

LITTLE ROCHE-A-CRI CREEK WATERSHED (UW01)

WATERSHED SUMMARY

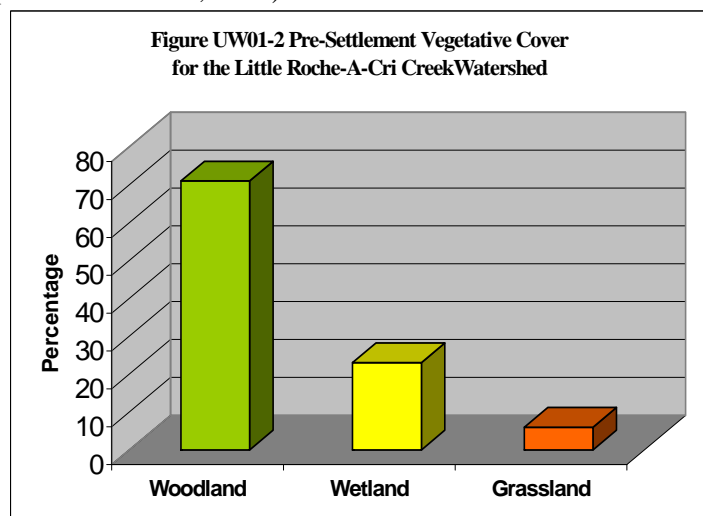
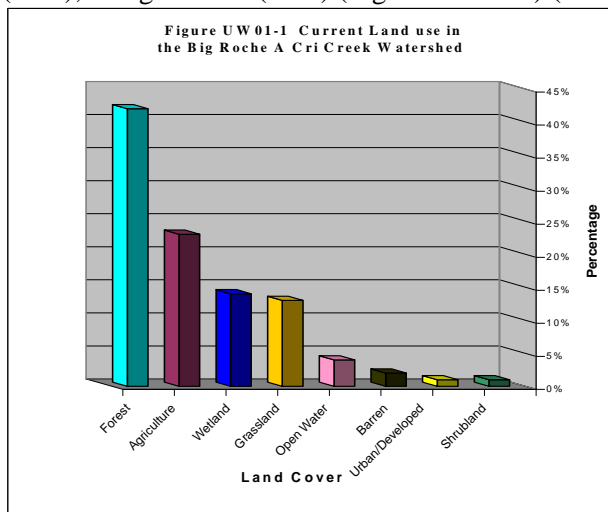
The Little Roche-A-Cri Watershed (Map UW01), situated in the southern part of the basin, is located in Adams, Waushara and Marquette Counties. This watershed was ranked using the Nonpoint Source Priority Watershed Selection Criteria. Based on surface and ground water data, the overall ranking is low.

The towns of Colburn, Richfield, and Lincoln are located within the northern portion of the watershed. These townships rank, as priority areas for erosion control, showing the greatest need for conservation practices (Adams County, 1987). Wind erosion, in conjunction with ditching, and pivot irrigation lead to nutrient and pesticide loading to local surface waters in the watershed.

POPULATION DEMOGRAPHICS

Little Roche-A-Cri Creek watershed is currently populated with 2,000 individuals. In contrast to other watersheds in the basin, this watershed has only increased by less than 0.75% since the 1970's. The population projection trend is headed slightly downward for the next 15 years (North Central Wisconsin Regional Planning Commission, 2000, Wisconsin Department of Administration, 2000).

According to land survey records from the mid-1800s, original vegetation consisted primarily of woodlands (Figure UW 01-2). Current land use in the watershed consists primarily of forested (42%), agriculture (23%), wetland (14%), and grassland (13%) (Figure UW01-1) (Enterprise Information, 1998).



WATERSHED STREAMS

A summary of watershed streams is listed in Table UW01-1. Figure UW01-3 indicates total number of stream miles in the Big Roche-A-Cri Creek Watershed.

Bingham Creek

Bingham Creek is classified as a forage fishery. A cranberry marsh lies near Bingham Creek below Unnamed Lake (T18N, R6E, Sec.21). Biotic index sampling in 1979 indicated very good and excellent water quality.

Carter Creek

Carter Creek is classified as a warm water sport fishery and a Class I, II, III trout fishery. Roche-A-Cri State Park, Carter Creek Fishery Area and Colburn Public Hunting Grounds are in the vicinity or adjacent to the creek. Beaver and beaver dams have cause severe problems, especially in the Colburn Public Hunting Grounds (Ironside, 2001).

In-stream cover is poor and the reproduction potential is limited due to lack of spawning areas. Rough fish have access from the Wisconsin River via Little Roche-A-Cri Creek. Biotic index sampling in 1979 indicated good and very good water quality. The town of Colburn is located in the upper watershed where wind erosion occurs (Adams County, 1987). Nutrients and pesticides may be entering the creek (Schultz, 1989).

Fordham Creek

Fordham Creek is recognized as the finest Class I trout stream in Adams County supporting strong naturally reproducing populations of Brook, Brown and Rainbow Trout (Ironside). Siltation and sedimentation are existing problems throughout the stream resulting in the loss of spawning substrate for fish as well as the loss of very valuable pool cover. A trout habitat improvement project was performed in the summer of 2001. The work that was done included the brushing of the streambank, the installation of brush bundles, which narrowed the stream channel, and the installation of overhead cover and mid-channel cover. Future work on the Fordham could include the installation of sediment traps to collect shifting sediment, the installation of overhead cover and mid-channel cover (Spaeth 2002).

The towns of Richfield and Lincoln is located within the upper portion of the Fordham Creek watershed. This is a wind erosion control priority area where sediment could enter the surface water. Nutrient and pesticide loading may also be impacting water quality (Schultz).

Little Roche-A-Cri Creek

Little Roche-A-Cri Creek is classified as warm water sport fishery and a Class I, II, III trout fishery. Habitat improvement efforts including overhead cover, mid-channel cover, the creation of pool cover, as well as bank stabilization may expand the potential of the Class II portion of Little Roche-A-Cri Creek (River Mile 13.7 - 22.0).

Biotic index sampling in the spring and fall of 1979 indicated very good and good water quality. The upper portions of Little Roche-A-Cri Creek lie in the town of Richfield. This is a wind erosion control priority area. Ditches in the watershed lead to nutrient and pesticide loading. The city of Adams WWTP discharges effluent to Little Roche-A-Cri Creek.

