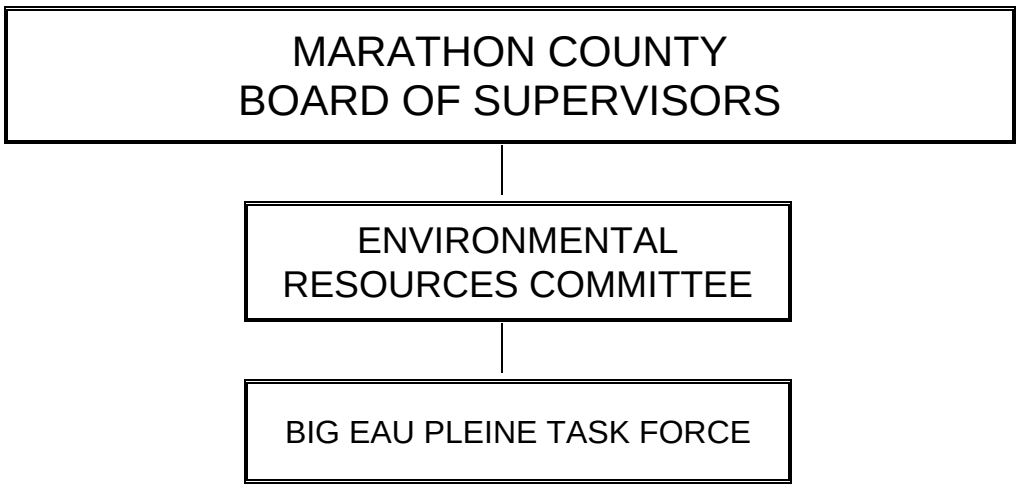
CASE STUDY

FOR

BIG EAU PLEINE WATERSHED

BIG EAU PLEINE TASK FORCE

December 2009



BIG EAU PLEINE TASK FORCE

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INTRODUCTION

In the spring of 2009, during the seasonal runoff and ice melting period, the Big Eau Pleine Reservoir experienced a significant fish kill. Unfortunately, fish kills and the threat of fish kills are not new to this river and reservoir system. Low dissolved oxygen levels during the spring, as well as high algae concentrations have been associated with the reservoir since its construction in 1937. This case study will provide an overview of the physical characteristics of the watershed, land use, land management, environmental studies, and a history of the conservation initiatives that define the story of the watershed. The intent of the case study is to provide a historical perspective of water quality and quantity issues for the watershed to serve as a basis for developing a long range plan for the river system.

PHYSICAL OVERVIEW

Geography. The Big Eau Pleine (BEP) River Watershed is located mostly in western Marathon County with smaller areas located in Clark and Taylor counties. The watershed includes 363 square miles (Map1). The Big Eau Pleine River flows into the reservoir (which swells to 6,677 acres when full) and then to Lake DuBay, both flowages of the Upper Wisconsin River Central Sub Basin.

Drainage Area. The BEP River Watershed drains approximately 238,000 acres from three counties: Marathon – 217,500 acres, Clark – 8,500 acres, and Taylor – 12,000 acres.

Geology. The BEP River Watershed lies west of a terminal moraine. The gently rolling landscape is characterized by a well developed drainage system that was enhanced and developed through nearly four decades of governmental assistance. Since there are very few undrained depressions, essentially every acre drains to a surface channel and eventually to the reservoir (Model Implementation Program Application, 1977). The watershed is covered with

relatively deep, silty sediment that forms the fine textured, loamy glacial “Withee” till. The fine textured, highly plastic till has a low permeability, but conducts free water (storm events and groundwater) both vertically and horizontally throughout the soil profile in fractures comparable to fractures in crystalline bedrock. Shallow dug wells are common in this landscape and are responsive to runoff events because of the highly developed fracturing within the glacial till. Along river and intermittent surface water flows, the glacial till has been eroded to expose Precambrian rock formations. The glacial tills (Withee and Bakersville) are commonly 12 feet or greater in depth throughout the upper portion of the watershed, but they are much thinner or absent in the lower reaches of the watershed.

Soil Resources. The soils of the watershed provide the basis for a productive agricultural industry. Map 2 identifies the location of prime farmland and hydric soils. Map 3 identifies the soil erosion rates for cropland soils within the watershed. The soils of the Upper BEP Watershed are poorly drained with low infiltration and permeable rates. The prominent soil associations are Loyal, Withee and Marshfield. The primary management and production concern for these soils is drainage. Therefore, the non-erosive removal of surface water through a system of terraces, grassed diversions, waterways, and drainage ditches to create an aerated root zone is the basis of most historical conservation and agricultural initiatives. Without functional surface drainage systems, crop failure was expected 1 out of every 10 years (Johnson, 1991). Soil textures also create severe winter manure spreading limitations because of low or no infiltration capacity. Soil textures create three agricultural management practices that pose direct water quality implications in this watershed:

1. *Seasonal Soil Saturation and Waste Applications.* Manure applications (solid or liquid) occur in the fall and spring of the year when no crops are present for nutrient uptake. Furthermore, these seasonal waste applications commonly coincide with nearly saturated or saturated surface soil conditions. Applications to saturated soils lead to surface ponding of liquid waste applications and high runoff risks. Groundwater recharge is most active during the spring and fall.

2. Waste Application onto Frozen Soils. In the fall and spring when soils are saturated, the ability to support heavy equipment is greatly diminished. Many manure spreading operations (emptying of waste storage facilities) occur after soils freeze (fall) or before they thaw (spring) in order to accommodate and support the weight of loaded equipment. Manures are therefore spread onto frozen and saturated soils that are prone to surface ponding and increased runoff risks during snowmelt and precipitation events.

3. Fall Tillage. Because the fine textured soils are saturated for long periods in the spring, fall plowing is an extensively used management practice. Fall plowing is beneficial in allowing the producer to distribute the labor for nutrient management, tillage and seedbed preparation over two seasons. Hauling waste in the late fall and early winter also minimizes road loading stress and conflicts during the spring when weights limits are necessary to protect roads as the frost and water are leaving the roadbed. Fall tillage also allows soil to warm and dry out quicker in the spring to allow earlier access to fields for field work. However, fall tillage increases the soil erosion and sediment delivery potential of cropland fields.

Wetlands. The wetland characteristics of the BEP watershed have been drastically altered by the development of agriculture. Map 4 identifies current wetland delineations. It must be appreciated that the flashiness of the watershed's hydrology is the result of a prolonged effort to drain the croplands to accommodate row crop production. It is estimated that nearly 50% of the Upper BEP watershed was wetland when development began for agricultural. The LBEP watershed land use inventory identified 2,974 acres (4%) of wetlands in this watershed.

Water Resources. The BEP River Watershed consists of nearly 210 miles (116 in UBEP and 94 LBEP) of rivers and streams (Map 4). The glacial till of the area produces moderate capacity wells. Much of the early agricultural development was supported by relatively shallow dug wells. Recharge of groundwater is primarily active in the spring and fall seasons. Because of the extensive surface drainage system, the recharge of the aquifer has been compromised. Water quality assessments (Big Eau Pleine River Priority Watershed Report Summary, 1984) indicate that flashiness of hydrology (the rapid rate of runoff) is a major contributor to degradation of water quality, aquatic habitat, and the fishery of the river system. Hydrologic

flashiness creates turbulence, sediment suspension, and reduces sustaining base flows in streams. The great variability of flow is related to gently rolling topography, the large amount of pasture and cropland use, and slow permeable soils. Some soils also have high groundwater problems. The combination of circumstances has created several nonpoint problems. In recent years, due to increase water consumption of industry, agriculture, residential, and municipal interests, the quantity of groundwater is becoming a concern. See Map 4 for surface water delineations, including Outstanding and Exceptional Waters.

LAND USE

Big Eau Pleine (BEP) River Watershed. The BEP watershed comprises 238,000 acres of land. In 1972, the EPA's Model Implementation Program Inventory identified the following land use categories and acres: 1. Cropland (60%) – 142,800 acres; 2. Pasture (15%) – 35,700 acres; 3. Woodland (17%) – 40,460 acres; and 4. Miscellaneous (8%) – 19,040 acres.

"Upper" Big Eau Pleine (UBEP) River Watershed. The Upper BEP watershed is characterized by primarily an agricultural land use. Specifically, Marathon County's concentration of dairies is greatest in this area. The UBEP represents 224 sq miles, 147,560 acres, or 62% of total watershed land mass with the following land use delineations (UBEP Priority Watershed Inventory, 1984): 1. Cropland and Pasture (66%) – 97,390 acres; 2. Woodland (20%) – 29,037 acres; 3. Grassland (3%) – 4,923 acres; and 4. Miscellaneous (11%) – 16,210 acres. No developed or wetland land uses were inventoried.

"Lower" Big Eau Pleine (LBEP) Watershed. The LBEP Watershed is also characterized as a primarily agricultural landscape, but the topographic slopes are steeper and bedrock shallower to the surface due to advanced erosion of the overburden till. The LBEP has a significant presence of non-metallic mining operations in the area (Map 5). The drainage area is approximately 139 square miles (38% of the total watershed land mass) or 92,168 acres (LBEP Priority Watershed Summary, 1992). The inventoried land use was 1. Cropland and Pasture

(60%) – 55,301 acres; 2. Woodland (24%) - 22,421 acres; 3. Grassland (9%) – 7,883 acres; 4. Wetland (4%) – 2,974 acres; and 5. Developed (3%) – 2,947 acres.

Table 1 provides a comparison of the land use changes during the years of 1972 and 1984.

Table 1. BEP - Comparison of Land Use 1972 to 1984

YEAR	1972	1984*
Cropland and Pasture	142,000 ac.	152,691 ac.
Woodland	40,460 ac.	51,458 ac.
Grassland		12,806 ac.

* 1984 combines UBEP and LBEP data

*Historical Countywide Land Use Data (S*ource US Census and WI Agricultural Statistics).

1. 1940 – Cropland 277,093 acres and Pasture 418,659 acres.
2. 1954 – Cropland 302,270 acres, Cropland-Pastures 66,256 acres, and Pasture 334,752 acres.

DEMOGRAPHICS

Population. In 1991, the LBEP watershed population was 4,500. (The respective Comprehensive Plans and Census information will be used to determine current municipality and township populations). The BEP watershed includes the following Villages and Cities: Stratford, Colby, Abbotsford, Dorchester, Stetsonville, Fenwood, and Milan. Residential development trends, population densities, and non-farm population trends have not been characterized for the watershed. Using sanitary system tracking, the build-up of residential lots in the watershed and along the reservoir was determined (Map 8).

Farms. In 1972, the BEP watershed consisted of 1,050 dairy farms with an average size of 180-200 acres. These farms managed on average a dairy herd of 70 cows with calves (MIP, 1972). There was a small presence of beef, pigs, sheep, and chickens. Cash cropping was negligible. The typical crop rotation consisted of corn, oats, and three years of hay. In

comparison, Marathon County had 1,705 farms in 1880. Total farm numbers increased to 7,039 in 1935 with 260,580 acres of cropland. Farm numbers began a decline with the consolidation of acres and livestock in the 1950's. By 1956 there were 6,340 farms; in 1960 there were 5,022 farms with an average acreage size 160 acres. In 1960, the cattle and calf population totaled nearly 168,700 head (Conservation, Planning and Zoning (CPZ) Report, 2007).

CONSERVATION INITIATIVES

During the 1940-1950's the focus on conservation was to develop the productive agricultural potential of Marathon County. Government assistance provided public financial and technical assistance to farmers through liming, fertility, erosion control, and design of water disposal systems. Conservation (along with road and bridge protection) was commonly led by federal USDA initiatives through local Soil Conservation Districts. The following list identifies some key dates and activities of early conservation efforts:

- 1937 - Wisconsin Soil Conservation District Law enacted through Chapter 92. Established local grass root conservation districts coordinated by the UW-Extension Service to bring on farm demonstration of erosion control practices.
- 1941 - Marathon County Soil and Water Conservation District established. Membership includes chairman of the County Board, County Superintendent of Schools, and three "practical" farmers. Soil erosion is identified as the most significant natural resource concern, but it is also of critical importance because of its impact on road and bridge infrastructure.
- 1942 - District Work Plan outlines the district's role in the areas of tree planting (1.5 million annually), young farmer and school education efforts, and the development of cropland (drainage, pH, and fertility). The greatest challenge to the District was the "failure to develop imperfectly drained land" (SCD, 1942). The heavy textured soils are not benefited by subsurface drainage techniques (tile) and therefore the w-ditch is preferred. Land leveling, terracing, land clearing, and livestock pond development are most popular conservation practices.
- 1945 - Terracing and drainage systems are king (the "construction of water disposal systems").
- 1950 - District considers discontinuing Rural Conservation education day because of being too successful and facilities and organizations could not handle people.
- 1958 – District completes 130 miles of terraces, waterways and surface drains. To date the District claims 1,000 miles of terracing and 350 miles of waterways.
- 1959 – District completes 123 miles of terraces, waterways and surface drains.

