for their community. This well is a shallow sand and gravel well with a capacity of 320 gpm. The water is of excellent quality and only chlorine is added to provide a level of disinfection for the distribution system. A Well Head Protection Program is in effect and the groundwater appears to be only moderately influenced by the agricultural surroundings and the many septic systems that were recently eliminated with the construction of the municipal water and sewer systems in 1993. The nitrate concentration in this well is 3.38 ppm.

Plover has two wells in the central sands region of this watershed. The wells produce plenty of water at over 1500 gpm each, but the nitrate levels are above the 10-ppm maximum contaminant level (MCL). A nitrate treatment plant using anion exchange resin is used to remove the nitrates in a portion of the outflow. The remainder is blended in to achieve the desired nitrate residual. The water is also provided with chlorination and fluoridation before it is distributed to the customers.

The Village has experienced tremendous growth since the water system was installed in 1989 and is in the process of constructing another well. Finding a well with adequate quantity is not a problem, but the new

well will require nitrate removal as well. The Village has been unable to find any sources with nitrates below the MCL.

The Village has been very aggressive in implementing their Well Head Protection Plan and the wells remain free of all other contaminants at this time.

The Village of Whiting was the first community in this State to construct a nitrate removal system for their water supply. For nearly 15 years, the Village was unable to use their well due to elevated concentrations of nitrates. The Village relied on water purchased from the City of Stevens Point to supply their customers with water. In 1992, the Village constructed an anion exchange plant to remove nitrates from Well 1and no longer had to purchase water from the City of Stevens Point. Another well was recently constructed adjacent to Well 1 to provide additional water for the village. Finding quantities of water in this area is not a problem; the sand and gravel aquifer is very productive.

The anion exchange process is identical to that used by the Village of Plover and chlorination and fluoridation are also provided. The Village has a Well Head Protection Program in effect and no other contaminants have been identified in either of these wells.

The City of Stevens Point has been very lucky in avoiding the nitrate problems other communities in this watershed have experienced. Well 5 for the city has the highest concentration of nitrates at above 8 ppm. Most of the other wells average around 2 ppm with Well 4 in between at 4 ppm. This is mainly due to the city wellfield being located on the northern edge of the central sands region, with less intensive agriculture, more forest and conservation coverage on the landscape.

Stevens Point does have problems with elevated manganese, which they are currently keeping under control with the addition of polyphosphates. Polyphosphates serve two roles in the City; it sequesters the manganese and reduces the corrosively of the water by coating the internal plumbing materials. Well 4 has much higher concentrations of both manganese and iron; a new filtration plant was constructed to allow this well to assume a more active production role. Aeration, chlorination, potassium permanganate, fluoridation and pressure filtration are provided at this well. The other wells are provided with chlorine, fluoride and polyphosphate additions.

The sand and gravel aquifer is very prolific, with yields between 1000 and 2000 gallons per minute. The elevated manganese has caused problems with plugging of the screens and the immediate formation near the well screens. This reduces the capacity of water available to the well over time. The City's newest well was constructed as a Ranney collector to reduce the velocity into the screen and provide for longer screen life. This well is capable of producing over 4000 gpm.

The City has a Well Head Protection Program and ordinance, which they are very aggressive in enforcing. They also have numerous monitoring wells surrounding their wellfield, which they monitor for early warning of any potential contamination that may impact these wells.

The Central Wisconsin Groundwater Center of the University of Wisconsin-Stevens Point conducted 1,098 well water tests for nitrates throughout the watershed. Of all the wells tested 18.7 percent of them contained nitrate concentrations greater than 10 parts per million. Of the 18.7 percent, 2.4 percent of the wells had nitrate concentrations of 20 parts per million or greater. The Department of Health and Safety set safe drinking water limits at a maximum of 10 parts per million. Any nitrate concentration over 10 parts per million or greater is not concerned safe to drink by the state of Wisconsin.