Figure UW01-3. Total number of stream miles in the **Little Roche-A-Cri Watershed.**

Exceptional Resource Waters = 11.2 (ERW or Cold I)
Outstanding Resource Waters = 10.3 (ORW or Cold II)
Cold III = 21.0
Warm Water Sport Fishery = 12.5 (WWSF)
Warm Water Forge Fishery = 20.0 (WWFF)
Limited Forage Fishery = 0.0 (LFF)
Limited Aquatic Life = 0.0 (LAL)
Unknown Classification = 24.0
Total of Stream Miles = 99.0
Number of Streams / Ditches = 16

WATERSHED LAKES

Friendship Lake, Adams County, is a 115-acre impoundment of the Little Roche-A-Cri Creek with a maximum depth of 16 feet. The fishery of the lake consists mainly of warm water fish species including large mouth bass and panfish. The stream flowing into the lake is classified as a Class I fishery. Brown trout have been known to reside in the lake once fall turn over has occurred. During the summer, increased plant densities have become a problem resulting in low dissolved oxygen levels and stagnate backwaters. The lake association along with the DNR have created a lake management plan and established self-help monitoring to reduce aquatic plant populations and other possible problems. A summary of the watershed lakes is found in Table UW01-2.

WISCONSIN POLLUTION DISCHARGE ELIMINATION SYSTEM PROGRAM (WPDES)

Table UW01-3 summarizes the WPDES in the Little Roche-A-Cri Creek Watershed.

Adams, Village of

The wastewater treatment plant is designed to discharge 300,000 gallons of water a day to the Little Roche-A-Cri Creek. The facility's oxidation ditches built in the year 2000 are designed to function until the year 2020. The average daily BOD is 510 pounds. The plant serves a population of 1,715 people.

Grande Cheese Company/Custom Ingredients Division

Grande Cheese Company/Custom Ingredients Division produces powders from liquid food products. The facility generates wastewater from cleaning equipment, boiler blowdown, noncontact cooling, and separating process. The wastewater is segregated into high, medium, and low strength flows. High strength wastewater (27,000 gallon per day), unusable by-products and some rinse waters, is landspread on approved sites. Medium strength wastewater (25,000 gallons per day), cleaning operations water, is discharged to a recently constructed ridge and furrow system. Noncontact cooling waters and reverse osmosis system waters are discharged to Little Roche-A-Cri Creek at a rate of 50,000 gallons per day.

GROUNDWATER

The Little Roche-A-Cri Creek Watershed contains the City of Adams and the Village of Friendship. These two municipalities share the same water source (Table UW01-4). The City of Adams owns three wells, two that withdraw water from the sandstone aquifer and one that draws from the shallower sand and gravel aquifer. Adams, in turn, sells water to the Village of Friendship.

The sandstone aquifer, which is protected by a clay overburden, was the traditional aquifer for these communities. The water is of very good quality with the exception of slightly elevated iron and manganese concentrations. Iron and manganese are naturally occurring elements that can cause aesthetic problems such as red, brown or black water, staining of fixtures and clothing as well as imparting taste and odors to the water.

The City elected to tap the shallower sand and gravel aquifer in the area with their newer Well 4 to avoid problems from iron and manganese. Iron and manganese were successfully avoided, but the shallower sand and gravel aquifer is more susceptible to contamination from the surface. Even though a wellhead protection program was adopted for this well, volatile organic compounds related to gasoline discharges have been detected in this well. Concentrations of these compounds remain lower than the Safe Drinking Water Act Standards therefore, the well remains in use and is monitored on an annual basis.

All three wells are very low in nitrates (less than 1.0 ppm) and fluoride is the only chemical added to the water to optimize the prevention of dental cavities. Chlorination facilities are available if the need for emergency disinfecting was to occur.

The Central Wisconsin Groundwater Center of the University of Stevens Point conducted well samples in every watershed in the Central Wisconsin Basin for nitrates and triazine. In the Little Roche-A-Cri Watershed 277 wells were tested for traces of nitrates, of the 277 wells tested, 13.7 percent of them were over the allowable 10 parts per million for safe drinking water. Of the wells that are over 10 parts per million, 5.7 percent of those wells contained concentration, greater than 20 parts per million. This exceeds the basin average by 3.2 percent and is the second highest percentage for concentrations greater than 20 parts per million or greater throughout the entire Central Wisconsin Basin.

Of the 29 wells tested for triazine in the Little Roche-A-Cri Watershed, 3.4 percent tested had concentrations over 1.1 parts per billion. None of the samples taken were over 3.0 parts per billion. Since triazine can not be used to set standards for drinking water limitations it is strongly recommended that if a test result comes back above 1 part 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 wadable baseline monitoring on watershed streams and lakes.

Table UW01-3.WPDES Sources within the Little Roche-A-Cri Creek Watershed, Adams & Waushara 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
Adams Wastewater Treatment Facility	0023159 31-Mar-04	M	Little Roche-A-Cri Creek WWSF	19 cfs	0.3	N	1.0 mg/L	N A new plant is being built	N	None
Grande Cheese Company/Custom Ingredients Division	0050547 31-Dec-02	M	Little Roche-A-Cri Creek WWSF and G	19 cfs	0.05 which goes to the creek and 0.052 which goes to G	pH (11.0 s.u.) daily maximum)	N	N	N	None

Table UW01-4 Little Roche-A-Cri Creek Watershed, Adams & Waushara Counties NPS Groundwater Rank: High

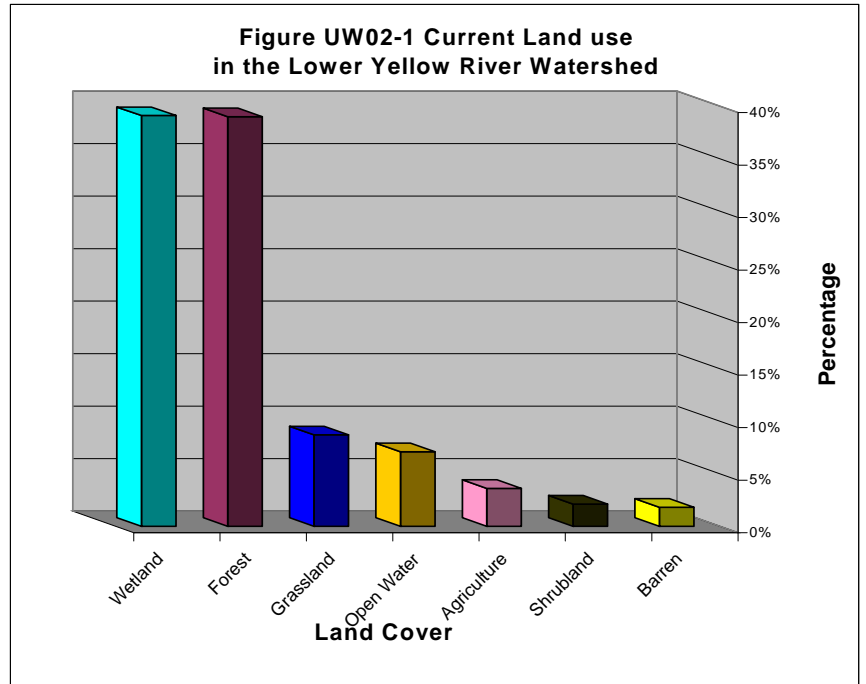
Municipal Water Supply Data														
Adams			Sanitary Survey Date 1996			Population 1741 (2,499 with Friendship)			PWSID 70101075			Ave. Day Use 350,000 Gallons		
Well	Entry Point	Unique Well No.	Well Const. Report	Geology	Well Depth	Casing Length	Bore/Screen Interval	Capacity (gpm)	Nitrate (ppm)	Treatment	Wellhead Protection	Calculated Fixed Radius	Flood Plain	Wetland
1	1	BF113	Yes	Sandstone	274'	160'	160'-274' (B)	300	0	FL, *Cl	No	<1200'	No	No
2	2	BF114	Yes	Sandstone	240'	166'	166'-240' (B)	510	0.12	FL, *Cl	No	<1200'	No	No
4	4	KP156	Yes	Sand & Gravel	126'	95'	95'-125' (S)	825	0.81	FL, *Cl	Yes	6937'	No	No