During the 1950's and 1960's, the Federal, State and Local Districts struggle with each other for control of the conservation delivery system. Through initiatives of programs like Public Law (PL) 566 - Small Watershed Program, the focus of conservation was changing from an erosion control to watershed management in response to increasing water quality concerns. The agricultural contribution to nonpoint pollution was becoming better understood. Increasing public awareness begins an era of environmental studies to understand the relationship of farming to water quality concerns and targeted corrective programming. During this time, watershed associations (BEP and Little Rib River) are formed to create a social network and peer support for voluntary conservation. The Clean Water Act was passed in 1972. Through the 1970's, a frustration by conservationists and environmentalists toward farmers grows. The environmental community begins to openly identify agricultural polluters and challenges the ineffectiveness of the district's voluntary and educational approach. This leads to legislative changes in the delivery of the State's conservation policy in 1982. Local conservation leadership is authorized by the State to County governments (birth of Land Conservation Committee). Conservation is still voluntary, but programming opportunities expand through targeted initiatives and a healthy influx of money.

- 1960 - District completes 106 miles of terracing and drainage ditches.
- 1965- Inventory of BEP Watershed project completed. Sedimentation and pollution from agriculture identified and assessed for first time.
- 1969 - District Report boasts over 50 miles of terraces, diversions, waterways, and surface drains installed. The rate of application has been constant for many years and 1,124 farmers have received Agricultural Conservation Program cost-sharing for practices. In 1969, over $500,000 of conservation practices are put on land. Big Eau Pleine Association hosts a Clark, Taylor, and Marathon County meeting with large attendance (dealing with road side erosion concerns). Phil Hein is president of Big Eau Pleine Watershed Association. Their annual meeting includes Dr Lee Dreyfus.
- 1972 - District Report shows 87,000 lineal feet of drainage ditches and diversions and 106 acres of waterways.
- Annual reports lapse until 2004. Focus now on water quality.

STUDIES AND ASSESSMENTS

1. 1958 – The Wisconsin Valley Improvement Company (WVIC) began measuring dissolved oxygen levels in the BEP Reservoir.
2. 1965 – First BEP watershed inventory. No office copy found.
3. 1972 National Eutrophication Study. The Phosphorus (P) loading to the reservoir over twice the rate considered capable of causing eutrophication. In this 1972 report, a secondary problem in water quality is linked to water level fluctuations in the reservoir.
4. 1974 UW- Stevens Point Study of Reservoir. Predicts that 50% reduction in P loads would reduce algae concentrations in reservoir by 57%. Estimates sedimentation and P loading, as well as documents the pollutant delivery processes.
5. 1975-1986 Marathon County Health Department Stream Monitoring Program: In 1975, the Marathon County Health Department monitored streams for coliform bacteria and fecal coliform bacteria sampled and recorded from May to August at the following locations: Highway A West Branch, Cherokee Park Beach, Spindler Bridge, Eau Pleine Park Beach, and Highway O Bridge. Summary reports of monitoring results were developed in 1975 and 1976. The data from 1977 to 1986 was not summarized in report form.
6. 1982 – 1992 Non-point Priority Watershed (Upper and Lower Sections)
    a. *UBEP Water Resource Appraisal*. The appraisal established the current conditions and uses of the watershed's lakes and streams. The appraisal determined that phosphorus was the primary pollutant of concern. The report indicated that the flashy hydrology is a huge concern to the condition and use of the water system. Headwaters streams are often fed by wetland drainage. Low stream flow is considered a serious barrier to improving stream conditions. Much of the enriched nutrient condition was due to agricultural runoff and wastewater treatment plant discharges. It is estimated that 54% of nutrient enrichment occurs during the spring season with runoff and snowmelt. 80% of watershed P load is sourced from upper portion of BEP watershed (includes point and nonpoint). Note: Little is appreciated about the relationship of sedimentation and P-delivery. The turbulence and suspension of the sediment/organics in the stream beds is also not fully explained relative to pollutant loading. Appraisal summary recognizes that the flashy character of the BEP watershed is partly due to soil type and shallowness of bedrock; these factors are largely uncontrollable.
    b. *UBEP Nonpoint Source Inventory.* The inventory determined the location and magnitude of the major nonpoint sources. The 900 landowners inventoried in the UBEP. The UBEP watershed represents 224 sq miles or 62% of total watershed land mass.

These assessments were used to produce water resource objectives and target levels of control in 4 categories:

- Barnyard Runoff
- Manure Spreading Runoff (calculated availability of suitable acres for spreading relative to field drainage development, slopes and proximity to waters)
- Upland Erosion Rates
- Streambank Erosion

The inventory included a census of all barnyards, manure spreading runoff (volume computations, "unsuitable" winterspreading acres, proximity to streams), upland erosion rates (Universal Soil Loss Equation -USLE) and sediment delivery, land use categorization, and streambank erosion (little found), as well as projected costs of remediation and implementation of practices.

The results of the inventory were used to rank the landowner projects to prioritize technical assistance and funding to the largest pollutant sources. Each landowner was assigned an eligibility category:

- Eligible – essential
- Eligible – nonessential
- Not eligible

c. *DNR LBEP River priority Watershed – Water Resource Appraisal Final Report (Jim Krietlow, June 1992)*. This reports states that the total P load delivery to the reservoir is 163,636 lbs annually from the BEP watershed of which 78,860 lbs is point-sourced (42,161 lbs controllable) and 84,776 lbs non-point sourced (29,196 lbs controllable).

7. *2009 - Big Eau Pleine Flowage Winter Runoff Study*. (Mark Hazaga -DNR, January 2009). A most current monitoring and evaluation study to characterize winter runoff from the BEP River Watershed, an agricultural watershed. Runoff contains high concentrations of organic matter, nutrients (Nitrogen & Phosphorus), and bacteria. The study references the 2005 winter runoff event that delivered a high Biological Oxygen Demand (BOD) load which caused a low Dissolved Oxygen (DO) condition and fish kill in the reservoir. The period of study was the early spring seasons of 2006 and 2007. The Spirit Flowage served as a reference site (a non-agricultural watershed). Seventy-seven percent (77%) of the BEP River Watershed (183,260 acres) is in agricultural land use with dairy the dominant activity.

Results indicated that BOD and P loading were 4 and 8 times greater, respectively, than comparable sampling results from Sprit Flowage. Bacteria concentrations in both watersheds increased during event sampling, but the concentrations were 7 times higher in the BEP. The presence of bacteria is associated with livestock waste in runoff.

Conclusions: The dominant land use of dairy farming in the BEP contributes significantly to increased delivery of bacteria, BOD and P to tributaries. Specifically, the average BOD load of the BEP during three days of runoff (adjusted for natural background) was compared to Wausau's average 3 day influent of BOD. The BOD load in the BEP was 14 times greater than the influent (raw sewage) BOD load to Wausau Wastewater Treatment Plant. The loadings from Freeman and Fenwood Creeks were not included in the study; therefore, results likely underestimate the actual loadings.

8. Soil Erosion Transect Survey (1999-2008). See Appendix G. Since 1999, the Marathon County Conservation, Planning and Zoning Department has conducted a transect survey to track soil erosion rates throughout the County. Over the period of tracking, the erosion rates within the BEP watershed have averaged approximately 2.3 tons per acre per year. Over the past 4 years the rates are beginning to increase. Ninety five percent of the sediment delivery to the streams and reservoir is sourced from this upland soil erosion.
9. Bibliography. Appendix I contains a list of studies and reports relative to resource issues with the Big Eau Pleine River Watershed and Reservoir.

CONSERVATION PROGRAMMING

1. *Model Implementation Program* – MIP (United States Department of Agriculture, USDA and Environmental Protection Agency, EPA, 1977).

This project initiative received incredible public, agency and landowner support as an EPA funded project through Section 208 funds of Clean Water Act. In the proposal, landowners have access to Agricultural Stabilization and Conservation Service (ASCS) cost share funds and Soil Conservation Service (SCS) technical assistance. The BEP Watershed Association was actively supporting the project. The association was a farmer and landowner group that promoted conservation as part of Soil and Water Conservation District (SWCD) work (and PL 566 influence). In support letters, Robert Gall indicates that WVIC began measuring dissolved

oxygen levels in 1958 and has observed oxygen depletion to one part per million or less almost every year with fish kills occurring during most of those years (1958 to 1977). WVIC was convinced the DO concerns are due to non-point runoff.

The MIP Pilot Project was designed to show how agency cooperation and the positive benefits/efficiencies of targeting financial and technical resources can improve the resource problems of the watershed. Landowners have access to ASCS funds, but are expected to shoulder some costs and to maintain best management practices. The program's structural policy is based upon voluntary participation in programs with financial and technical support provided by public agencies. This conservation delivery strategy continues to be the preferred federal strategy over the 80+ years (1930's to current) of conservation initiatives. From the beginning, people questioned: 1. the use of public funds on private lands, 2. the effectiveness of voluntary approaches (District's unwillingness to create a regulatory structure), and 3. the motivation of farmers to maintain the public investments.

Independent studies by EPA and UW-Stevens Point indicate that Phosphorus (P) is the limiting or controlling nutrient levels in the BEP. A predicted annual P load of 92,500 lbs was derived from the 1972 National Eutrophication Study. A similar loading of 100,000 lbs was calculated by UWSP using monitoring information collected at Stratford during 1974-75. Based on information in the EPA study, a 58% P reduction would need to be realized to achieve Vollenweider's "dangerous" level where algae blooms would be reduced to a level to realize a perceivable improvement of water quality. The UWSP study indicated that 75% of P load was delivered during November and April. In 1975, 55% of the P load came in April alone. About 95% of load came from agriculture (3% from municipal and industrial sources). Septic tanks are contributing approximately 1%. Manure is major source of the organic pollutant and Phosphorus load. The UWSP study indicated that 87% of farm operations spread manure in winter. With relatively impermeable winter conditions, tight textured soils and well developed drainage systems, it was stated that practically every acre of land drains to a waterway and

eventually to the reservoir. Manure contributions also contribute to high coliform bacteria counts. Bacteria samples in 1975 and 1976 show snowmelt and early spring rainfall runoff fecal counts of 5,456 and 1,475 per 100 ml, respectively.

The following summary of proposed management practices and estimated costs over a three year period was developed from sampling and extrapolating work conducted in the Northern Hamann Creek Subwatershed.

	Proposed BMP's:	**Minimum***	**Costs**	**Maximum***	**Costs**
1.	WSF (stacking pads):	160	$1,600,000	520	$5,200,000
2.	Barnyard Diversions:	80	$ 200,000	260	$ 650,000
3.	Contour Strips:	7000 ac	$ 28,000	23,400 ac	$ 93,600
4.	Grassed Waterways:	820 ac	$ 574,000	2,730 ac	$1,911,000
5.	Diversions:	1,821,000 ft	$ 728,400	6,071,000 ft	$2,428,400
6.	Terraces:	339,000 ft	$ 118,700	1,131,000 ft	$ 395,900
7.	Chisel Plowing:	14,800 ac	$ 74,000	49,400	$ 247,000
8.	Technical and Administration:		$ 462,300		$1, 277,600
9.	Water Monitoring		$ 60,000		$ 60,000
		Total	$3,845,400		$12,263,500

Expected Program Results. A rapid improvement of water quality was expected because of the program efforts. The improvement (outcome) would be seen as a reduction in the intensity of algae bloom. Monitoring of Hamann Creek would be used calculate the total environmental improvements and impact of installed BMP's.

The selection decision was made on January 11, 1978. Marathon County Project <u>was not</u> selected (confirmed in letter from Senator William Proxmire). It was not to be a separately funded project but rather an initiative by USDA and EPA to show the benefits of targeting existing federal program efforts to watersheds "impacted" by agricultural runoff and sedimentation.

2. *Hamann Creek Watershed Project*: (16,000 acre drainage area).

This voluntary project was established in March 1978 in response to the failure of Model Implementation Program bid. The project's funds ($100,000) were administered through the Marathon County Agricultural Stabilization and Conservation Service (ASCS) as a special Agricultural Conservation Program (ACP) Cost-sharing allocation. Conservation best management practices focused on vegetated channels, terracing, soil treatment (liming), permanent vegetated areas, and pond dugouts. No report of outcomes or tracking of implemented practices were found in the files. The intent of the project was to focus conservation efforts on a relatively small watershed (third order) with monitoring to determine if technical assistance and funds could provide measurable water quality benefits.