Of the 193 wells tested for triazine in the Plover/Little Plover Watershed, 3.6 percent of the wells tested had concentrations at 1.1 parts per billion or greater of triazine. None of the wells sampled were over 3.0 parts per billion. Since triazine can not be used to set standards for drinking water limitations, it is strongly recommend that if a test result comes back above 1 parts per billion of triazine, the well should be tested further for total concentrations of atrazine.

Higher nitrate concentrations are found in poorly constructed shallow wells (<28' deep). Most watersheds have some localized groundwater contamination problems because of various land use and waste disposal practices. There are a significant number of high capacity wells within this watershed, which may need to be properly sealed if they are no longer being used. Many wells with in the water shed produce higher than desirable concentrations of iron, and often times require treatment to avoid staining of household fixture.

WATERSHED RECOMMENDATIONS

1. Fisheries Staff should further conduct monitoring on Lost Creek and North Creek to verify the presence of trout.

2. Fisheries and Land Staff should continue to pursue land acquisition or leases along the Plover River for streambank protection and habitat improvement.

3. Wastewater Staff should conduct site visits along the Plover River (T28N, 9E, S25) to determine if sand and gravel operations are impacting water quality.

4. Plover River's Jordan Project hydroelectric project proposal should maintain run-of-river flows to protect water quality, fish and aquatic life.

5. Local government, partnership groups and the Department of Natural Resources should combine efforts to develop and implement innovative land-use strategies to protect valuable water resources within the Plover/Little Plover River Watershed.

6. Fish and Aquatic Habitat Staff should conduct baseline monitoring on watershed lakes.

7. Plover/Little Plover River Watershed should be considered a priority for future grant eligibility under the State Nonpoint Source Pollution Abatement Program.

8. Basin staff should encourage the University of Stevens Point to continue with their monitoring efforts to study groundwater in proximity of the Little Plover River. In the absence of a regulatory authority, we should work with local groundwater users to reduce or minimize potential impacts to aquatic life.

Table UW12-1. Plover / Little Plover River Watershed. Marathon, Portage, Shawano and Langlade Counties. Square Miles: 195 Stream Miles: 123. NPS Stream Rank: Medium.

Stream Name	Length (miles)	Codified Use	Biolgical Use (Existing)	Biological Use Potential	SUPPORTING USE FULLY-PART-NOT-THR/MILES	303d Listed Water	Assess. Categ. M E U	Tren	Integ Indic	Integ Stat.	Data Level[i]	PROBLEMS SOURCE//IMPACT	COM N R	REF.
Aniwa Creek T29NR10ES10 WBIC: 1408500	5.0	Cold	Cold II/0-5.0[b]	Same	PART	No	M 2000	U	IBI = 30	Fair	B,H	HAB,TEMP/BDAM, PSB,IMP		1, 2, 3, 4,19
Hay Meadow Creek T24NR08ES18 WBIC: 1409800	4.0	DEF	Cold/0-4.0[e]	Same		No	U	U						5
Little Plover River T23NR08ES16 WBIC: 1402100	6.0	DEF ERW	WWSF/0-1.25[e] Cold 1/1.25-6[b]	Same Same	PART/1.25 FULLY- THR/4.75	No	M 2000	U	W. IBI = 12 Cold IBI = 90	V P E	B,H	NPS,SED,PST,TEMP ,BASEFLOW,HAB,MI G/BY,WD,IRR, SB,HM,MUNP,IMP		1,5,6,7,8 ,910,11, 16,17,18 ,19
Lost Creek T24NR08ES26 WBIC: 1403400	4.0	ERW	Cold I/0-4.0[b]	UNK	UKN	No	U	U				SED,FLOW,HAB, PST/CL,DCH		5,12
North Creek T25NR09ES18 WBIC: 1404100	6.0	ERW	Cold I/0-6.0[b]	Same	UNK	No	M 2000	U	IBI = 5	VP	B,H			1, 5,19
Pike Lake Creek T27NR09ES26 WBIC: 1406100	3.0	DEF	WWFF/0-3.0[e]	UNK	UNK	No	U	U						2, 6, 13
Plover River T23NR08ES09 WBIC: 1402800	64.0	DEF Cold Cold ERW	WWSF/0-32.5[e] Cold III/32.5-47[b] Cold II/47-50.6[b] Cold I/50.6-64[b]	Same UN K UNK Same	PART PART PART/3.6 PARt/13.4	No	M 2000	U U I I	W. IBI =40-80 C. IBI =20-90	F – E P – E	B,H	SED,NPS,HAB, TEMP/BY,GR. PIT,WD,BDAM,PSB		1,2,4,5,6 ,7,8,13,1 4,15,16, 17,18,19
Rice Lake Creek T27NR09ES13 WBIC: 1406400	1.0	DEF	WWSF/0-1.0[e]	Same	UNK	No	E	U						2, 4
Wis. Riv. Un. Channel WBIC: None	1.0	DEF	WWSF/0-1.0[e]	Same	UNK	No	E	U						2
Unnamed Ditch T24NR8ES26 WBIC: 1403300	1.0	DEF	UNK/0-1.0	UNK	UNK	No	U	U						1
Unnamed Creek T26NR9ES16 WBIC: 1405300	2.0	Cold	Cold II/0-2.0[b]	Same	UNK	No	E	U						1
Unnamed Creek T26NR9ES31 WBIC: 1404700	2.0	Cold	Cold II/0-2.0[b]	Same	UNK	No	E	U						1
Unnamed Creek T26NR9ES32 WBIC: 1404900	2.0	Cold	Cold II/0-2.0[b]	Same	UNK	No	E	U						1
Unnamed Creek T27NR9ES11 WBIC: 1406800	1.0	Cold	Cold II/0-1.0[b]	Same	UNK	No	E	U						1
Unnamed Creek T27NR9ES26 WBIC: 1406000	1.0	Cold	Cold I/0-1.0[b]	Same	UNK	No	E	U						1
Unnamed Creek T28NR9ES25 WBIC: 1407300	0.4	ERW	Cold I/0-.4[b]	Same	UNK	No	E	U						1