LOWER YELLOW RIVER WATERSHED (UW02)

WATERSHED SUMMARY

The Lower Yellow River Watershed (Map UW02) is located in Juneau, Wood and Jackson counties. This watershed was ranked using the Nonpoint Source Priority Watershed Selection Criteria. Based on surface and ground water data, the overall ranking is low.

The majority of the watershed streams are ditched. Very little information about current use classification is available. A portion of the watershed lies within the Necedah National Wildlife Refuge. The refuge was established as a breeding ground for migratory birds and other wildlife. Historically the land in and around the refuge was once a vast open peat bog with scattered islands of savanna and woodland. Once settlers arrived, the land use surrounding the refuge drastically changed.



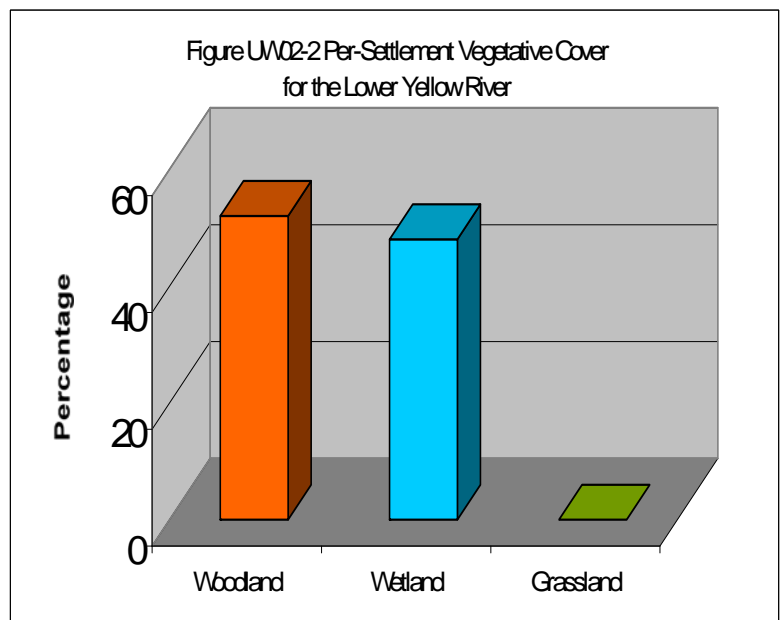
Fires from logging slash burned uncontrollably throughout the area. By the 1930's, the peat was mostly gone and many farmers were looking for land with richer soils and longer growing seasons.

Although agriculture proved economically unsuccessful, more than 94 miles of ditches and intermittent streams were left behind. Today they are used for water control.

POPULATION DEMOGRAPHICS

The Yellow River Watershed is currently populated with 6,134 individuals. The population projection trend is headed slightly downward for the next 15 years (North Central Wisconsin Regional Planning Commission, 2000, Wisconsin Department of Administration, 2000).

According to land survey records from the mid-1800's, original vegetation consisted of woodlands and wetlands in equal portions (Figure UW-02-2). The watershed has changed very little and still consists of extensive wetland and forested areas (Figure UW-02-1). Plans to protect the watershed from being over developed are being implemented (Enterprise Information, 1998).



WATERSHED STREAMS

A summary of watershed streams is listed in Table UW02-1. Figure UW02-3 indicates the total number of stream miles in the Lower Yellow River Watershed.

Remington Ditch

A cranberry marsh exists in the upper section of Remington Ditch.

Spencer Robinson Ditch

Biotic index sampling conducted in 1978 indicated fair water quality.

West Petenwell Ditch

West Petenwell Ditch is classified as a Class II trout stream. In response to an increase in agricultural irrigation, a water quality study was conducted by the DNR in 1981 and 1982. Water chemistry results indicated substantial increases in nitrite+nitrate nitrogen between the control and impact stations, suggesting nitrogen compounds associated with agricultural fertilizers are lost to groundwater. Low dissolved oxygen levels in lower portions of the ditch may be due to heavy aquatic plant growth and the low dissolved oxygen associated with incoming groundwater. Also, biotic index samples from this same location indicated "very poor" water quality, which correlates with low dissolved oxygen. Pesticides may also be a problem.

Fisheries Management installed halved logs in the ditch to improve in-stream cover for trout. This ditch is subjected to heavy fishing pressure.

Yellow River

The Yellow River is classified as a warm water sport fishery. Pirate Perch, which are on the state watch species list, inhabit the Yellow River. The village of Necedah and O'Dell Bay Sanitary District discharge their effluent to the Yellow River. Fish contaminant monitoring should be conducted above and below Necedah. This river is presently listed on the Federal 303(d) Impaired Waterbodies list.

WATERSHED LAKES

Many of the lakes in the watershed are part of the Necedah Wildlife refuge. The majority of these flowages were created to provide wildlife habitat refuges for migratory birds and wildlife. Gamefish are also known to inhabit some of these flowages where conditions allow growth and survival of fish species. Northern pike and bluegill are the dominant fish found in some of these lakes. Table UW02-2 summarizes watershed lakes in Lower Yellow River Watershed.

WISCONSIN POLLUTION DISCHARGE ELIMINATION SYSTEM PROGRAM (WPDES)

Table UW02-3 summarizes WPDES in the Lower Yellow River Watershed.

City of Necedah

The village built a wastewater treatment plant in 2002. It is located off of Ninth Street on the south end of the Village. It is designed to treat 0.156 MGD of wastewater with an organic loading of 286 pounds of BOD per day. The plant consists of a mechanical fine screen, two sequencing batch reactors, UV disinfection, aerobic sludge digestion and storage, and chemical phosphorous removal equipment. Currently the plant is not required to remove phosphorous because the levels of phosphorous in the discharge are below the levels set in NR 217 that would require a limit of 1 mg/L.