3. *Upper Big Eau Pleine (UBEP).*

The UBEP was selected in 1984 as a priority watershed and funded by the WI Nonpoint Pollution Abatement Program. Implementation began July 1987 and was completed in August 1995. Criteria for selection included:

- Practicality of pollutant reduction of nonpoint pollutant sources
- Willingness of local governments and landowners to participate
- Public use of streams, lakes and groundwater in watershed

Of the approximately 900 farms inventoried for the UBEP project, Table 2 identifies the breakdown of landowners/resource concerns that were determined to be eligible for program funds and technical assistance. The conservation staffs of Marathon, Clark and Taylor Counties participated in local administration of Priority Watershed project. Local assistance included landowner contact, watershed, water quality, and land management education, Best Management Practice design, cost-share agreement development, progress reporting, and administration of funds. If all BMP's implemented, the cost estimated at $4.1 million dollars (includes both landowner and state shares). The estimated staff hours for local assistance were 47,463.

Table 2. Rankings of Evaluated UBEP farms:

	Manure Spreading	Cropland Erosion	Animal Lot Runoff
No. Eligible Operations	212	244	121
Pollutant Reduction if all eligible operations participate	70%	90%	70%

DNR project evaluation responsibilities included:

1. Monitor key water quality parameters and habitat before and after BMP application in one of the subwatersheds, and
2. Track estimates of pollutant load reductions achieved through BMP installations with annual adjustments made to project schedule.

Pollutant Reduction goals:

- Barnyard Reduction: 70%. (Phosphorus)
- Reducing the amount of winter spread manure on unsuitable or critical acres.
- Soil erosion: 28% reduction of total soil loss (measured as "**T**olerable" soil loss rate).

UBEP Progress Reports:

a. *Ruthe, (August 1995).* Marathon County conducted its own evaluation in 1995 at the conclusion of the watershed project. This consisted of re-contacting the 292 landowners eligible for practices (Table 2).
   - o Barnyard Practice eligible (93). 31 installed BMP.
   - o Manure Management (163). 67 previously had Waste Storage Facility (WSF) and 36 installed WSF with staff assistance and funding.
   - o Cropland Erosion (192). 107 already had complying (< 4 tons/acre/year erosion rate) Conservation plans from Farmland Preservation Program or Farm Bill work, 9 installed a BMP through Watershed.

The reasons cited by landowners for non-participation in the watershed program were:

1. avoidance of government, 2. too costly for BMP's, 3. cost-share offer not high enough, 4. poorly understood the eligibility criteria, 5. close to retirement age, and 6. left farming or uncertain of future.

b. Interim Evaluation by DNR in 1991. The interim report indicated the following:

- o Stream conditions show no substantial improvement in water quality (note about severe drought of 1987-88 influencing results, potentially).
- o Too soon for BEP reservoir to respond to land management improvements.

- Barnyard runoff P will be reduced by 28% on a watershed wide basis if all BMP's installed (42% of the targeted P from barnyards).
- 50% of targeted lands will no longer be used for winter spread manure. (37% of the lands identified as inappropriate for winter spreading).
- Only 6% of soil loss reduction will be realized (21% of the targeted soil loss).

According to this report, the estimated total P load is 161,636 lbs annually (1987). With 1989 point source sampling results, the estimated P load was reduced to 128,613 lbs annually. The nonpoint contribution is 106,500 lbs. (Milan's dairy just starting up and contributions not yet determined.) Point sources represent overall 17% of P load. Water monitoring by DNR in 1985-86 and 1989 show that 11 of 20 sampled stream sites showed a decline in water quality; 4 sites showed improvements in water quality. At this point in the project's life, it was determined that there would only be moderate success in meeting water resource objectives.

c. *Final Report by DNR (June 1997) Covers the years 1985 through 1996.* Project objectives:

- Improve the BEP reservoir
- Reduce cropland erosion by 25% (measured as "**T**olerable" soil loss rate).
- Reduce animal lot P load by 70%.
- Reduce manure spreading on unsuitable acres by 70%. Unsuitable acres for winter spreading defined as fields that:
  - contain significant surface water drainage ways,
  - have slopes greater than 4 %,
  - are within 200 feet of a surface water, and
  - are flood prone (as determined by soil type).

The project plan estimated that if objectives met, overall P delivery would be reduced 16.2%. This would also reduce amount of algae by 16%. The Water Quality Evaluation Monitoring Strategy included:

- water quality (in stream) assessment designed to measure trends over 10 years
- Land management assessment to determine water quality trends from land use management changes proved to be less straightforward. Issues challenged included:
  - pollutant dynamics too variable (farm size changes,
  - idling of farms, and loss of livestock),
  - improvements take many years,
  - cause and effect not clear.

DNR determines that the nonpoint assessments (post-project) for water quality improvements because of BMP implementation proved to be too variable to state quantifiable cause and effect outcomes. During the 10-year period of the Upper and Lower Big Eau Pleine non-point source pollutant reduction programs, total phosphorus concentrations within the reservoir showed no improvement (no decline) from 1985 through 1994 based on WVIC water chemistry data. WVIC Trophic State Index (TSI) water quality studies conducted from 2000 through 2002 showed a slight increase in total phosphorus and chlorophyll 'a' throughout the reservoir. Secchi depth (water transparency) declined during this same period.

In 1989, 17% of total P load to reservoir was from discharges of wastewater treatment plants. In 1995, it was determined that the point source loadings were close to 1985 levels. Regulatory rules are in place to improve this point source contribution by 2000 (See Table 3).

Land Management Evaluations:

1. Barnyard Runoff – thirty three (33) practices installed. UBEP project funded 31 projects and 2 were completed without cost-share money. Approximately 1000 lbs Total P/ yr in a 10 year storm event have been reduced or 42% of project goal. (42% of 70% = 29% reduction).
2. Manure Storage – realized 74% of project goal in eliminating winter spread manure. Sixty-seven (67) waste storage facilities were funded by project and 13 installed without cost-share funds. Note that Marathon County developed and adopted the first county-wide Animal Waste Storage Ordinance via leverage of the Priority Watershed Project.
3. Cropland Erosion – goal to reduce 25% of sediment delivery from cropland. Cropland is 95% of sediment source to reservoir. Only 10% of goal achieved (3% reduction in total erosion). Targeted rate of 2 Tons/acre/year. This was a difficult sell because most program compliance requirements are 4 tons/acre/year.
4. Milking center wastes – project did not address this waste source of P. This waste stream was addressed at 67 farms where the dilute waste was incorporated into designs for waste storage facility systems.

Financial evaluation:

1. State expended $1,786,429 for UBEP project.

- $685,687 for local assistance (includes Taylor and Clark Counties) and
- $1,100,742 for practice implementation, could have been much greater if all agreements were implemented (nearly 36% of agreements expired without action).

Summary – The BEP Reservoir will likely always be eutrophic, hampered by nutrients originating from agricultural lands. Sedimentation continues to be the major concern with phosphorus contributions.

Tracking progress hindered by lack of updated farm information (before vs. after). Note that "critical sites" became a planning concept in 1993 but not incorporated into the UBEP project.

See Appendix B for list of participating landowners, cost-share agreements, and BMP implementation.

4. Lower Big Eau Pleine Watershed – LBEP (1991-2003). (139 sq mi)

Inventory begins in 1991. Implementation begins in 1993 and ended in 2003. LBEP is a continuation of the UBEP effort aimed at reducing: polluted runoff from barnyards and feedlots, sediment from cropland, and runoff from winter spread manure.

Ground Water Assessment: A groundwater assessment involved well sampling; also a feature of this watershed: 23 % of wells collected had nitrates exceeding 10 mg/l (enforcement standard -ES) and 65% of wells had nitrates between 2-10 mg/l (preventative advisory level-PAL). The area wells were considered to have a significant nitrate concern. Triazine is found in 1% wells at ES levels while 19% of wells above PAL.

Surface Water Resource Assessments:

- 95% of the inventoried sediment source from cropland and 3% from streambanks
- Barnyards – 208 yards assessed contributing 9,873 lbs P annually to waters.
- Streambanks – 99 miles assessed contributing 830 tons of sediment annually (3% of total).
- 12 miles of reservoir shoreline found to have eroding concerns contributing 513 tons annually. Affects 55 landowners.
- Upland sediment – 91,526 acres inventoried. Streams receive 23,755 tons annually (95% of total). 80% cropland, 8 grazed woods, and 3% pasture.

Pollution reduction Goals:

- sediment reduction by 35% (33% reduction of agricultural uplands, 45% reduction of streambank sediment, and 60% reduction of shoreland reduction)
- P reduction by 50%. To accomplish this goal 70% reduction from barnyard sources; 50% of winter spread organic pollutant sources on "unsuitable" acres; and sediment sourced P must be achieved. Unsuitable acres for winterspreading include acres located within 200 feet of surface water that have a significant surface drainage development, slopes greater than 4%, and flood prone.
- Algae controls reduction of 57%. A combined 50% reduction in P load from both UBEP and LBEP will reduce algae in reservoir by 57%.

Landowner participation: Voluntary:

- Agricultural lands: Category I eligible if eroding > 4.0 tons/ac/y. (16,379 ac or 31% of total sediment load), Category II eligible if erosion 2.0-4.0 tons/ac/y (9% of sediment load)
- Animal Lots (115 of 208 sites need control of runoff): Category I if > 40 lbs P/year; Category II is 20-24 lb P/year. The target delivery rate is 20 lbs P/yr. (today's performance standard is 15 lbs P/yr or 5 lbs P/yr in a Surface Water Management Area).
- Manure Spreading: Category I if winter spread of 16 or more acres of unsuitable acres. Category II if spreading on 11-15 critical acres. Critical acres are those with slopes of 4% or if flood prone.

Funding projections:

- $5,902,043 ($4,738,750 for BMP installation w/ $2,391,865 cost-share portion, $50,000 for easements w/ 437,500 c/s, $1,099,733 staffing w/ $824,800 state local assistance, $13,560 for educational activities w/ $10,170 state allocation).

See Appendix C for list of participating landowners, cost-share agreements, and BMP implementation.

LBEP Close-out Report (compiled by CPZ staff):

Barnyard Runoff. There were 53 barnyard runoff projects installed through the priority watershed project. These projects reduced phosphorus loadings an estimated 6,142 pounds/annually (during a 10 year storm event) which is 62% reduction. The reduction goal was 70% reduction of P from this source. The cost for barnyards was $816,900.

Waste Storage Facilities. There were 28 waste storage facilities installed to reduce winter spreading applications of manure. These projects addressed 930 "critical acres." The project goal was to reduce manure applications to critical acres by 50% or 374 acres. The

subset inventory may have underestimated the total critical acres in the watershed. The total cost for waste storage facilities was $681,213.

Cropland Erosion. The goal for cropland erosion was a 33% reduction. The project achieved 23% of its goal or a total reduction of 7.5% overall.

Streambank Erosion. The watershed goal was to reduce streambank erosion by 50%. The project installed 13,500 lineal feet of streambank fencing to limit cattle access and trampling of the stream banks. As a result, the project achieved 75% of its goal for an overall sedimentation reduction of 37.5%.

Other Practices. The watershed project also funded 4,482 acres of nutrient management plans, 977 acres of managed intensive grazing, 34 acres of wetland restoration, 12 acres of waterways, 30 milking center waste control systems, and 4 well abandonments. In all, 88 cost-share agreements were developed and implemented with $1,701,872.82 allocated to landowners.

5. *Marathon County Nutrient Management (NM) Program (March 1993).*

Marathon County initiates a Nutrient Management Program in April 1991, as part of the Priority Watershed Project. Project provided technical and planning assistance to farmers on a voluntary basis and initially works with farmers receiving municipal and industrial wastes for cropland applications. The project provides free soil and manure sampling for participants. The NM program finds that landowners are over applying fertilizer by 65% based upon soil tests and UW technical recommendations. Since NM is considered a new concept and management skill for landowners, most farmers are hesitant to participate. Most participation is limited to a small percentage of cropland in order to assure that reduced nutrient application does not lower yield production. The lack of whole farm participation makes it difficult to determine the environmental and economic implication of current fertilizer programs.

6. *Lower Big Rib River Priority Watershed (LRR*).

In 1996, Marathon County started the inventory process for the LRR watershed located in west central Marathon County and lies west of the Big Eau Pleine River watershed. The LRR is also dominated by an agricultural land use. A Farm Practices Inventory conducted by UW-Extension in 1996-1997 indicated that farmers exceeded UW-EX recommendations for nitrogen and phosphorus by 30% and 109%, respectively. The over application of nutrients was in part due to the lack of proper nutrient crediting of manure applications and legume plow-down.