Unnamed Creek T28NR9ES36 WBIC: 1407100	0.3	ERW	Cold I/0-.3[b]	Same	UNK	No	E	U						1
Unnamed Creek T28NR10ES05 WBIC: 1407800	0.3	ERW	Cold I/0-.3[b]	Same	UNK	No	E	U						1
Unnamed Creek T28NR10ES19 WBIC: 1407400	3.0	ERW	Cold I/0-3.0[b]	Same	UNK	No	E	U						1
Unnamed Creek T28NR10ES18 WBIC: 1407500	1.0	ERW	Cold I/0-1.0[b]	Same	UNK	No	E	U						1, 15
10 Unnamed Creeks	15													

Table UW12-2. Plover / Little Plover River Watershed. Marathon, Portage, Shawano and Langlade Counties.
Nonpoint Source Lake Rank: Medium

Lake Name	Fishery Use	Access	Area (acres)	Max/Mean Depth (Feet)	Lake Type	Watershed Drainage	Phos. Class	TSI Range	Fish Advis.	LMO	Impairment & Source / Impact	Aquatic Plant Data	Exotics	Self-Help Monitoring	Recommends.
McDill Pond T23R08ES09 1403200	Panfish LM Bass N. Pike	BR	261.0	15/5	DG	163	2A	46.6	NT	No	NPS,URB/SED NUTS		CLP	SECCHI	.
Big Bass Lake T26NR09ES20 1405200	Panfish	BR	174.0	13/5	SE	.7	1A	47.1	None	No	NPS/NUTS	1999			
Pike Lake T27NR09ES24 1406300		BR	205.0	34/13	DG	3.2	1A	51.07	None	No	NPS/HAB, NUTS SED	1999			
Springville Pond T23NR08ES15 1402300	Trout Panfish LM Bass	BR	18.0	12/NR	DG	23.26	2C		NT	No	NPS/HAB,NUTS URB/SED		ERW CLP		
Plover River Flow. T23NR08ES09 1403000	Panfish LM Bass N. Pike		30.0	10/NR	DG		2C		NT	No					
Jordan Pond T24NR08ES12 1403600	Panfish LM Bass N. Pike	BR	84.0	10/4	DG	4.68	2C		NT	No	NPS/HAB,NUTS SED			SECCHI	
Bentley Pond T25NR09ES07 1404500	Panfish N. Pike	NW	86.0	5/2	DG		2C		NT	No	NPS/HAB NUTS,SED				
Bakers Lake T25NR09ES32 969500	Panfish LM Bass N. Pike	W	16	35/NR	SE	.3	1C		NT	No					
Bluebird Lake T23NR08ES14 972300					SE		1C			No					
Glisezinski Lake T25NR09ES04 987100	Panfish LM Bass N. Pike	R	40.0	17/4	SE	.25	1A		NT	No	BY/NUTS				