Figure UW02-3. Total number of stream miles in the Lower Yellow River Watershed.

Exceptional Resource Waters = 0.0
(ERW or Cold I)

Outstanding Resource Waters = 6.0
(ORW or Cold II)

Cold III = 0.0

Warm Water Sport Fishery = 109.0
(WWSF)

Warm Water Forge Fishery = 0.0
(WWFF)

Limited Forage Fishery = 0.0
(LFF)

Limited Aquatic Life = 0.0
(LAL)

Unknown Classification = 130.0
Total of Stream Miles = 245.0
Number of Streams / Ditches = 56

GROUNDWATER

The Lower Yellow River Watershed contains the wells supplying the Village of Necedah. The village has two wells each tapping a different aquifer. The sandstone aquifer tapped by Well 2 is only used in emergency situations as iron and manganese filtration is required to provide water of suitable quality to be used for drinking. The entire village is normally supplied by Well 3, which is a shallow sand and gravel well, which produces very good water quality. The water has a fairly low pH, which can be aggressive to common plumbing materials such as lead and copper. For this reason, sodium hydroxide is added to increase the pH and stabilize the corrosive nature of the water. Chlorine is also added as a precautionary measure to minimize bacteriological activity in the system. Both wells are low in nitrates at about 1.1 ppm.

The village is growing rapidly to the south and is proposing to develop a new well in this direction. New wells are required to have wellhead protection programs adopted and the village is encouraged to incorporate all their wells in any comprehensive Well Head Protection program.

The Central Wisconsin Groundwater Center conducted 61 well samples in the Lower Yellow River Watershed and the results came back that all the wells are below the unsafe drinking standards for the state of Wisconsin at 10 parts per million.

Of the 5 wells tested for triazine in the Lower Yellow River Watershed, 20 percent tested had concentrations of 3.0 parts per billion or greater of triazine. Since triazine can not be used to set standards for drinking water limitations, but it is strongly recommend that if a test result comes back above 1 part 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 wadable baseline monitoring on watershed streams.
2. Fish and Aquatic Habitat Staff should conduct baseline non-wadable monitoring within the Lower Yellow River.
3. Watershed Staff should evaluate the severity of bacteria problems in the Lower Yellow River, as identified on the 303 (d) List.

Table UW02-1. Lower Yellow River Watershed; Counties: Juneau, Jackson, & Wood Counties. Square Miles: 234, Stream Miles: 245.

Nonpoint Stream Rank: Low

Stream Name	Length (miles)	Codified Use	Biological Use (Existing)	Biological Use Potential	SUPPORTING USE FULLY-PART- NOT-THR/MILES	303(d) Listed Water	Assess. Categ. M E U	Trend	Integ Indic	Integ Status	Data Level!	PROBLEMS SOURCE//IMPACT	COM		REF.
													N	R	
Albert Lat. Ditch T19NR02ES12 WBIC: 1348100	2.0	DEF	UNK/0-2.0	UNK/2.0	UNK/2.0		E	U						R	
Avery Lat. Ditch T19NR02ES24 WBIC: 1347900	6.0	DEF	UNK/0-6.0	UNK/6.0	UNK/6.0		U	U							
Bewick Lat. Ditch T19NR03ES30 WBIC: 1347800	4.0	DEF	UNK/0-4.0	UNK/4.0	UNK/4.0		U	U							
Carpenter Lat. Ditch T19NR03ES30 WBIC: 1347700	1.0	DEF	UNK/0-1.0	UNK/1.0	UNK/1.0		U	U							
Danielson Lat. Ditch T19NR03ES17 WBIC: 1347100	8.0	DEF	UNK/0-8.0	UNK/8.0	UNK/8.0		E	U						R	
E. Branch L. Yellow R. T19NR03ES06 WBIC: 1349900	8.0	DEF	WWSF/0-8.0 ^e	Same ^e	UNK/8.0		E	U						R	110,58
E. Branch Spencer Robinson Ditch T19NR03ES04 WBIC: 1353500	7.0	DEF	WWSF/0-7.0 ^e	Same ^e	UNK/7.0		E	U						R	110,58
Johnson Lat. Ditch T29NR05ES27 WBIC: 1457300	3.0	DEF	UNK/0-3.0	UNK/3.0	UNK/3.0		U	U							
Little Yellow River T17NR04ES19 WBIC: 1346300	23.0	DEF	WWSF/0-23.	Same ^e	Same ^e		E	U						R	110,58
McConnell Lat. Ditch T20NR03ES07 WBIC: 1350900	2.0	DEF	UNK/0-2.0	UNK/2.0	UNK/2.0		U	U							
McDowell Lat. Ditch T19NR02ES01 WBIC: 1349800	1.0	DEF	UNK/0-1.0	UNK/1.0	UNK/1.0		U	U							
Morse Lat. Ditch T20NR03ES06 WBIC: 1351000	1.0	DEF	UNK/0-1.0	UNK/1.0	UNK/1.0		U	U							
Neal Lat. Ditch T19NR03ES18 WBIC: 1347000	8.0	DEF	UNK/0-8.0	UNK/8.0	UNK/8.0		E	U						R	
Rattail Lat. Ditch T19NR03ES32 WBIC: 13470000	4.0	DEF	WWSF/0-4.0 ^e	Same ^e	UNK/		U	U							58
Rawson Lat. Ditch T20NR02ES24 WBIC: 1349100	1.0	DEF	UNK/0-1.0	UNK/1.0	UNK/1.0		U	U							
Remington Ditch T29NR5ES8 WBIC: 1361400	12.0	DEF	UNK/0-12.0	UNK/12.0	UNK/12.0		E	U			B	CM/	R	109	

Table UW02-2.