REGULATORY PROGRAMS AND COMPLIANCE

Local Land Management Ordinances:

- 1984 – Marathon County Board approves Animal Waste Storage Ordinance to regulate the construction and significant alteration of waste storage impoundments (earthen lagoons only). Incidental non-regulatory mention of STD 633-nutrient management. See Appendix D – history of AWO or Waste Storage Facility and Nutrient Management Ordinance.
- 2002 – State Agricultural Performance Standards and Prohibitions (NR 150's). This effort fully develops a statewide regulatory direction to conservation compliance and long term maintenance of public conservation investments. Regulatory compliance is guided by State agencies, but implemented through local ordinances and administration. See Appendix E – State Agricultural Performance Standards and Prohibitions (PS&P's). Note that administrative rules that implement the PS&P's are found in NR 151, 152, and 153, as well as ATCP 50. Chapter 92 of State Statutes provides County Land Conservation Committees authority to regulate these activities, conduct resource studies, and administer cost-share funding to implement rules.
- 2008 – Livestock Facility Siting Ordinance. This ordinance authorizes the County to regulate Concentrated Animal Feedlot Operations (CAFO's) with specific livestock types when over 500 animal units and they expand by over 20% of 2006 cattle population. Regulatory guidelines are provided by State Statute 93 and Administrative Rule ATCP 51. Marathon County CPZ Department works closely with regional DNR staff to

coordinate the regulatory administration of this ordinance with NR 243 regulatory activities administered by DNR for CAFO's over 1000 animal units.

- 2009 – Waste Storage Facility and Nutrient Management Ordinance. This revision for the first time provides clear authority to the County to regulate nutrient management planning when associated with waste storage facilities. As of 2008, there are approximately 60,103 acres (40%) of cropland under Nutrient Management (NM) planning compliance in the BEP watershed. This represents 230 individual landowner/operator NM plans of which 104 are associated with Waste Storage Facilities (WSF's) constructed prior to 1985; 115 NM plans are associated with WSF's constructed after 1985 construction; and 11 NM plans are associated with program compliance requirement (not ordinance). There remain 19 total WSF systems currently without a NM plan (no cost-share to impose compliance). See Map 6 for farms with a NM plan. According to the 2007 CPZ Inventory of Waste Storage Facilities, there are a total of 313 waste storage facilities in the BEP watershed of which 252 are currently utilized (See Map 7 for location of waste storage facilities). Since 1997, when the closure of abandoned waste storage facilities became regulated by Marathon County through ordinance, the CPZ has closed 51 facilities in the BEP watershed.

Land Use Ordinances and Initiatives:

1. Zoning ordinances
2. Non-metallic Mining Ordinance.
3. Sanitary ordinances. See Map 8.
4. Farmland Preservation Program (41,344 acres enrolled). See Map 6.
   i. Contract Agreement – Compliance per Soil and Water Standards.
   ii. Zoning Certificates- PS&P's compliance
5. Managed Intensive Grazing Project

6. *Regulatory Compliance:*

Table 3. BEP Wastewater Permits: WPDES P loadings for municipalities (Lbs/year).

Municipality	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Milan SD	2404	2109	2183	2073	1058	620	769	738	597	492
Stratford		222	125	219	256	141	144	192	150	165
Colby			311	277	352	173	290	229	642	314
Abbotsford				958	1259	736	908	641	604	884
Stetsonville									747	629

Source NC – DNR (Jim Schmidt, 2007).

Table 4. BEP WPDES – DNR Concentrated Animal Feedlot Operation (CAFO) permits

Permit No	Facility	Animal Units	Dairy	Heifers	Calves
WI-0061841-02-0	Heeg Bros	1385	950	55	
WI-0061832-02-0	Maple Ridge	1465	975	70	150
WI-0062413-01-0	Lynn Bros	3623			
	Miltrim Farms (land)	2520	1800	0	0
	Bach Dairy (land)	>1000			
	Dic-Wisco Farms (land)	>1000			

Table 5. Marathon County Regulatory Programming Compliance

Program	Animal Units	Acres	No.	
Waste Storage Facility Ordinance			252	
NM Planning		60,103	230	
Farmland Preservation		41,344		
WSF abandonments			51	
SWRM compliance				
TRM compliance			24	
Livestock Siting Ordinance • DeJong Dairy • Hein Homestead Farms	 710 700			
Managed Intensive Grazing Project				

USDA programming to be determined.

References

1. 1965 BEP watershed inventory.
2. 1972 National Eutrophication Study.
3. 1974 University of Wisconsin- Stevens Point Study.
4. !977 Model Implementation Program (Application).
5. Soil Conservation in Wisconsin: Birth to Rebirth. Leonard Johnson, 1991. UW-Madison, Department of Soil Science.
6. Big Eau Pleine Priority Watershed Summaries (Lower and Upper).
7. Marathon County Comprehensive Plan – 2005.
8. 2009 - Soil Erosion Transect Survey Report.
9. 2007 – Conservation, Planning, and Zoning Waste Storage Facility Inventory.

APPENDICES

A – Chronological Review of News Articles

B – Upper Big Eau Pleine Watershed: Participation Summary

C – Lower Big Eau Pleine Watershed: Participation Summary

D – Summary of Regulatory Activities: Ordinances *(In Text referred to as history of Animal Waste Ordinance or Waste Storage Facilities and Nutrient Management)*

E – AG Performance Standards & Prohibitions ("Runoff Rules") *(In Text referred to as State Agricultural Performance Standards and Prohibitions)*

F – Farmland Preservation Program Participation (*Not referred to in Text)*

G – Soil Erosion Transect Survey Results.

H – Marathon County Resolution (*Not referred to in Text)*

I – Bibliography of Studies Pertaining to Big Eau Pleine River Watershed and Reservoir

J – List of Information or Inventory Needs

Appendix A
Chronological Review of News Articles

News Articles:

- July 14, 1974 (*Milwaukee Journal*). Reports of massive fish kill in March. DNR strongly believes the pollutant source is whey, but unable to confirm because of abundance of cheese plants in the BEP. Sportsmen still believe WVIC to blame because of water flow management. Petition signed by 11,000 people. Bob Wylie claims there is currently no limit to water level. WVIC and DNR agree that pollution upslope causes problems.
- Fall 1974 (*Marshfield News Herald*). DNR announces $20,000 to conduct pollution study. This in response to 11,000 petitioners and the realization that they did not have sufficient data to support contention that WVIC was not managing the flowage with the best interest of public. DNR reports fish kills in 1954-59 and 1963-74.
- December 16, 1977 (*AgriView*): Announces the 240,000 acre BEP watershed has been nominated as a Model Implementation Program (MIP) to demonstrate water quality improvement possibilities. Byron Shaw says, “most of the watershed’s problems are due to agr runoff from manure (mostly winter spreading) and fertilizers.” Calculates that the 1300 farms in watershed send 100,000 lbs of P into reservoir each year, along with 1 million pounds of nitrogen and 22 million pounds of soil. Also cheese factories contributing 10-15% of the problem (wash water high in phosphates). Shaw suggests slowing runoff and trapping nutrients as solutions.
- March 6, 1978 (*Wausau Daily Herald*). Winterkill plagued BEP since its creation. Reservoir created 1937; DNR reports kills in 1940,1947, 1948, 1950, 1951, 1954, 1958, 1959, 1961, 1963, 1964, 1965, 1967, 1974, 1976, 1977. Biologist studying the BEP pinpointed the flowage’s trouble, the farmer.
- March 7, 1978 (*Wausau Daily Herald*). 900 farms contribute 12,000 to 20,000 tons of sediment annually to BEP (USGS estimated one single event delivered 9,000 tons to BEP). Bryon Shaw states that 100,000 lbs of P delivered annually with 5% municipal sourced, 10% from cheese factories, and 85% from agricultural through sediment). Notes the 1976-77 total fish kill related to summer drought and subsequently little water in the flowage. The BEP River stopped flowing.
- March 8, 1978 (*Wausau Daily Herald*). Announces $100,000 ASCS targeted funds for Hamann Creek watershed. Voluntary with $2,500 maximum payment. P-load identified as likely problem to water quality. Hamann Creek has 100 farmers.

- March 8, 1978 (*Wausau Daily Herald*). BEP can be cleaned up, costs will be high. Costs estimated at $10 million. Cite challenges of non-point pollution initiatives over 900 farms. Lee states, “there should be comfort taken that after 40 years, the source of the BEP winter die-off appears to be identified and people are trying to do something about it.”
- March 27, 1978 (*Wausau Daily Herald*): ASC meeting for farmers on Hamman Creek Project.
- March 29, 1978 (*Wausau Daily Herald*). DNR announces that BEP River watershed likely to be selected as state priority non-point abatement project. Previous federal grant request for runoff controls on 900 farms in both upper and lower reaches of watershed estimated at between $3-12 million dollars.
- January 9, 1979 (*Wausau Daily Herald*): Lack of funding/costs prevent aeration installation on BEP. The action was promoted by citizens along the reservoir. WVIC and DNR involved with private citizen group. (WVIC agrees to hold water level higher than desired at 1135 until February 1. It has been the WVIC operational goal to draw reservoir down to lowest allowable **level** by February 1. El 1114 ft). Surface area ranges from 7,000 to 350 acres. WVIC offered to pay $5,000 (of $40,000 total estimate) toward aeration equipment; $3,000 toward operational costs.
- February 27, 1980 (*Wausau Daily Herald*): BEP in trouble! The issue more than just water level. DO near zero in 10 mile stretch of reservoir. Low DO caused by agr runoff with heavy nutrient load and BOD that accumulates on reservoir floor. It is suspended when sediment scoured. Marshfield Sportsman group is seeking funds for aerator with DNR, WVIC and Marathon County support anticipated.
- April 26, 1980 (Marshfield News Herald): Marshfield Sportsman group trying to raise $12,856 to install aerator. Project proposed at $50,000. DNR committing $25,000 (as a matching grant). Marathon County -$8,144, and $5,000 WVIC. A petition signed by nearly 10,000 people also circulated asking DNR and WVIC to maintain a minimum water level.
- January 2, 1981 (*Wausau Daily Herald*): Anticipating completion of aerator moderating DO levels. Applauds the effort of DNR, Marathon County Park Dept, WVIC, sportsman and citizens. New system includes 20,000 ft of plastic pipe laid in 14 sections ranging from 600 to 2,200 ft apart. Two 40 hsp motors to blow air into water. Depth of water 26-30 ft where pipes to be laid. Project intends to open 60 ac of water to diffuse oxygen from atmosphere. DNR official cites the agr runoff as source of problem.

- February 1981 (*Wausau Daily Herald*): Aeration experiment underway. Looks promising. Monitoring after 3 days indicates that the aeration turbulence is disrupting the stratification of oxygen and temps (WVIC).
- Spring 1981 (*News Herald*): Aerator began February 6 and created 10-15 acres of water.
- June 13, 1984 (*Wausau Daily Herald*). BEP earmarked for funds to control pollution for clean-up.
- September 7, 1986 (*Wausau Daily Herald*). Wasteland became prime nature area. Land considered too poor to farm. Building a dam would better control water flow on Wisconsin River, a primary source of power for paper mills. Article gives history of construction and describes the project.
- August 28, 1987 (*Wausau Daily Herald*): Upper BEP announces $1 million dollar grant from Wisconsin fund. The proposed target of reducing P by 50% projected to cost $4.1 million dollars. Inventoried 900 landowners. Voluntary program.
- September 6, 1987 (*Wausau Daily Herald*): Lake blooms in early summer and nearly "dies" each winter. Dean Kaatz announces that $2 million in cost share funds will be set aside to address agr runoff in upper BEP section where most of the runoff occurs (nearly 80%). Goal of the project is to reduce 50-70% of P-loading. According to model a reduction of 50% P will reduce algae by 57%.
- November 12, 1987 (*News Herald*): BEPCO announced as a new group of about 100 people. Discussed plans to address the FERC license process and comments on operational requirements.
- December 8, 1987 (*Tribune-Phonograph*). BEPCO to file for incorporation.
- January 6, 1988 (*Tribune-Phonograph*). BEP group incorporates – BEPCO. Goal is to improve the entire BEP for those seeking recreational activities. The quality and quantity of the water will be the focal point. Over 100 members.
- April 1988 (*Wausau Daily Herald*). BEPCO (240 members now) preparing for upcoming (1993) FERC license renewal. They understand the algae problems and recreational significance of the reservoir and hope to influence operational aspects of license. B. Martini discusses water quality initiatives and understandings: cheese factories (with high P detergents), agricultural runoff, and municipalities of Milan, Abbotsford, and Colby (P-load unknown).