Lake Name	Fishery Use	Access	Area (acres)	Max/Mean Depth (Feet)	Lake Type	Watershed Drainage	Phos. Class	TSI Range	Fish Advis.	LMO	Impairment & Source / Impact	Aquatic Plant Data	Exotics	Self-Help Monitoring	Recommends.
Lake Clarre T23NR08ES23 994500			17	15/NR	SE	.06	1C		NT	No					
Lake Susan T24R08ES21 996300			23	24/NR	SE	.10	1C		NT	No					
North Twin Lake T25NR09ES16 1007300			37	7/	SE		1C			No					
South Twin Lake T25NR09ES21 1015300			53	9/	SE		1C			No					
Chain Lakes T26NR09ES30 976400			8		SE		1C			No					
Little Bass Lake T26NR09ES20 998100	Panfish LM Bass	BR	11.0	37/NR	SE	.9	1C		NT	No	Winterkill				
Little Lake T27NR10ES31 999400			19.0	9/NR	SE		1C		NT	No					
Mission Lake T27NR09ES36 1005400	Panfish LM Bass Muskie	BR	107.0	26/12	SE	61	1C	46.1	NT	No	NO				
Mystery Lake T28NR10ES03 1007100			12.0	8/NR	SE	35	1C		NT	No					
Swamp Lake T26NR09ES22 1020800			12.0	6/NR	SE	57	1C		NT	No					
Wadley Lake T26NR09ES33 1177600	Panfish LM Bass N. Pike	BR	46.0	27/9	SE	.9	1A		NT	No	NO				
Bear Lake T27NR09ES27 1405900	Panfish		55.0	16/NR	SE	.52	1C		NT	No	NO				
Lost Lake T27NR10ES06 1407000	Panfish LM Bass N. Pike	BR	42.0	22/NR		.9	1C	65.2	None	No	Winterkill				

Table UW12-3. Plover / Little Plover River Watershed Marathon, Portage, Shawano and Langlade Counties. Wisconsin Pollution Discharge Elimination (WPDES) Program.

Facility	Permit No./ Expires	Industrial Or Municipal	Receiving Stream/ Classification G = groundwater	Q710 of Receiving Stream	Design Flow (MGD)	Variances	Phosphorus Limit	Facility Plan Candidate? Y/N	Waste Load Allocation	Recommendations
Hatley, Village of	0036803 30 June 2003	M	G	NA	0.038	None	NA	Yes	No	Build a new plant
Stora- Enso	12/31/04	I	Wisconsin River FFAL	Q4,3 870	NA	NA	NA	NA	No	No
Kimberly Clark	3/31/05	I	Wisconsin River FFAL	1160	NA	WQBEL	1.0	NA	No	No
Whiting WWTP	12/31/2006	M	Wisconsin River FFAL	1100	0.310	No	1.4	No	NA	Regionalize treatment with Stevens Point or Plover
Stevens Point WWTP	63/30/05	M	Wisconsin River FFAL	1100	5.23	No	1.4	Yes	NA	Working on a facility plan to address organic loadings.