Lower Yellow River Watershed, Juneau, Jackson 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	Recommends.
Unnamed Lake T21NR03ES05 1363400		No	99.0	4/UNK	DG				NT	No	NPS				
Rynearson Flowage Pl. 2 T18NR03ES06 1346900	Panfish N. Pike	No	493.0	NR	DG	45.4	2C		NT	No	NPS				
Rynearson FL. Pool 1 T18NR03ES09 1353300	Panfish N. Pike	No	570.0	14/UNK	DG	57.0	2C		NT	No	NPS				
Necedah Lake T18NR04ES18 1354300			112.0		DG	526.0	2C		NT	No	NPS				
Sprague-Mather Flowage T19NR03ES06 1348600	Panfish N. Pike	R	1930.0	9	DG	27.46	1C		NT	No	NPS				
Pool #18 T20NR03ES19 1350500	Panfish N. Pike	No	180.0	8	DG	4.92	1C		NT	No	NPS				
Pool #13 T20NR03ES30 1347300	N. Pike	No	35.0	2/UNK	DG	4.92	2C		NT	No	NPS				
Pool #28 T20NR03ES08 1347600		No	96.0	NR	DG	2.52	2C		NT	No	NPS				
Goose Pool T19NR02ES01 1349700	Panfish N. Pike	No	74.0	NR	DG	10.4			NT	No	NPS				
Pool #19 T20NR02ES24 1350200		No	41.0	2/UNK	DG	1.12	2C		NT	No	NPS				
Pool #27 T20NR02ES12 1350800	N. Pike	No	15.0	2/UNK	DG				NT	No	NPS				
Unnamed Lake T21NR03ES32 1361900		R	40.0	2/UNK	DG				NT	No	NPS				
Quail Point Flowage T21NR03ES08 1362200		No	28.0	2/UNK	DG				NT	No	NPS				
G Flowage T21NR03ES05 1362400			40.0		DG				NT	No	NPS				
Unnamed Lake T21NR02ES33 1364500		No	76.0	3/UNK	DG				NT	No	NPS				

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.
Unnamed Lake T21NR02ES33 1364900			30.0		DG				NT	No	NPS				
Unnamed Lake T21NR02ES33 1365100			40.0		DG				NT	No	NPS				
Unnamed Lake T21NR02ES29 1365300			87.0		DG				NT	No	NPS				
Unnamed Lake T21NR02ES30 1365900			27.0		DG				NT	No	NPS				
Unnamed Lake T21NR01ES25 1366100			120.0		DG				NT	No	NPS				
Corner Marsh T21NR03ES10 1368400			30		DG				NT	No	NPS				
Middle Marsh T21NR03ES10 1368600			30.0		DG				NT	No	NPS				
Bullgrass Flowage T21NR03ES09 1368800			75.0		DG				NT	No	NPS				
E. Potts Flowage T21NR03ES03 1369100			30.0		DG				NT	No	NPS				
Fish Lake T18NR04ES22 1376100			40.0		DG				NT	No	NPS				
3 Unnamed Lakes			20.0												

Table UW02-3.

WPDES Sources within the Lower Yellow River Watershed.

COUNTIES: Juneau, Jackson & Wood

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
City of Necedah	3/31/2004	M	Yellow River FFAL	8.7 cfs	0.13 MGD	None	None	Complete	N	The Village is amending a facility plan to increase the design flow. The new plant will have a P limit of 1 mg/L and secondary limits.

Table UW02-4.

Municipal Water Supply: Necedah

NPS Groundwater Rank: Low

Municipal Water Supply Data														
Necedah			Sanitary Survey Date 2000			Population 844			PWSID 72901301			Ave. Day Use 150,000 Gallons		
Well	Entry Point	Unique Well No.	Well Const. Report	Geology	Well Depth	Casing Length	Bore/Screen Interval	Capacity (gpm)	Nitrate (ppm)	Treatment	Wellhead Protection	Calculated Fixed Radius	Flood Plain	Wetland
2	2	BG049	Yes	Sandstone	150'	62'	62'-150' (B)	275	1.1	Cl, pH, I	No	<1200'	No	No
3	3	BG050	Yes	Sand & Gravel	63'	48'	48'-63' (S)	525	1.12	Cl, pH	No	2493'	No	No

CRANBERRY CREEK WATERSHED (UW03)

WATERSHED SUMMARY

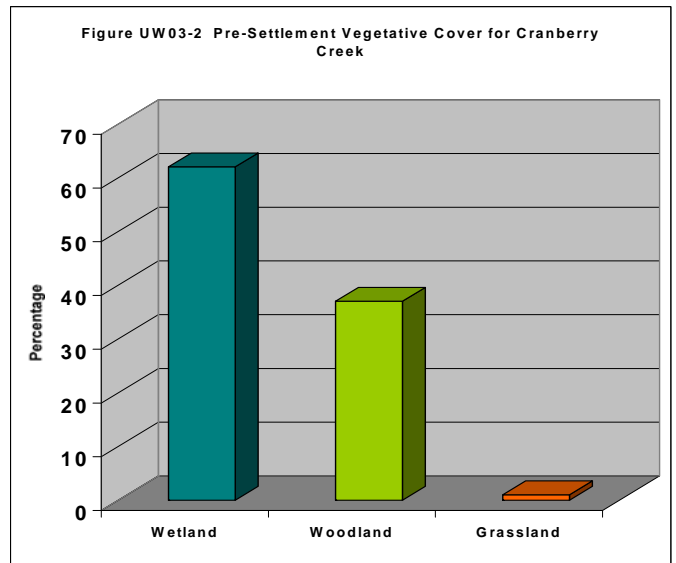
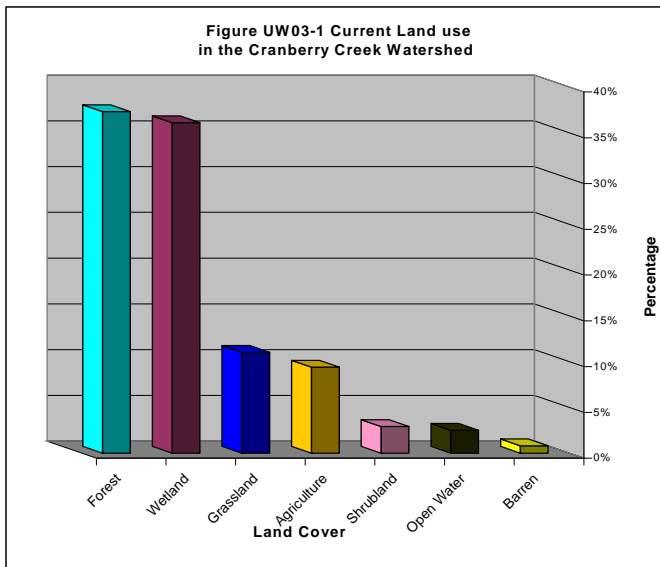
The Cranberry Creek Watershed (Map UW03) is located in Juneau and Wood counties. This watershed is made up of very diverse habitats ranging from a bombing range to cranberry marshes. Cranberry Creek Watershed is located a few miles west of Wisconsin Rapids, Port Edwards and Nekoosa. This watershed was ranked using the Nonpoint Source Priority Watershed Selection Criteria. Based on surface and ground water data, the overall ranking is low.

As the name implies, Cranberry Creek Watershed is mainly cranberry marshes. There are 17 to 20 cranberry-growing operations with over 100 cranberry bogs. The DNR lacks information about water quality impacts as a result of surface water discharges from these marshes. There is a concern that nutrients from fertilizers and pesticides/herbicides discharged from these marshes could be degrading water quality and harming sensitive species of aquatic life. Additional research is needed to fill data gaps.