- July 1, 1988 (*Wisconsin State Farmer*). Duane Natzke's farm featured on tour of watershed practices and programming. Stated that a UBEP project goal to reduce 16.2% of P loading to reservoir could control algae production. 900 landowners inventoried.
- July 31, 1988 (*Wausau Daily Herald*): Record summer drought mentioned. WVIC states that previous 20 months have been below normal precipitation which has reduced stream flows by 30-40%.
- October 6, 1988 (*Wausau Daily Herald*). Eau Pleine fish study announced. WVIC tagging walleyes to determine how fish survive during low DO level seasons. DNR staff will follow movements through study.
- March 19, 1989 (*Wausau Daily Herald*). Eau Pleine walleye avoid trouble by traveling near ice or in shallow water areas because of higher DO levels. At bottom of channel the DO near zero.
- April 8, 1989 (*Wausau Daily Herald*). Watershed needs a boost. After $1 million funding of UBEP watershed in August of 1987, only 21 farmers have signed cost-share agreements for $126,307.
- January 7, 1990 (*Wausau Daily Herald*): Documents fish kill during December 1989.
- March 1, 1990 (*Wausau Daily Herald*): Fourth aerator system added to the BEP reservoir west of Hwy S. Reports of a December 1989 fish kill. Slug of water causing problem had 40 ppm BOD. Normal BOD is 1.5 to 2.0 ppm.
- April 17, 1990 (*Wausau Daily Herald*). BEP avoids major fish kill. Timely rain and warm weather contributes to good luck.
- October 19, 1990 (*Wausau Daily Herald*). LBEP and Yellow River Watersheds selected for Priority Watershed status. UBEP has spent $1 million on non-point controls.
- November 5, 1990 (*Milwaukee Sentinel*). 900 farms inventoried in UBEP. Lassa getting ready to inventory another 500 in LBEP. Of 900 in UBEP, 125 farms were eligible and enrolled in cost-share agreements. 140,000 pounds P-load from UBEP watershed flows annually to reservoir with slightly more than ½ coming from non-point sources. At that time, 42,000 pounds P estimated sourced from Milan and Abbotsford treatment plants.
- January 23, 1991 (*Record-Review*). Announcing meeting for landowners of LBEP watershed.
- October 24, 1992 (*Wausau Daily Herald*). Announcing LBEP watershed meetings.

- March 3, 1993 (*Wausau Daily Herald*). Stream flows strong and DO levels healthy (twice the normal levels). Reservoir estimated at 5,000 acres. Aeration started 2 weeks earlier. Since 1985, minor fish kills reported. None significant.
- February 26, 1995 (*Wausau Daily Herald*): WVIC claims that study of last 24 years of reservoir history may give clue that can prevent future fish kills. Since 1970, eight documented fish kills (6 of these between 1970 and 1980). Only 2 (1989 and 1990) kills after 1980 and those were drought years. Reason: aeration added in 1981. Article states that watershed sediments settle in the upper reservoir and is scoured and flushed from the basin during winter drawdown. The scouring and removal suspends nutrients and creates a heavy oxygen demand slug of water. The sediment must be removed when ice is covering the reservoir.
- March 9, 2009 (*Stevens Point Journal*): Discussion of aerator not operating efficiently. Failing aeration system coupled with an increase in organized agricultural material cited. Ice situation this year also a problem. BEPCO believes the fish kills would end if WVIC did not lower the water levels as far as they do.
- April 9, 2009 (*Marshfield News Herald*): DNR will likely request funding in the next budget to research and measure how much agricultural runoff and industrial runoff the reservoir can handle. Cost estimated to be $65,000 and will take 2 years. CPZ could help provide data. Shaw study mentioned and said that in order to see a healthy reservoir, P levels in runoff would need to be reduced to 20,000 lbs annually.
- October 5, 2009 (*Wausau Daily Herald*). Work on aerator system upgrades begin with WVIC workers. BEPCO and County funds ($27,000 each) are highlighted. System in worse condition than previously believed. Water levels because of drought still a concern. Agricultural sources cited as contributing problem.

Appendix B
Upper Big Eau Pleine Watershed: Participation Summary

PRIORITY WATERSHED GRANT PROGRAM Revised August 9, 2004

BEST MANAGEMENT PRACTICES CODES, COST-SHARING RATES, AND FUNDING SOURCE (Chapter NR 120)

****Effective 10/1/02 (do not select for new cost-share agreements)**

BMP CODE	BMP NAME	UNIT	OLD RATE	NEW RATE	FUNDING TYPE
C3	FIELD DIVERSIONS	Feet	70%	70%	BONDING
C4	TERRACES	Feet	70%	70%	BONDING
C5	GRASSED WATERWAYS	Acres	70%	70%	BONDING
L1	BARNYARD RUNOFF MANAGEMENT	No.	70%	70%	BONDING
L2	MANURE STORAGE FACILITIES	No.	N/A	70%	BONDING
~~L2A**~~	~~FIRST $20,000 MANURE STORAGE~~	No.	70%	N/A	BONDING
~~L2B**~~	~~REST TO $35,000 MAXIMUM MANURE STORAGE~~	No.	50%	N/A	BONDING
L3	LIVESTOCK FENCING	Feet	50%	70%	BONDING (****see foot note for flat rate)
L4	ANIMAL LOT ABANDONMENT OR RELOCATION	No.	70% +	70%	BONDING
L5*	INTENSIVE GRAZING MANAGEMENT (Rotational Grazing)	Acres	50%	70%	BONDING (permanent BMP components)
L6	MILKING CENTER WASTE CONTROL SYSTEMS	No.	70%	70%	BONDING
L7	ANIMAL WASTE STORAGE SYSTEM ABANDONMENT	No.	70%	70%	BONDING
~~L8**~~	~~CATTLE MOUNDS~~	No.	70%	N/A	BONDING
LR	ROOFS FOR BARNYARD RUNOFF MGT & MANURE STG FACILITIES	No.	70% +	70%	BONDING
M1	CRITICAL AREA STABILIZATION	Acres	70% +	70%	BONDING
M2	GRADE STABILIZATION STRUCTURES	No.	70% +	70%	BONDING
~~M3**~~	~~SHORELINE PROTECTION - non specific~~	Feet	70%	N/A	BONDING
M4	AGRICULTURAL SEDIMENT BASINS	No.	70%	70%	BONDING
M6	PESTICIDE MANAGEMENT	Acres	70%	70%	BONDING - Spill control facilities only!
M7	WETLAND RESTORATION	Acres	70%	70%	BONDING
M8	LAKE SEDIMENT TREATMENT	Acres	70%	70%	BONDING
M9	WELL ABANDONMENT	No.	70%	70%	BONDING
~~MB**~~	~~SHORELINE BUFFERS~~	Feet	70%	N/A	BONDING
	SHORELINE & STREAMBANK PROTECTION:	Feet	70%	70%	BONDING
MC	STREAM CROSSING	Feet	70%	70%	BONDING
MF	STREAMBANK FENCING	Feet	70%	70%	BONDING
MO	OTHER SHORELINE PROTECTION	Feet	70%	70%	BONDING
MR	STREAMBANK RIP-RAPPING	Feet	70%	70%	BONDING
MS	STREAMBANK SHAPING & SEEDING	Feet	70%	70%	BONDING
~~MH~~	~~SHORELINE HABITAT RESTORATION~~	Feet	70%	N/A	BONDING
MG	SHORELINE HABITAT RESTORATION FOR DEVELOPED AREAS	Feet	NEW	70%	BONDING
MU	RIPARIAN BUFFERS	Acres	NEW	70%	BONDING
UR	URBAN BEST MANAGEMENT PRACTICES	No.	NEW	70%	BONDING
~~U5~~	~~STRUCTURAL URBAN BEST MANAGEMENT PRACTICES~~	No.	70%	N/A	BONDING
C1	CONTOUR FARMING	Acres	70%	70%	CROPPING (*** see foot note for flat rate)
C2	CONTOUR & FIELD STRIPCROPPING	Acres	70%	70%	CROPPING (*** see foot note for flat rate)
C7	HIGH RESIDUE MANAGEMENT SYSTEMS *(includes old C8 & C9)*	Acres	70%	70%	CROPPING (*** see foot note for flat rate)
C10	CROPLAND PROTECTION COVER (Green Manure)	Acres	70%	70%	CROPPING (*** see foot note for flat rate)
L5T*	INTENSIVE GRAZING MANAGEMENT (Rotational Grazing)	Acres	50%	70%	CROPPING (temporary BMP components)
M5	NUTRIENT MANAGEMENT	Acres	70%	70%	CROPPING
M6	PESTICIDE MANAGEMENT	Acres	70%	70%	CROPPING

*L5 includes permanent components, such as permanent fencing, watering systems, and erosion stabilization. L5T includes temporary components, such as temporary fencing & portable watering systems. The total cost share of the watering system may not exceed **$2,000** for the following components: pipeline watering & pasture watering systems, wells, spring developments & portable watering systems such as pumps, pipes & tanks.

*****NR 120.18(1)(g) Cropping Flat Rates:**

$9.00 per acre for contour cropping
$13.50 per acre for strip-cropping
$7.50 per acre for field strip-cropping
$18.50 per acre per year for high residue management systems
$25 per acre per year for cropland protection cover (green manure)

******NR 120.18(1)(g)6 Fencing Flat Rates:**

$5.00 per linear rod/3 strand barbed wire/steel or wooden post
$8.00 per linear rod/woven wire/steel or wooden post
$3.00 per linear rod/2 strand elec/fiberglass,steel, or wooden post
$7.50 per linear rod/high tensile wire/fiberglass posts

Page 1 of 1

Upper Big Eau Pleine Watershed: Participation Summary

Upper Big Eau Pleine Watershed Cost-Share Agreements

UBE

CSA #	BMP Code	Units	Total Paid
2	L2	1	$16,527.29
4	L2	1	$7,319.10
5	L2	1	$9,069.65
6	L2	1	$1,786.75
7	L2	1	$6,705.95
8	C5	1.4	$1,470.00
9	L2	1	$7,532.77
10	L2	1	$10,000.00
12	L2	1	$7,032.86
14	L1	1	$18,594.86
	C5	1	$583.37
	MC	1	$275.12
	C1	23	$138.00
	C2	10	$100.00
	L2	1	$10,000.00
15	L2	1	$7,504.60
16	L1	1	$1,073.13
17	L2	1	$10,803.65
19	L2	1	$7,506.34
20	L1	1	$13,528.94
	C2	31	$310.00
21	L1	1	$18,543.25
	L2	1	$7,848.23
22	L1	1	$6,455.62
23	L2	1	$10,000.00
24	L2	1	$7,998.54
25	C1	6	$36.00
	C2	16	$160.00
26	L2	1	$9,050.66
27	C2	17	$297.50
	C1	12	$72.00
	C5	0.3	$473.20
28	L1	1	$14,907.30
	L2	1	$10,000.00
29	L2	1	$8,306.01
30	L1	1	$13,086.99
	L2	1	$9,174.97
31	L2	1	$10,000.00
34	L1	1	$8,918.01
35	L1	1	$16,713.51
	L2	1	$10,000.00
37	L1	1	$9,068.35
38	C5	0.9	$1,117.97
40	C5	0.2	$840.00
	L1	1	$12,444.46
41	L1	1	$11,364.95
	C5	3.33	$4,582.61
	M2	1	$2,924.25
	C2	72	$720.00
42	L2	1	$10,000.00
44	L1	1	$10,594.97
	L2	1	$8,768.28
45	L2	1	$9,823.14
46	L2	1	$10,000.00
47	L2	1	$9,686.89
50	L1	1	$20,507.85
	L2	1	$10,000.00
51	L1	1	$16,073.50
	L2	1	$14,722.14
53	L2	1	$10,000.00
54	L1	1	$2,095.51
56	L1	1	$13,242.78
57	L2	1	$9,221.70
59	L1	1	$883.90
60	L1	1	$16,316.86
63	L1	1	$9,864.66
	L2	1	$18,348.66
68	C2	20.6	$206.00
	C1	4.4	$26.40
70	L2	1	$8,117.00
71	L1	1	$17,659.42
	L2	1	$10,000.00
76	L2	1	$6,733.36
77	L2	1	$9,394.04
78	L2	1	$7,665.20
	L1	1	$16,055.00
79	L2	1	$8,690.15
80	L2	1	$10,000.00
81	L1	1	$16,481.54
82	L1	1	$12,453.53
83	L2	1	$8,575.69
	L1	1	$11,390.40
84	L1	1	$14,510.23
85	L1	1	$14,169.15
86	L2	1	$8,605.53
88	L1	1	$11,656.40
	L2	1	$9,142.75
89	L2	1	$9,530.51
92	L2	1	$10,000.00
93	L2	1	$10,000.00
95	L1	1	$10,714.66
97	L1	1	$5,280.90
99	L1	1	$21,723.26
102	L1	1	$19,146.37
103	L1	1	$12,261.20
104	L1	1	$41,771.33
	C7	60	$600.00
107	L1	1	$9,916.10
109	L2	1	$9,235.48
110	L1	1	$38,810.76
119	L2	1	$10,000.00
121	L4	1	$8,913.89
	L2	1	$8,813.58
	L1	1	$18,302.20
122	L1	1	$12,443.21
	L2	1	$9,230.08
	C5	3	$2,223.09
	M5	1	
124	L2	1	$9,836.02
	L1	1	$16,841.97
126	L2	1	$20,000.00
130	L1	1	$18,380.84
131	L2	1	$10,000.00
132	L2	1	$10,000.00
	L1	1	$11,677.47
	M5	1	
133	L1	1	$17,904.43
			$1,128,206.74