Table UW12-4. Plover / Little Plover River Watershed. Marathon, Portage Shawano and Langlade Counties. NPS Groundwater Rank: High

Municipal Water Supply

Hatley — Sanitary Survey Date 1998 — Population 400 — PWSID 73712562 — Ave. Day Use 30,000 Gallons

Well	Entry Point	Unique Well No.	Well Const. Report	Geology	Well Depth	Casing Length	Screened Interval	Capacity (gpm)	Nitrate (ppm)	Treatment	Wellhead Protection	Calculated Fixed Radius	Flood Plain	Wetland
1	1	AR339	Yes	Sand & Gravel	50'	36'	36'-50'	320	3.38	Cl	Yes	1998'	No	No

Plover — Sanitary Survey Date 2000 — Population 10,664 — PWSID 75007262 — Ave. Day Use 1.2 MGD (MGD = Million Gallons per Day)

Well	Entry Point	Unique Well No.	Well Const. Report	Geology	Well Depth	Casing Length	Screened Interval	Capacity (gpm)	Nitrate (ppm)	Treatment	Wellhead Protection	Calculated Fixed Radius	Flood Plain	Wetland
1	1	AV462	Yes	Sand & Gravel	110'	60' & 20'	60'-80' & 100'-110'	1500	5.33	ZN, Cl, Fl	Yes	2508'	No	No
2	2	AV465	Yes	Sand & Gravel	118'	78'	78'-118'	1900	8.4	ZN, Cl, Fl	Yes	3326'	No	No

Whiting — Sanitary Survey Date 1997 — Population 1824 — PWSID 75001366 — Ave. Day Use 250,000 Gallons

Well	Entry Point	Unique Well No.	Well Const. Report	Geology	Well Depth	Casing Length	Screened Interval	Capacity (gpm)	Nitrate (ppm)	Treatment	Wellhead Protection	Calculated Fixed Radius	Flood Plain	Wetland
1	1	BG715	Yes	Sand & Gravel	90'	55'	55'-90'	600	9.4	Zn, Cl, Fl	Yes	<1200'	No	No
7	7	MD170	Yes	Sand & Gravel	90'	68'	68'-90'	600	6.64	Zn, Cl, Fl	Yes	<1200'	No	No

Stevens Point — Sanitary Survey Date 1996 — Population 24,066 — PWSID 75001410 — Ave. Day Use 7 MGD (MGD = Million Gallons per Day)

Well	Entry Point	Unique Well No.	Well Const. Report	Geology	Well Depth	Casing Length	Screened Interval	Capacity (gpm)	Nitrate (ppm)	Treatment	Wellhead Protection	Calculated Fixed Radius	Flood Plain	Wetland
4	4	BG709	Yes	Sand & Gravel	56'	32'	32'-53'	1000	2.43	Cl, Fl, I, PO4	Yes	4052'	No	No
5	5	BG710	Yes	Sand & Gravel	72.5'	53'	53'-70'	1200	8.05	Cl, Fl, PO4	Yes	3627'	No	No
6	6	BG711	Yes	Sand & Gravel	90'	54'	54'-90'	2000	1.76	Cl, Fl, PO4	Yes	3253'	No	No
7	7	BG712	Yes	Sand & Gravel	80'	54.5'	54.5'-80'	2100	1.07	Cl, Fl, PO4	Yes	3858'	No	No
8	8	BG713	Yes	Sand & Gravel	85'	54.5'	54.5'-85'	2100	1.74	Cl, Fl, PO4	Yes	3542'	No	No
9	9	BG714	Yes	Sand & Gravel	80'	48.5'	48.5'-80'	1200	4.11	Cl, Fl, PO4	Yes	2677'	No	No
10	10	LG796	Yes	Sand & Gravel	87'	84'	3 laterals	2000	2.99	Cl, Fl, PO4	Yes	2979'	No	No