The Juneau County soil erosion control plan listed the Cranberry Creek/Wisconsin Rapids Watersheds as a priority for erosion control and improved irrigation management. According to estimates, nearly all the cropland is eroding at greater than tolerable levels due to wind erosion (Meyer, 1987). There is a potential for groundwater pollution due to the rapid permeability of soils and poor irrigation management (Meyer, 1987).

POPULATION DEMOGRAPHICS

The population in this watershed has not changed in the past 30 plus years and it is projected to remain steady for the next 20 years. The steady population is a result of a high water table causing a small percentage of suitable land for construction (North Central Wisconsin Regional Planning Commission, 2000, Wisconsin Department of Administration, 2000). Before settlement of this area, the land was comprised of 62% wetland and 37% woodlands (Figure UW-03-2). Today, the land is still dominated by wetlands and woodlands (Figure UW-03-1) (Enterprise Information, 1998).



WATERSHED STREAMS

A summary of watershed streams is found in Table UW03-1. Figure UW03-3 indicates the total number of stream miles in the Cranberry Creek Watershed.

Cranberry Creek

Cranberry Creek, a 30-mile long stream, supplies the cranberry marshes with an adequate water supply. This creek supports a warm water fishery, including sport fish. The remaining streams have unknown classifications. Additional monitoring is recommended to fully understand this watershed's potential.

WATERSHED LAKES

The Cranberry Creek Watershed includes 476 acres of unnamed lakes with maximum depths less than 6 feet (Table UW03-2). Limiting factors to these lakes include low dissolved oxygen causing fish kill in the winter, sedimentation, and possible temperature increases. Discharges from cranberry marshes may contain nutrients, pesticides and sediment.

GROUNDWATER

There are no high capacity drinking water wells located in Cranberry Creek. The Central Wisconsin Groundwater Center ground water results indicate nitrate levels only exceed the public health standard 2.8 percent of the time. The basin average exceeds the nitrate public health standard only 10.8%.

Of the 111 wells tested for triazine in the Cranberry Creek Watershed, 2.7 percent of the wells tested had concentrations at 1.1 parts per billion or greater of triazine. None of the samples taken 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 part 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 wadable baseline monitoring for watershed streams.

Figure UW03-3. Total number of stream miles in the
Cranberry 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 = 30.0
(WWSF)

Warm Water Forge Fishery = 0.0
(WWFF)

Limited Forage Fishery = 0.0
(LFF)

Limited Aquatic Life = 0.0
(LAL)

Unknown Classification = 71.0
Total of Stream Miles = 101.0
Number of Streams / Ditches = 26

Table UW03-1. Cranberry Creek Watershed, Juneau & Wood Counties Square Miles: 70 Stream Miles: 101 NPS Stream Rank: Low

Stream Name	Length (miles)	Codified Use	Biological Use (Existing)	Biological Use Potential	SUPPORTING USE FULLY-PART-NOT-THR/MILES	303(d) Listed Water	Assess. Categ. M E U	Trend	Integ Indic	Integ Status	Data Level	PROBLEMS SOURCE/IMPACT	COM		REF.
													N	R	
Cranberry Creek T19NR03ES11 WBIC: 1354800	30.0	DEF	WWSF/0-30*	Same	FULLY/30.0		E	D			B,P	SB/DCH/HAB WD/CM	R		123,109,1 10,98,311 9,159,157 .130
Elm Creek T22NR04ES13 WBIC: 1360800	7.0	DEF	UNK/0-7.0	UNK/7.0	UNK/7.0		E	U			B,P	DCH/HAB WD/PST/SB, PWL, BY/CM/	R		109,153, 3,119, 159,157
Unnamed Ditch T20NR04ES07SWSW29 WBIC: 1355000	6.0	DEF	UNK/0-6.0	UNK/6.0	UNK/6.0		E	U					R		110
Unnamed Ditch T20NR04ES12NENE29 WBIC: 1355300	6.0	DEF	UNK/0-6.0	UNK/6.0	UNK/6.0		E	U					R		110
Unnamed Ditch T21NR04ES30SWSW29 WBIC: 1355900	5.0	DEF	UNK/0-5.0	UNK/5.0	UNK/5.0		E	U					R		110
Unnamed Ditch T21NR04ES30SWNE72 WBIC: 1356200	5.0	DEF	UNK/0-5.0	UNK/5.0	UNK/5.0		E	U			B	SB	R		109,3
Unnamed Ditch T21NR04ES05SENNW29 WBIC: 1358700	6.0	DEF	UNK/0-6.0	UNK/6.0	UNK/6.0		E	U					R		110
Unnamed Ditch T21NR03ES36SESW72 WBIC: 1355600	5.0	DEF	UNK/0-5.0	UNK/5.0	UNK/5.0		E	U			B	SB	R		109,3
18 Unnamed Ditches	31.0														

Table UW03-2. Cranberry Creek Watershed Juneau & Wood Counties NPS Lake Rank: Low

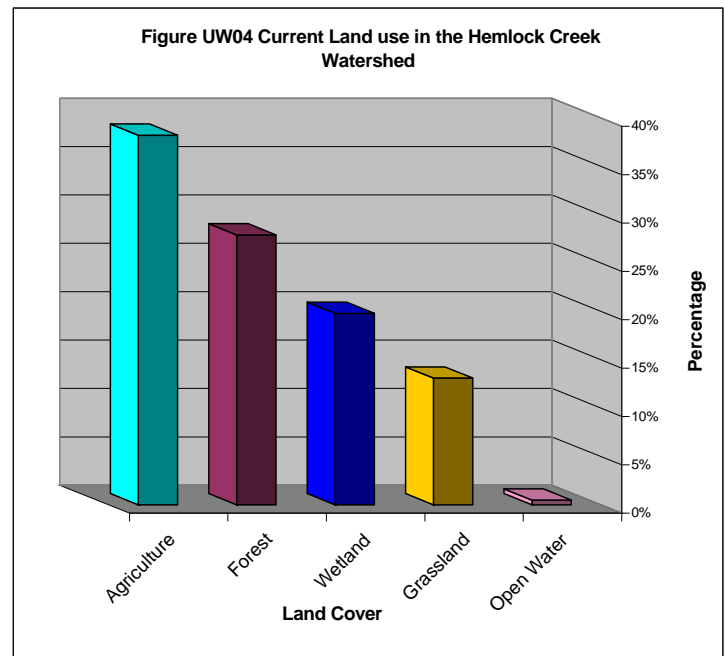
Lake Name	Fishery Use	Access	Area (acres)	Max/Mean Depth (Feet)	Lake Type	Watershed Drainage	Phos. Class	TSI Range	Fish Advis.	LMO	Impair Source/Impact	Aquatic Plant Data	Exotics	Self-Help Monitoring	Recomm
Unnamed Lake T21NR04ES16 1360200		No	100.0	4/UNK	DG	1.33	1C		NT	No					
Unnamed Lake T22NR04ES32 1356600		No	95.0	3/UNK	DG	.8	1C		NT	No					
Unnamed Lake T22NR04ES27 1357600		No	30.0	6/UNK	DN	.19	1C		NT	No					
Unnamed Lake T22NR04ES27 1358100		No	40.0	5/UNK	DN	.05	1C		NT	No					
4 Unnamed Lakes			42.0												

HEMLOCK CREEK WATERSHED (UW04)

WATERSHED SUMMARY

The Hemlock Creek Watershed (Map UW04) is located in Wood and Juneau counties. This watershed was ranked using the Nonpoint Source Priority Watershed Selection Criteria. Based on surface and ground water data, the overall ranking is high. This overall ranking establishes the watershed as a high priority for grant eligibility through the Nonpoint Source Program.