Appendix C
Lower Big Eau Pleine Watershed: Participation Summary

PRIORITY WATERSHED GRANT PROGRAM

Revised August 9, 2004

BEST MANAGEMENT PRACTICES CODES, COST-SHARING RATES, AND FUNDING SOURCE (Chapter NR 120)

****Effective 10/1/02 (do not select for new cost-share agreements)**

BMP CODE	BMP NAME	UNIT	OLD RATE	NEW RATE	FUNDING TYPE
C3	FIELD DIVERSIONS	Feet	70%	70%	BONDING
C4	TERRACES	Feet	70%	70%	BONDING
C5	GRASSED WATERWAYS	Acres	70%	70%	BONDING
L1	BARNYARD RUNOFF MANAGEMENT	No.	70%	70%	BONDING
L2	MANURE STORAGE FACILITIES	No.	N/A	70%	BONDING
~~L2A**~~	~~FIRST $20,000 MANURE STORAGE~~	No.	70%	N/A	BONDING
~~L2B**~~	~~REST TO $35,000 MAXIMUM MANURE STORAGE~~	No.	50%	N/A	BONDING
L3	LIVESTOCK FENCING	Feet	50%	70%	BONDING (****see foot note for flat rate)
L4	ANIMAL LOT ABANDONMENT OR RELOCATION	No.	70% +	70%	BONDING
L5*	INTENSIVE GRAZING MANAGEMENT (Rotational Grazing)	Acres	50%	70%	BONDING (permanent BMP components)
L6	MILKING CENTER WASTE CONTROL SYSTEMS	No.	70%	70%	BONDING
L7	ANIMAL WASTE STORAGE SYSTEM ABANDONMENT	No.	70%	70%	BONDING
~~L8**~~	~~CATTLE MOUNDS~~	No.	70%	N/A	BONDING
LR	ROOFS FOR BARNYARD RUNOFF MGT & MANURE STG FACILITIES	No.	70% +	70%	BONDING
M1	CRITICAL AREA STABILIZATION	Acres	70% +	70%	BONDING
M2	GRADE STABILIZATION STRUCTURES	No.	70% +	70%	BONDING
~~M3**~~	~~SHORELINE PROTECTION - non specific~~	Feet	70%	N/A	BONDING
M4	AGRICULTURAL SEDIMENT BASINS	No.	70%	70%	BONDING
M6	PESTICIDE MANAGEMENT	Acres	70%	70%	BONDING - Spill control facilities only!
M7	WETLAND RESTORATION	Acres	70%	70%	BONDING
M8	LAKE SEDIMENT TREATMENT	Acres	70%	70%	BONDING
M9	WELL ABANDONMENT	No.	70%	70%	BONDING
~~MB**~~	~~SHORELINE BUFFERS~~	Feet	70%	N/A	BONDING
	SHORELINE & STREAMBANK PROTECTION:	Feet	70%	70%	BONDING
MC	STREAM CROSSING	Feet	70%	70%	BONDING
MF	STREAMBANK FENCING	Feet	70%	70%	BONDING
MO	OTHER SHORELINE PROTECTION	Feet	70%	70%	BONDING
MR	STREAMBANK RIP-RAPPING	Feet	70%	70%	BONDING
MS	STREAMBANK SHAPING & SEEDING	Feet	70%	70%	BONDING
~~MH~~	~~SHORELINE HABITAT RESTORATION~~	Feet	70%	N/A	BONDING
MG	SHORELINE HABITAT RESTORATION FOR DEVELOPED AREAS	Feet	NEW	70%	BONDING
MU	RIPARIAN BUFFERS	Acres	NEW	70%	BONDING
UR	URBAN BEST MANAGEMENT PRACTICES	No.	NEW	70%	BONDING
~~U5~~	~~STRUCTURAL URBAN BEST MANAGEMENT PRACTICES~~	No.	70%	N/A	BONDING
C1	CONTOUR FARMING	Acres	70%	70%	CROPPING (*** see foot note for flat rate)
C2	CONTOUR & FIELD STRIPCROPPING	Acres	70%	70%	CROPPING (*** see foot note for flat rate)
C7	HIGH RESIDUE MANAGEMENT SYSTEMS *(includes old C8 & C9)*	Acres	70%	70%	CROPPING (*** see foot note for flat rate)
C10	CROPLAND PROTECTION COVER (Green Manure)	Acres	70%	70%	CROPPING (*** see foot note for flat rate)
L5T*	INTENSIVE GRAZING MANAGEMENT (Rotational Grazing)	Acres	50%	70%	CROPPING (temporary BMP components)
M5	NUTRIENT MANAGEMENT	Acres	70%	70%	CROPPING
M6	PESTICIDE MANAGEMENT	Acres	70%	70%	CROPPING

*L5 includes permanent components, such as permanent fencing, watering systems, and erosion stabilization. L5T includes temporary components, such as temporary fencing & portable watering systems. The total cost share of the watering system may not exceed **$2,000** for the following components: pipeline watering & pasture watering systems, wells, spring developments & portable watering systems such as pumps, pipes & tanks.

*****NR 120.18(1)(g) Cropping Flat Rates:**

$9.00 per acre for contour cropping
$13.50 per acre for strip-cropping
$7.50 per acre for field strip-cropping
$18.50 per acre per year for high residue management systems
$25 per acre per year for cropland protection cover (green manure)

******NR 120.18(1)(g)6 Fencing Flat Rates:**

$5.00 per linear rod/3 strand barbed wire/steel or wooden post
$8.00 per linear rod/woven wire/steel or wooden post
$3.00 per linear rod/2 strand elec/fiberglass,steel, or wooden post
$7.50 per linear rod/high tensile wire/fiberglass posts

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Lower Big Eau Pleine Watershed: Participation Summary

Case Study BEP
APPENDIX C

CSA #	PRACTICE CODE	UNITS INSTALLED	PROJECT COMPLETE	YEAR COMPLETED	PAYMENT DATE	TOTAL COST SHARE PAID
1	L1	1	Y		12/15/1999	$10,942.18
1	L2	1	Y		11/29/1999	$32,744.84
1	M5		Y		6/14/2000	$315.00
3	L1	1	Y		1016.95	$17,279.19
3	L5		Y		12/1/1998	$9,791.14
4	MF	2000	Y		9/28/1992	$2,381.35
7	L2	1	Y		9/29/1998	$17,752.16
7	M5	82.5	Y		12/31/2002	$183.50
7	C5	0.4	Y		11/2/1998	$757.09
7	C7	45.5	Y		12/21/2002	$1,119.25
8	L1	1	Y		6/9/1993	$1,464.64
11	L1	1	Y		10/18/1993	$8,759.87
11	M5	228	Y		12/31/2002	$290.75
12	L1	1	Y		12/7/1993	$20,403.40
12	C5	0.5	Y		9/30/1995	$465.46
12	L7	1	Y		11/9/1999	$936.03
12	L2	1	Y		11/9/1999	$19,196.58
12	L6	1	Y		11/9/1999	$70.18
13	L1	1	Y		8/25/1994	$16,700.38
13	M5	105	Y		12/31/2002	$99.50
13	L2	1	Y		4/1/1996	$22,469.66
14	L1	1	Y		6/12/1995	$598.50
14	L2	1	Y		8/27/1996	$21,000.00
14	L7	1	Y		8/1/1994	$761.60
16	L1	1	Y		6/29/1994	$19,957.53
16	M5	342.5	Y		12/31/2002	$304.75
16	C5	2	Y		5/25/1994	$1,683.54
16	L6	1	Y		12/20/1995	$3,102.11
17	L1	1	Y		9/14/1995	$17,271.80
17	L2	1	Y		9/16/1994	$15,124.01
17	M5	193	Y		12/31/2002	$202.50
18	L2	1	Y		94	$8,704.95
19	L1	1	Y		12/29/1998	$32,672.87
19	L2	1	Y		1996	$11,200.00
19	M5	289.5	Y		12/31/2002	$178.75
19	C5	1.5	Y		1998	$1,499.90
19	M7	1	Y		1998	$2,888.60
19	C7	199.8	Y		12/31/2002	$3,696.30
21	L1	1	Y		1994	$19,997.77
21	L2	1	Y		1994	$20,000.00
21	M5	191	Y		12/31/2002	$277.75
21	C2	18	Y		1996	$180.00
21	C5	1	Y		1994	$548.79
21	C7	11.8	Y		12/31/2002	$218.30
22	L1	1	Y		1994	$18,459.01
22	M5	166	Y		2000	$260.00
23	MF	3000	Y		1994	$2,900.80
24	L1	1	Y		1994	$14,059.96
25	L1	1	Y		1995	$12,050.22
25	M5	115	Y		1999	$216.00
26	L1	1	Y		8/4/2003	$27,347.20
26	L6	1	Y		1/9/2003	$5,745.25
27	L2	1	Y		8/17/1995	$13,959.15
28	L1	1	Y		2000	$17,306.02
28	M5	205	Y		1999	$340.00
28	L2	1	Y		1995	$20,481.07
29	L1	1	Y		1998	$11,834.33
29	L2	1	Y		1998	$18,494.97
29	C7	7.2	Y		2001	$133.20
31	L1	1	Y		1998	$13,521.34
31	M5	213	Y		1998	$234.35
32	L1	1	Y		1996	$12,685.25
32	L2	1	Y		1995	$19,409.20
32	M5	144	Y		2000	$140.00
32	L5	149	Y		1998	$7,805.48
32	C5	1.2	Y		1998	$655.90
33	L1	1	Y		1996	$18,308.82
33	L2	1	Y		1996	$22,341.72
33	M5	100	Y		2001	$383.25
34	L1	1	Y		1995	$9,076.89
35	L1	1	Y		1995	$10,186.16
36	L1	1	Y		1995	$15,279.92
36	M5	65	Y		1999	$35.75
38	L1	1	Y		1995	$10,844.44
38	L2	1	Y		1996	$14,563.37
38	M5	110	Y		1996	$181.25
40	L1	1	Y		1999	$28,479.99
41	M5	400	Y		2000	$600.00
42	L1	1	Y		1995	$406.00
44	L2	1	Y		1999	$16,715.67
44	M5	111	Y		2000	$192.00
45	L1	1	Y		1995	$11,200.00
47	L1	1	Y		1995	$12,026.42
47	L2	1	Y		1999	$22,104.08
47	M5	169	Y		2000	$380.50