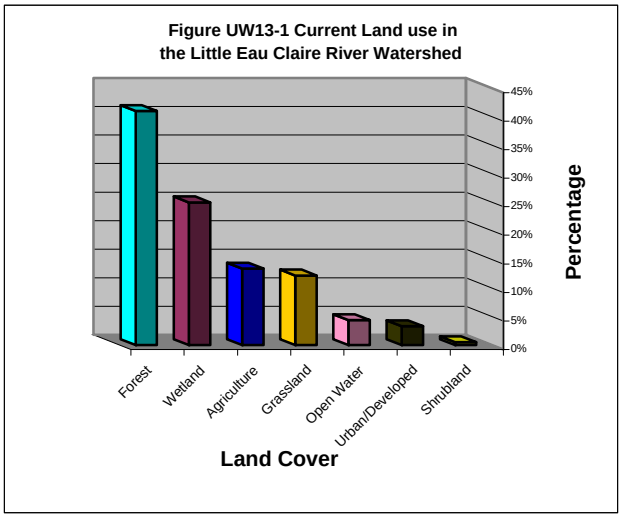
LITTLE EAU CLAIRE RIVER WATERSHED (UW13)

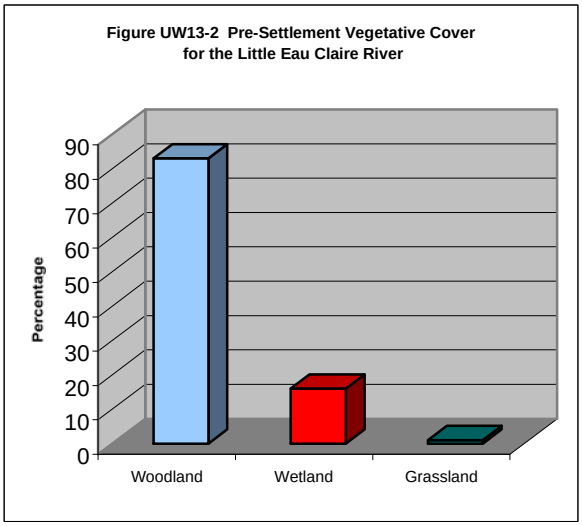
WATERSHED SUMMARY

The Little Eau Claire River Watershed (Map UW13-1) is located in Portage and Marathon Counties. This watershed was ranked using the Nonpoint Source priority Watershed Selection Criteria. Based on available surface and groundwater data, the overall Nonpoint Source ranking is low.

POPULATION DEMOGRAPHICS

Little Eau Claire River watershed makes up six percent of the basin's total population with an average annual growth (North Central Wisconsin Regional Planning Commission, 2000, Wisconsin Department of Administration, 2000). This watershed sits between two major cities: Stevens Point and Wausau. The pre-settlement era and the current land use are both dominated by woodlands and wetlands (Figure UW13-2, Figure UW13-1). With every little research being conducted in this watershed, the impacts of human and agriculture development are unknown, (Enterprise Information, 1998).





WATERSHED STREAMS

A summary of watershed streams is listed in Table UW13-1. Figure UW13-3 indicates the total number of stream miles in the Little Eau Claire River Watershed.

Hay Meadow Creek
Fishery surveys completed in 2000 found a forage fish community. In-stream habitat was limited by shallow channel depth, fine sediment deposition and the lack of pools, riffles and fish cover.

Little Eau Claire River
The Little Eau Claire River is classified as a forage fishery.

WATERSHED LAKES

There are 33 acres of unnamed lakes in the Little Eau Claire River Watershed (Table UW13-2).

DEWEY MARSH WILDLIFE AREA

The Dewey Marsh is a natural area located in the Little Eau Claire Watershed. It is predominantly a northern sedge meadow of moderate diversity. The meadow consists of blue-joint grass and sedges with

scattered sphagnum hummocks. Willow, hardhack, and alder are of minor importance as are scattered clumps of cattail and bur-reed. A portion of the headwaters of Hay Meadow Creek flow through the sedge meadow. Hay Meadow Creek is darkly stained soft water of low gradient. A 200-foot zone of paper birch, aspen, red maple and red oak buffers the sedge meadow. Rocks are exposed in many areas and there is little peat formation under the sedge mat. Wildlife using the area is diverse and includes the sharp-tailed grouse, sandhill crane, prairie chicken, saw-whet owl, yellow-headed blackbird and Henslow's sparrow. Soils range from peat to sandy loam.