Several cranberry marshes exist within the Hemlock Creek Watershed. Presently, the Department lacks information in regards to water quality impacts that are a result of surface water discharges from the cranberry bogs. There is a concern that contaminants from fertilizers and pesticides are being discharged from various nonpoint sources that may be degrading water quality and harming sensitive aquatic species. Additional monitoring is recommended to determine affects of agriculture to this watershed.

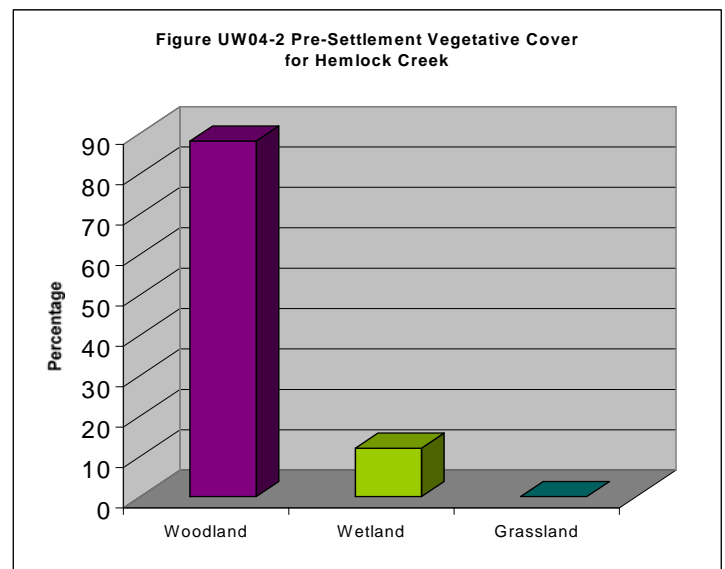


The Wood County Soil Erosion Control Plan ranked this watershed third priority out of 10 watersheds for NPS control management needs. Soil erosion in the towns of Arpin and Hansen located in the upper portion of the watershed cause severe impacts to the overall water quality of the watershed.

POPULATION DEMOGRAPHICS

Hemlock Creek is located in the southeastern part of the basin. The population in the past 30 years has only increased by 300 people. The population projection is determined to decline in the next 15 years. Reasons for this are unknown at this time (North Central Wisconsin Regional Planning Commission, 2000; Wisconsin Department of Administration, 2000).

Agriculture presently occupies the largest portion of land in the watershed (Figure UW04-1). With the majority of the land being placed towards agriculture, the pre-settlement percentage of woodlands has heavily declined in the past 100 years (UW04-2). The pre-settlement wetlands also often became agriculture fields such as cranberry bogs. This resulted in a low percentage of wetlands in the watershed today (Enterprise Information, 1998).



WATERSHED STREAMS

A summary of watershed streams is listed in Table UW04-1. Figure UW04-3 indicates the total number of stream miles in the Hemlock Creek Watershed.

Hemlock Creek

A stream survey conducted by the DNR in 1985 revealed heavy streambank erosion at some locations. Agricultural runoff was also occurring. A barnyard inventory conducted in 1985 identified 17 barnyards with 1,300 head of cattle within 1,000 feet of a major tributary to Hemlock Creek.

The creek also suffers from diurnal shifts in dissolved oxygen concentrations that may be caused by in-stream algal blooms. Both the villages of Arpin and Vesper WWTPs discharge effluents to Hemlock Creek.

Little Hemlock Creek

Biotic index sampling results indicated fair water quality.

WATERSHED LAKES

Three unnamed lakes are located within the Hemlock Creek Watershed. Little or no information exists on these lakes. A summary of watershed lakes is listed in Table UW04-2.

WISCONSIN POLLUTION DISCHARGE ELIMINATION SYSTEM PROGRAM (WPDES)

Table UW04-3 summarizes the WPDES in the Hemlock Creek Watershed.

Village of Arpin

The Arpin wastewater treatment facility is designed to discharge 65,600 gallons of water to Hemlock Creek. Treatment is by way of aerated lagoons. The last major improvements to the facility were in 1988. The last year of the facilities design life is 2008. The Design BOD loading is 85 lbs/day. The facility serves a population of 312 people.

Village of Vesper

The Vesper wastewater treatment facility is designed to discharge 100,000 gallons per day of wastewater to an unnamed tributary to Hemlock Creek. The facility utilizes a two cell aerated pond system for treatment. The last major improvements were in 1977. The design BOD loading is 300 lbs/day. Completion of a facility upgrade is required by the end of September 2005. The facility serves a population of 598 people.

Ocean Spray Cranberries, Inc. - Babcock

Ocean Spray Cranberries, Inc., is a fruit receiving/packaging facility located 16 miles southwest of Wisconsin Rapids at Babcock, Wisconsin. Between 0.5 and 0.8 million barrels of fruit are received during the annual cranberry harvest. Wastewater generated during receiving/packaging is 99.7% water and about 0.15% to 0.25% solids. About 1.2 million gallons of wastewater is generated during the five to ten week harvest season and about 0.3 million gallons of wastewater is generated during the rest of the year. Wastewater generated during the warm weather months, April to December, is temporarily stored in a 0.35 MG steel tank. From this tank, the wastewater is transported by semi tanker to the 42-acre spray field located about 2 miles north of the receiving station on STH 80. The spray field is routinely seeded to a combination alfalfa-grass cover crop following application and incorporation of byproduct solids in every fourth to fifth year of the rotation to reestablish the crop. Wastewater generated during the cold winter months, December to April, is also stored in a 0.35-MG steel tank. The facility has four groundwater monitoring wells located around the perimeter of the site. These wells have been monitored

since 1981. The remaining byproduct solids consist of damaged or cull berries, leaves, vines and bog sediment, are landspread on the spray field solids at an average rate of less than 40 wet tons per acre.