CSA #	PRACTICE CODE	UNITS INSTALLED	PROJECT COMPLETE	YEAR COMPLETED	PAYMENT DATE	TOTAL COST SHARE PAID
47	MF	4000	Y		2001	$5,602.21
48	L1	1	Y		1999	$12,908.70
49	L5	118	Y		1996	$9,090.24
50	L2	1	Y		1995	$12,579.29
51	L1	1	Y		1995	$322.00
51	L2	1	Y		2002	$45,000.00
52	L1	1	Y		2002	$39,825.09
53	L1	1	Y		1997	$31,614.50
54	L1	1	Y		1996	$8,289.47
55	L1	1	Y		1996	$644.00
56	L1	1	Y		2002	$20,791.44
56	MF	4010	Y		2003	$2,030.87
56	C5	1.6	Y		1997	$1,616.93
57	L1	1	Y		1998	$12,026.10
57	M5	139	Y		1997	$194.25
58	L2	1	Y		1996	$25,245.09
58	M5	90	Y		1997	$158.50
59	L2	1	Y		1998	$22,091.54
59	L7	1	Y		1996	$6,351.96
59	L1	1	Y		2002	$10,174.93
60	L1	1	Y		1997	$14,604.07
60	M5	89	Y		1997	$174.75
60	C7	16	Y		1997	$296.00
61	M7	2.5	Y		1998	$5,583.34
61	C7	168	Y		2002	$11,971.35
67	L1	1	Y	2002	1/9/2003	$41,825.37
69	L1	1	Y	1998	12/3/1998	$21,911.24
70	C5	0.8	Y	1997	6/12/1997	$937.12
70	C7	53	Y	2002	6/21/2002	$980.50
72	L1	1	Y	1998	11/5/1998	$11,875.85
72	M5	119	Y	2000	4/27/2000	$222.50
73	L1	1	Y	1998	10/1/1998	$15,782.26
73	M5	181	Y	2002	3/11/2002	$499.00
74	L1	1	Y	1999	11/9/1999	$15,789.60
76	L1	1	Y	2003	11/18/2003	$26,708.51
77	L1	1	Y	1997	12/18/1997	$9,901.32
77	L2	1	Y	1997	12/18/1997	$33,641.69
77	M5	120	Y	1998	7/30/1998	$210.50
78	L2	1	Y	2003	12/30/2003	$64,260.00
78	C10	10.9	Y	2002	1/10/2002	$272.50
79	L1	1	Y	1999	11/11/1999	$6,367.90
80	L1	1	Y	2003	11/18/2003	$27,148.21
80	L2	1	Y	2002	1/9/2003	$64,379.62
80	L6	1	Y	2002	1/9/2003	$5,530.30
80	M9	1	Y	2002	1/9/2003	$414.80
80	L7	1	Y	2002	1/9/2003	$5,018.40
82	L5	78	Y	1998	1/14/1999	$5,640.83
84	L2	1	Y	2000	4/30/2001	$13,241.55
85	C7	50	Y	1998	6/4/1998	$1,341.25
86	L1	1	Y	2001	12/14/2001	$33,575.34
86	L2	1	Y	2001	11/5/2001	$35,000.00
86	L6	1	Y	2001	10/26/2001	$2,653.00
86	MF	500	Y	2001	1/10/2002	$2,165.75
89	L1	1	Y	2000	12/14/2000	$1,574.81
91	M5	368	Y	2001	6/22/2001	$865.62
91	L2	1	Y	2000	10/5/2000	$45,000.00
91	L7	1	Y	2000	10/5/2000	$10,109.05
91	M9	2	Y	2000	10/5/2000	$432.71
91	C7	126.3	Y	2002	6/21/2002	$4,843.30
92	C7	54	Y	1999	5/20/1999	$999.00
92	L5	20	Y	1998	1/7/1999	$3,906.57
96	L5	160	Y	1999	4/22/1999	$2,106.74
97	M7	2	Y	2000	10/5/2000	$8,182.30
98	M7	2.5	Y	1998	10/1/1998	$5,006.75
99	M7	2	Y	2000	11/2/2000	$5,381.81
102	M7	2	Y	1998	9/17/1998	$5,057.29
104	L5	35	Y	2000	10/5/2000	$3,639.87
105	L5	100	Y	2002	6/28/2002	$2,287.12
106	M7	2	Y	2000	9/7/2000	$6,228.73
107	L1	1	Y	2001	12/21/2001	$24,024.05
108	F3	3000	Y	2002	7/12/2002	$510.00
108	M1	55	Y	2002	7/12/2002	$6,485.29
109	L1	1	Y	2002	5/17/2002	$2,945.95
110	L5	228	Y	2001	8/27/2001	$15,865.37
113	C10	58	Y	2002	1/10/2002	$1,450.00
114	C7	4.7	Y	2001	6/7/2001	$86.95
116	C10	16.5	Y	2002	1/10/2002	$412.50
118	L1	1	Y	2002	1/9/2003	$15,999.26
118	L2	1	Y	2002	11/7/2002	$4,513.18
120	M7	1	Y	2001	11/16/2001	$3,702.21
123	L3	5930	Y	2002	1/9/2003	$4,772.60
123	L1	1	Y	2002	1/9/2003	$1,127.00
124	C5	1.4	Y	2003	8/11/2003	$5,026.29
125	M9	1	Y	2002	7/12/2002	$301.00

Permit #	Suffix	Name	Township	Storage Size (1000 gals)	Construction Permit Date	Permit Amount Pd.	Nutrient Management Agr Plan	Final Construction Check
101		Natzke, Duane	Johnson	471				x
102		Pinter, Gerald	Holton	576				x
103		Pinter, Lawrence	Holton	329				x
104		Schroeder, William	Emmet	576				x
105		Nikolai, Victor	Day	583				x
106		Gumz, Jim/Michael	Johnson	524				x
107		Larson, Harry	Wien	449				x
108		Belter, David	Halsey	524				x
109		LaRoche, Leonard	Bern	337				x
109	A	Pearce, James	Bern	Abandonment	9/6/2007	$100	N/A	Oct. 2007
110		Wichlacz, Eugene	Johnson	606				x
111		Geiger, Dennis	Hull	748				x
112		Rietz, Gary	Bern	426				x
113		Knott, David	Johnson	524				x
114		Umlauff, Rod	Holton	501				x
115		Bauer, George	Eau Pleine	150				
116		Borth, Kenneth/Russel	Halsey	352				x
117	A	Gingerich, Melvin	Cleveland	Abandonment	10/29/2007	$100	X	11/6/2007
117		Laessig, Terry	Cleveland	479				x
118		Radke, Albert	Eau Pleine	875				x
119		Kilty, Pat	Frankfort	509				x
120		Reamer, Richard	Holton	598				x
120	A	Swarey,Jacob	Holton	Abandonment	9/27/2007	$100	N/A	10/28/2008
121		Sundermeyer, Larry	Holton	539				x
122		Bonsal, Bill	Wien	524				x
122	A	Meador, Jamey	Wien	Abandonment	11/7/2007	$100	N/A	11/29/2007
123		Christiansen, Ken	Hull	688				x
124		Kaiser, Dennis	Cassel	464				x
125		Viegut, Arden	Wien	591				x
126		VanDerGeest, Gary	Berlin	561				x
127	A	Dommer, Carl	Hull	Abandonment	10/9/2007	$100	N/A	11/12/2007
127		Shannon, Howard	Hull	449				x
128		Rueden, Greg	Holton	524				x
129		Diedrich, Ray	Rietbrock	329				x
130		Williams, Marv	Rietbrock	486				x
131		Wingler, John	Holton	501				x
132		Wellner, Charles	Holton	479				x
133		Koffarnaus, Carlin	Hull	142				x
134		Punke, Mark	Halsey	337				x
136		Stauske, George	Johnson	591				x
137		Litchfield, Roger	Bern	329				x
137	A	Swarey, Benjamin	Bern	Abandonment	10/3/2007	$100	N/A	7/??/2008
138		Punke, Dennis	Wien	299				x
139		Schreiber, Fred	Emmet	337				x
140		Posphychalla, Walter	Cassel	434				x
141		Bender Farm	Holton	636				x
142		Pinter Farm	Holton	337				x
143		Wussow, Bruce	Frankfort	800				x
144		Bach, George	Holton	511				x
145		Hein Homestead	Eau Pleine	980				x
146		Spindler, Charles	Cleveland	490				x
147		Kampmeyer, John	Hull	561				x
148		Johnson, Duane	Hull	406				x
149		Hammel, Charles	Johnson	322				x
150		Wieler, Ron	Rietbrock	269				x
151		Christian, Gene	Maine	314				x
152		Punke, Dennis	Wien	187				x
153		Bargender, Clarence	Frankfort	374				x
155		Siegharter, John/Joe	Norrie	411				x
156		Tesch, Ken	Holton	509				x
157		Horacek, Peter	Johnson	711				x
158		Horacek, Jerome	Holton	434				x
159		Brill, John	Hull	842				x
160		Horst, Benjamin	Hull	711				x
161		Rankl, Jerome	Holton	449				x
162		Brusky, Mike	Eau Pleine	120				x
163		Knorr, Don	Rietbrock	554				x
164		Hamman, Charles	Cleveland	625				x
165		Hilgeman, Dan	Cleveland	419				x
166		Kreft, Claude	Bern	191				x
167		Hoppenworth, Jay	Wien	838				x
168		Woller, Craig	Berlin	224				x
169		Bargender, Lawrence	Frankfort	438				x
170		Ruesch, Rod	Holton	578				x
171		Becker, Leonard	Halsey	262				x
172		Juedes, Floyd/Melvin	Holton	501				x
173		Radke, Al	Marathon	598				x
174		Kruger, Dean	Hull	791				x
175		Brodziski, Frank	Rietbrock	598				x
176		Halopka, Eugene/Terry	Johnson	426				x
177		Weichelt, James	Day	411				x
178		Asplund, Greg	Johnson	473				x
179		Miltrim Farms	Bern	785				x
180		Schmitt, Alan/Karen	Johnson	299				
181		Soper, Jack	Holton	449				x
182		Bergs, Peter	Cassel	449	10/7/1992			x
183		Seehafer, Bruce	McMillan	411				x
184		Schreiber, Galen	Johnson	748				x
185		Brecke, Gerry	Holton	1159				x
186		Mauer, Wayne	Rietbrock	643				x
187		Miller, Arnold	Green Valley	449				x
188		Graff, Ed	Holton	539				x
188	A	Graff, Ed	Holton	Abandonment	10/30/2007	$100	N/A	11/29/2007
189		Stuttgen, Jim	Johnson	441				x
190		Fricke, Allen	Hull	576				x
191		Schnabel, Randy	Brighton	277				x
192		Thorpe, Bob	Easton	224				x
192	A	Thorpe, Bob	Easton	Abandonment	9/12/2007	$100	N/A	Nov. 2007
193		Bohman, Gary	Frankfort	598				x
194		Stroetz, Dennis	McMillan	1047				x
195		Hackel, Ken	Hull	123				x
196		Krenz, Bruce	Hamburg	262				x
197		Hoppenworth, Larry	Wien	718				x
198		Swacker, Ray	Holton	574				x
199		Hein, Mike	Johnson	468				x

Permit #	Suffix	Name	Township	Storage Size (1000 gals)	Construction Permit Date	Permit Amount Pd.	Nutrient Management Agr Plan	Final Construction Check
200		Borchardt, James	Wien	581				x
201		Redetzke, LeRoy	Eau Pleine	530				x
202		Schilling, Wayne	Wien	889				x
203		Umlauff, Rod	Holton	374				x
204		Miller, Herman	Spencer	449				x
205		Oelke, Tom	Berlin	1047				x
206		Kunze, Paul	Hull	381				x
207		Domagola, Dennis	Bergen	180				x
208		Ploeckelman, Jim	Holton	370				x
209		Hollatz, Dale	Green Valley	299				
210		Hoppenworth, Larry	Wien	299				x
211		Leffel, Arden	Wien	464				x
212		Borchardt, Jerry T.	Wien	244				x
213		Graff, Dan	Holton	123				x
214		Weis Heritage Acres	Brighton	426				x
215		Remus, Carl	Cleveland	434				x
216		Kulus, Dave Sr.	Johnson	1176				x
217		Koepke, Neal	Frankfort	451				x
218		Blume, Henry	Johnson	465				x
219		Schreiner, Charles	Wien	340				x
220		Borchardt, Jason	Wien	396				x
221		Schmitt, Alan	Johnson	1592				x
222		Horst, Allen	Bern	499				x
223		Zahn, Steve	Maine(South)	583				x
224		Hoppenworth, LaRon	Wien	556				x
225		Schreiber, Galen	Johnson	275				x
226		Kilty, Mark	Frankfort	450				x
227		King, Kelly	Wien	475				x
228		Gumz, Bill	Holton	475				x
229		Ostrowski Farms	Elderon	2500				x
230		Guralski, Lyle	Rietbrock	150				x
231		Miltrim	Bern	1571				x
232		Arnes, Jon	Day	524				x
233		Bangart, James	Day	449				x
234		Kiedrowski Farms	Elderon	449				x
235		Tompkins, Ernest	Wien	556				x
236		Chris, Jeff	Holton	263				x
237		Duvall, Tim	Hull	67				x
238		Sturm, John	Hamburg	1646				x
239		Schaefer, Dan	Holton	383				x
240		Nieman, Gary	Spencer	114		$100		x
241		Kingdom Haven Farm	Cassel	500	2/29/1996	$350	x	x
242		Pope, Kayo	Holton					x
243		Schairer, James	Norrie	4000	9/24/1996	$350		x
244		Zimmerman, Mark	Easton	50	6/25/1997	$100		x
245		Lueddecke, Dave	Holton	176	6/6/1996	$200	x	x
246		Rausch, Alan	Halsey	3000	6/13/1996	$350	x	x
247		Schreiber, Dawayne	Holton	964	6/26/1996	$350	x	x
248		Mara-Wood Farms Inc	Spencer	454	7/24/1996	$300		x
249		Kohlbeck, Ray	Day	500	7/29/1996	$300		x
250		Forrest, Brian L.	Eau Pleine	125	10/19/1997	$200		x
251		Zugier, Alvin	Holton		9/4/1996	$300		x
251	A	Zugier, Christine / Alvin	Holton	Abandonment	5/12/2009	$200	NA	
252		Haas, Russell	Hull					x
253		Kops, Gerald	Brighton	50	10/30/1996	$100		x
254		Draeger's Dairy Farm	Rib Falls	2000	9/6/1996	$350		x
255		Martin, Ira Lamar	Brighton	400	9/9/1996	$300	x	x
256		Wiesman, Leroy	Cleveland	179	9/17/1996	$250		x
257		Greenberg Farms	Eau Pleine	17	9/18/1996	$100		x
258		VanDerGeest Farms	Maine(North)	3500	9/18/1996	$350		x
259		Stieber, Lorton	Emmet	405	9/18/1996	$300	x	x
260		Zahrt View Farm, Inc.	Easton	400	10/2/1996	$300	x	x
261		Schreiber, Roman	Johnson	599	10/3/1996	$350		x
262		Bastman, Todd	Frankfort	824	5/21/1997	$350	x	x
263		Lenhard, Ken	Rietbrock	247	7/13/1998	$250	x	x
264		Buss, Warren	Holton		3/20/1997	$300		x
265		Matthiae Dairy Farms	Cassel		12/3/1996	$100		x
266		Brandt, Bob	Green Valley	50	5/14/1997	$100	x	x
267		Stueber, John	Cleveland	2000	Apr-97	$350		x
268		Horstman, Robert	Spencer	474	8/27/2003	$300		x
269		Klade, Doyle C.	Hewitt					
270		Sturzenegger, Ernst	Hewitt					
271		Hein Homestead Farms Inc.	Eau Pleine		10/19/1997	$350		x
272		Forest Lawn Farms	Wausau	2000?		$250		x
273		VanDerGeest Farms	Maine(North)	500		$350		x
274		Fisher, Mike	Reid	50	7/23/1997	$100		x
275		Stankowski, Edwin	Emmet	290	6/21/1999	$300	x	x
276		Buss, Bill	Norrie	50	8/5/1997	$100		x
277		Shimek, Pat	Bergen	495	9/10/1997	$300	x	x
278		Daul, Richard	Rietbrock	109.4	9/6/1999	$200	x	x
279		Young, Charles	Green Valley	443	5/14/1999	$300	x	x
280		Drawbond, Larry	Frankfort	304	12/1/1997	$300	x	x
280	Mod.	Arnold, Peter	Frankfort	489 added	8/26/2009	$450	X	X
281		Kasten, William	Bergen					
282		Bohman, Arnold	Cleveland	432	4/2/1998	$300	x	x
283		Kaiser, Dennis	Cassel	50	5/18/1998	$100	x	x
284		Schug, JoAnn	Halsey					
285		Kurth, Steve	Hewitt		8/7/1998	$125	x	x
286		Jern, Ken						
287		Schreiner, Thomas	Bern					
288		Weigel, Don	McMillan	50+	8/31/1998	$200		x
289		Myszka Bros.	Rietbrock	250	9/3/1998	$250		x
290		Gliniecki, Joe	Eau Pleine	1250	9/16/1998	$250		x
291		Dittman, Duane	Texas(East)	250,000	9/16/1998	$100		x
292		Maple Ridge Dairy	Eau Pleine	400,000	9/16/1998	$350		x
293		Borchardt, Lowell	Wien	466	6/0/99	$300	x	x
294		Geerts, Jack	Holton	1250	5/4/1999	$350		
295		Ostricki, Leroy	Day	975	6/22/2000	$350	x	x
296		Tryba, Mike	Bergen	575	8/9/2001	$350	x	x
297		VanDerGeest, Gary	Maine	300,000	May-99	$500	x	x
298		Rahm, Keith	Hull	2,000	May-99	$500		x
299		Falkowski, Tim	Easton	30	Jul-99	$500		x
300		Bhend Bros.	Johnson	713	Jul-99	$350		9/1/1999
302		Belanger, Gary	Johnson	29	Aug-99	$100		10/1/1999
303		Riehle, Leonard	Hull	1200	Aug-99	$350		x