Much of Dewey Marsh burned in the fall of 1976; it consumed large areas of peat in the natural area and a tamarack-spruce swamp. The site (5,677 acres) was designated as a state natural area in July 1983. The Dewey Marsh supports a variety of actives including hiking, bird watching, research and hunting for deer and small game. Dewey Marsh is located 6 miles north of Stevens Point.

Figure UW13-3. Total number of Steam miles in the Little Eau Claire River Watershed

Exceptional Resource Waters = 0.0
(ERW or Cold I)

Outstanding Resource Waters = 0.0
(ORW or Cold II)

Cold III = 0.0

Warm Water Sport Fishery = 0.0
(WWSF)

Warm Water Forge Fishery = 46.6
(WWFF)

Limited Forage Fishery = 0.0
(LFF)

Limited Aquatic Life = 0.0
(LAL)

Unknown Classification = 26.0
Total of Stream Miles = 72.0
Number of Streams / Ditches= 23

GROUNDWATER

There are no high capacity wells located in this watershed for municipality drinking water purposes.

The Central Wisconsin Groundwater Center of the University of Wisconsin-Stevens Point conducted 421 well water tests for nitrates throughout the watershed. Of all the wells tested 9.8 percent of them contained nitrate concentrations greater than 10 parts per million. Of the 9.8 percent, 1.2 percent of the wells had nitrate concentrations of 20 parts per million or greater. The Department of Health set safe drinking water limits at a maximum of 10 parts per million. Anything over that is not considered safe to drink by the state of Wisconsin.

Of the 82 wells tested for triazine in the Little Eau Claire River Watershed, 2.9 percent of the wells tested had concentrations at 1.1 parts per billion or greater of triazine. None of the wells sampled were over 3.0 parts per billion. Since triazine can not be used to set standards for drinking water limitations, it is strongly recommend that if a test result comes back above 1 parts per billion of triazine, the well should be tested further for total concentrations of atrazine.
Higher nitrate concentrations are found in poorly constructed shallow wells (<28' deep). Most watersheds have some localized groundwater contamination problems because of various land use and waste disposal practices.

WATERSHED RECOMMENDATIONS

1. Fish and Aquatic Habitat Staff should conduct wadable baseline monitoring on watershed streams focusing on Nonpoint Source Impact.

2. Locate unused High Capacity wells and improperly constructed dugs wells, and ensure that they are properly sealed (abandoned) in accordance with NR 812.

Table UW13-1. Little Eau Claire River Watershed. Portage & Marathon Counties. Square Miles: 123 Stream Miles: 72. Nonpoint Source Stream Rank: Low

Stream Name	Length (miles)	Codified Use	Biolgical Use (Existing)	Biological Use Potential	SUPPORTING USE FULLY-PART-NOT-THR/MILES	303d Listed Water	Assess. Categ. M E U	Tren	Integ Indic	Integ Stat.	Data Level[i]	PROBLEMS SOURCE//IMPACT	COM N R	REF.
Hay Meadow Creek T24NR08ES18 WBIC: 1409800	19.0	DEF	WWFF/0-19[e]	Same	PART/19	No	M 2000	U	IBI = 5	VP	B	SED,HAB,FLOW /SB		8,28,25, 161
Unnamed Creek T24NR08ES03 SENW WBIC: 1409900	3	DEF	WWFF/0-3.0[e]	Same	PART/3	No	M 2000	U	IBI = 34	F	B	SED,HAB		161
Lit. Eau Claire River T25NR07ES02 WBIC: 1423300	27.0	DEF	WWFF/0-27[e]	Same	UNK	No								8,28,44
18 Unnamed Creeks	21													
3 Unnamed Creeks	5													

Table UW13-2.Little Eau Claire River Watershed. Portage & Marathon Counties. Nonpoint Source Lake Rank: Low

Lake Name	Fishery Use	Access	Area (acres)	Max/Mean Depth (Feet)	Lake Type	Watershed Drainage	Phos. Class	TSI Range	Fish Advis.	LMO	Impair Source/Impact	Aquatic Plant Data	Exotics	Self-Help Monitoring	Recommends.
3 Unnamed Lakes	N/A	No	33.0	N/A					No	No	No	No	No	None	