GROUNDWATER

The Hemlock Creek Watershed contains one municipal water system, the Village of Vesper. The Village has three wells that pump water from fractures in the granite bedrock (Table UW04-4). Due to characteristically low yields, at least two of these wells must be run together to supply the Village. All of these wells have elevated concentrations of iron and manganese, which are treated through gravity sand filters prior to distribution to the customers. The water produced by these wells is also of low pH, resulting in corrosive effects on internal plumbing materials. All the water pumped from the wells is treated with chlorine, sodium hydroxide, potassium permanganate and fluoride as well as being filtered. The pH adjustment is necessary for optimization of iron and manganese removal as well as to stabilize the corrosive nature of the water.

Water from these wells has also been identified as being fairly high in radon, a naturally occurring radioactive gas that is commonly found in the bedrock in this area. Once a radon standard has been finalized and adopted by this state, the Village will need to provide aeration equipment to remove the radon from the water. All other safe drinking water act parameters are well within the standards and the nitrate concentrations in all the wells are zero. Locating wells in this area with enough yields to warrant development is very difficult as the crystalline bedrock is the only alternative.

The Central Wisconsin Groundwater Center conducted tests on 78 wells in the Hemlock Creek Watershed and found that 6.3 percent of the wells were over their allowable limit of nitrates for safe drinking water standards in Wisconsin. One well tested had a concentration of 40 ppm; this is four times higher than the health department allows for safe drinking water.

Of the nine wells tested for triazine in the Hemlock Creek Watershed, none of the wells tested had concentrations at 1.1 ppb or greater of triazine. 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 ppb of triazine, the well should be tested further for total concentrations of atrazine.

WATERSHED RECOMMENDATIONS

1. Watershed Management should conduct a water quality standards review of Hemlock Creek for Arpin and Vesper WWTP discharge.
2. Vesper Municipal Wastewater Treatment Facility should upgrade to meet BOD, Suspended Solids, and Ammonia limits.
3. Hemlock Creek Watershed should be considered a high priority for future grant eligibility under the State Nonpoint Source Pollution Abatement Program.

Table UW04-1. Hemlock Creek Watershed, Wood County. Square Miles: 160 Stream Miles: 82 NPS Stream Rank: High

Stream Name	Length (miles)	Code Use	Biological Use (Existing)	Biolo. Use Potential	SUPPORTING USE FULLY-PART-NOT-THRMILES	303(d) Listed Water	Assess. Categ. M E U	Trend	Integ Indic	Integ Status	Data Level ^l	PROBLEMS SOURCE//IMPACT	COM N R	REF.
Dawes Creek T23NR04ES33 WBIC: 1367800	7.0	DEF	WWFF/0-7 ^e	Same	PART/7.0		M 2001	U	IBI = 29-31 HBI = 4.1	P-F V. G.	B,P,H	PSB,SB,NPS,BY/ NUT,SED,HAB,FLOW		34,99,107,3, 161
E. FK. Hemlock Creek T23NR04ES12 WBIC: 1367800	6.0	DEF	WWFF/0-6.0 ^e	Same	PART/6.0		M 2001	U	IBI = 27-32 HBI = 4.71	P-F GOOD	B,P,H	BY,NSP,SB/ NUT,SED,HAB,FLOW		107,3,161
Hemlock Creek T21NR03ES23 WBIC: 1366300	38.0	DEF LFF LAL	WWFF/0-28.1 ^e FFAL/28.1-33.4 ^e FFAL/33.4-38 ^e	Same Same Same	PART/28.1 PART/5.3 PART/4.6		M 2001	U	IBI = 10-60 HBI=4.7-6.1	V.P -G F - G	B,P,H	CL,SB,NPS,URB,PSM, CM/SED,NUT,HAB, FLOW	N	34,107,115,72, 69,146,154,3, 161,157,130
L. Hemlock Creek T22NR04ES05 WBIC: 167100	11.0	DEF	WWFF/0-11.0 ^e	Same	PART/11.0		M 2001	U	IBI = 26-29 HBI = 5.6	Poor Fair	B,P,H	PSB,BY,SB,NPS/ NUT,SED,HAB,FLOW	N	34,107,3,161
N. Fork Hemlock Cr. T21NR03ES23 WBIC: 1366300	7	DEF	WWFF/0-7.0 ^e	Same	PART/7.0		M 2001	U	IBI = 24-31 HBI = 5.13	P-F Good	B,P,H	PSB,BY,SB,NPS/ NUT,SED,HAB,FLOW		34,3,161
Un. Creek 13-8 T23NR04ES13	2	LAL DEF	FFAL/0-0.2 ^e WWFF/0.2-2 ^e	Same Same	PART/0.2 PART/1.8		M 2001	U	IBI = 0-34	V.P -F	B,P,H	URB,HM/SED,HAB		161
Un. Creek 25-13 T24NR04ES25 WBIC: 1367860	4	DEF	WWFF/0-4 ^e	Same	PART/4		M 2001	U	IBI = 47-64	F-G	B,P,H	NPS,HM/SED,HAB		161
3 Unnamed Ditches	4.0													
4 Unnamed Creeks	9.0													

Table UW04-2. Hemlock Creek Watershed, Wood County 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	Recommends.
Unnamed Lake T22NR04ES09 1366700	Panfish	No	30.0	4/UNK	DG	1.0	1C		NT	No	Unknown				
2 Unnamed Lakes			13.0												

Table UW04-3.

WPDES Sources with the Hemlock Creek Watershed.

Wood County

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
Arpin Wastewater Treatment Facility	0031267 30-Sep-04	M	Hemlock Creek LAL	0 cfs	0.0656	TSS (60 mg/L)	N	N	N	The facility should meet the chloride and copper compliance schedules
Vesper Wastewater Treatment Facility	0030309 31-Mar-02	M	Unnamed ditches to Hemlock Creek LAL	0 cfs	0.1	N	N	N	N	none
Ocean Spray Cranberries, Inc. – Babcock	0039071 31-Mar-04	I	G	NA	1.2 MG/Y	N	N	N	N	The facility should upgrade to meet BOD, Suspended Solid, and Ammonia limits.

Table UW04-4.

Hemlock Creek Watershed, Wood County Municipal Water Supply

NPS Groundwater Rank: High

Municipal Water Supply Data														
Vesper			Sanitary Survey Date 1999			Population 641			PWSID 77201344			Ave. Day Use 120,000 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
1	200	CH767	Yes	Granite	500'	49.5'	49.5'-500'	40	0	Cl, pH, I, FL,	No	<1200'	No	No
2	2	BH572	Yes	Granite	143.5'	30'	30'-143.5'	90	0	Cl, pH, I, FL,	No	<1200'	No	No
3	200	BH573	Yes	Granite	282'	32'	32'-282'	160	0	Cl, pH, I, FL,	No	<1200'	No	No