Permit #	Suffix	Name	Township	Storage Size (1000 gals)	Construction Permit Date	Permit Amount Pd.	Nutrient Management Agr Plan	Final Construction Check
304		Martin, Marlin	Eau Pleine	280	Sep-99	$300		6/1/2000
305		Bredl, Ralph	Day	38	Oct-99	$100		11/1/1999
306		Doering, Herb	McMillan	500+	Oct-99	$350		8/1/2000
307		Stieber, Lorton	Emmet	8.5	Oct-99	$100	x	11/1/2000
308		Heeg Farms	Frankfort	4,500	Oct-99			6/1/2000
309		Frahm, Dave	Rib Falls	433				
310		Miltrim Farms	Johnson	10,000	1/3/2000	$350		4/1/2000
311		Schwoerer, Rick	Frankfort	600	3/16/2000	$350	x	6/1/2000
312		Blaser, Dave	Rietbrock	800	10/6/2003	$350		10/3/2005
313		Ostrowski, Dick & Greg	Elderon	64	4/13/2000	$200		8/1/2000
314		Javorek, Darrell	Knowlton	35	5/1/2000	$100		7/1/2000
315		Wadzinski, Steve	Cassel	96	6/9/2000	$200		7/1/2000
316		Lenhard, Ken	Rietbrock	1	6/21/2000	$100	x	8/1/2000
317		Guralski, Lyle	Rib Falls	<50	6/13/2001	$250		x
318	A	VanDerGeest Farm	Maine(North)	Abandonment				8/1/2000
319		Horning, Claire	Cleveland	1000	Oct-00	$350		x
320		Martin, Marvin	Hull	1000	Sep-00	$350		x
321	A	Ag Research Station	McMillan	Abandonment				x
322		Heeg	Frankfort	1,000				x
323		Albrecht, P.	Hamburg	7,000	1-May	$350	x	x
324		Hass, Dean	Hull	450	1-May	$300		x
325		Paul, Mark	Rib Falls	1,400	1-Jun	$300	x	x
326		Kaiser, Rodney	Cassel					
327		Buss, Bill	Norrie	25	6/26/2001	$100		x
328	A	Emmerich, Dan	Berlin	Abandonment	6/26/2001	$100		x
329		VanDerGeest Dairy	Maine	21				x
330		Paul, Scott	Eau Pleine	20				
331		Daul, Ben	Emmet	306	8/9/2001	$300	x	x
332		Rungie, Ronnie	Wien					
333		Mengel, Donny	Cleveland	404	7/25/2002	$300		x
334		Urmanski, Gary L.	Rietbrock	103	7/25/2002	$200	x	x
335		Totzke, Carl	Frankfort	20	1-Aug	$100		x
336		Norrbom, Paul	Elderon	5	9/14/2001	$100		x
337		Schug, Delmar	Hamburg	1	10/4/2001	$100		x
338		Kreager, Keith	Cassel	420	9/29/2008			
339	A	Zimmerman, Paul	Johnson	Abandonment	5/9/2002	$150		x
340		Urmanski, Rick	Rietbrock	10	5/10/2002	$100	x	10/2/2005
341		Breitenfeldt, Lorenz	Wausau	180	6/2/2002	$400	x	x
342		VanDerGeest Dairy	Maine	50,000	6/2/2002	$250	x	x
343	A	Weber, Jerome	Day	Abandonment	7/30/2002		N/A	6/24/2005
344		Cihlar Farms	Mosinee	1400	10/3/2002	$350		x
345		Ahrens, Russ	Marathon	100	10/7/2002	$200		x
346		Wiese, Walter	Halsey	100	10/8/2002	$200		x
347		Aschbrenner, Troy	Rib Falls	3.5	10/20/2002	$100		x
348		Debcott Dairy	Day		10/22/2002	$350		x
349		Sternweis, Steve	Spencer	2,000	10/20/2002	$350		x
350		Javorek, Darrell	Knowlton	30		$100		x
351		Maguire, Meldon	Emmet		10/28/2003	$300	x	x
352		Gassner, Jerome	Marathon	22.8	9/7/2004	$250	x	11/4/2005
353		Maple Ridge Dairy	Eau Pleine	1,400	10/9/2003	$500		x
354	A	Larson, Harry	Wien	Abandonment	6/30/2003	$750	N/A	7/3/2003
355		Gropp, Duane	Brighton	3,000	7/22/2003	$500		8/3/2003
356		Ostrowski Farms	Elderon	1,400	8/19/2003	$500		x
357		Prahl, Robert	Wausau		8/19/2003	$500		11/3/2004
358		UW-Marshfield	McMillan	1	3/16/2004			x
359		UW-Marshfield	McMillan	55	3/16/2004			x
360		Kingdom Haven Farm	Cassel	6,433	9/16/2004	$750	x	x
361		Jenks Jersey's, LLC	Cassel	10,225	6/30/2009	$850	X	
362		Seehafer, Ken	McMillan	2,000	8/23/2004	$500		x
363		Kroening, Leroy	McMillan		10/18/2004	$500		Dec. 2005
364		Ostrowski Farms	Elderon	3,000	7/28/2004	$500		x
365		Peterson, Andy	Elderon	2,000	8/3/2004	$500		x
367	A	Royal Haven	Cassel	Abandonment	9/22/2005	$500	N/A	Nov. 2005
368	A	Koffarnaus, Carlin	Hull	Abandonment		$500	N/A	6/26/2005
369		Ruesch, Dave	Holton					1/9/1900
370		Boschma, John	Frankfort	125	8/23/2004	$200		x
371		Bredl, Ralph	Day	15	9/28/2004	$100	x	x
373	A	Seehafer, Ken	McMillan	Abandonment				6/26/2005
374	A	Weaver, Mark	Eau Pleine	Abandonment	11/10/2004	$500	N/A	Oct. 2004
375	A	Kaiser, Rodney	Cassel	Abandonment	11/12/2004	$500	N/A	Nov. 2004
376	A	Schoenrock, Erwin	Frankfort	Abandonment	11/25/2004	$500	N/A	7/1/2005
377	A	Gajewski, Gary	Rietbrock	Abandonment	12/9/2004	$500	N/A	6/26/2005
378	A	Iwaszczenko, John	Emmet	Abandonment	1/13/2005	$500	N/A	7/1/2005
379		Forrest, Brian	Eau Pleine		8/4/2005	$500		Dec. 2005
380		Zimmerman, Mark	Easton		9/15/2005	$500		Dec. 2005
381		Ostrowski Farms	Elderon	3,000	4/21/2005	$750	N/A	x
382		Kuehl, Karl/Ann	Frankfort					
383	A	Haas, Larry	Hull	Abandonment	4/29/2005	$500	N/A	7/1/2005
384		Fischer	Reid	3,000	6/7/2005	$500	x	Nov. 2005
385		Buss, William	Norrie	1,300	7/5/2005	$500	x	Nov. 2006
386		Boschma, John	Frankfort	2,000	6/28/2005	$500		Dec. 2005
387		Lynn, Farms	Brighton	450	8/2/2005	$300		Sept. 2005
388		Ahrens Farms	Marathon	2,000	9/8/2005	$500		Dec. 2005
389		Urmanski, Rick	Rietbrock	1,300	9/9/2005	$500		Nov. 2005
390	A	Hertzler, Jonas	Johnson	Abandonment	7/7/2005	$500	N/A	Aug. 2005
391		Double "P" Dairy	Hamburg					
392		Bunkleman, James	Halsey	540	9/13/2005	$350		Oct. 2005
393		Martin, Marvin	Hull	743	10/4/2005	$350		Nov. 2005
394		Bauer, Duane	McMillan	369	4/26/2006	$300		Sept. 2006
395	A	Brubacker, Harvey	Hull	Abandonment	9/13/2005	$500	N/A	Sept. 2005
396	A	Kampmeyer, Jamison	Hull	Abandonment	11/30/2005	$500	N/A	6/6/2006
397	A	Hargraves, Gerald	Cassel	Abandonment	11/12/2006	$100	N/A	11/6/2006
398		Tomson, David	Plover	829	9/21/2009	$450	X	
399	A	Urmanski, Rick	Rietbrock	Abandonment	9/27/2005	$500	N/A	Nov. 2005
400		Harder, Fredrick	Hamburg	448	6/15/2006	$300	X	12/19/2007
401		Worden, Darrell	Wausau	4,700	6/13/2006	$500		10/16/2007
402		Oberholtzer, Carl	Hull	3.4	5/8/2006	$100		
403	A	OK Seeger Farm	Cleveland	Abandonment	5/17/2006	$100	N/A	6/6/2006
404	A	Heggelund, Eric	Easton	Abandonment	5/22/2006	$100	N/A	6/6/2006
405	A	Fuelster, Roger	Wien	Abandonment	5/24/2006	$100	N/A	7/6/2006
406	A	Hilgart, Madaline	Eau Pleine	Abandonment	7/14/2006	$100	N/A	12/28/2006
407		Sternweis, Steve	Spencer	86	8/9/2006	$200	X	
408	A	Kottke, Ken	Halsey	Abandonment	8/10/2006	$200	N/A	7/6/2006
409	A	Baumann, George	Emmet	Abandonment	9/14/2006	$100	N/A	Sept. 2006
410	A	Graff, Dan	Holton	Abandonment	10/18/2006	$100	N/A	12/6/2006

Case Study BEP
APPENDIX D

Permit #	Suffix	Name	Township	Storage Size (1000 gals)	Construction Permit Date	Permit Amount Pd.	Nutrient Management Agr Plan	Final Construction Check
411	A	Heeg Bros Real Estate	Frankfort	Abandonment	10/30/2006	$100	N/A	12/14/2006
412	A	Ford, Guy	Hewitt	Abandonment	11/15/2006	$100	N/A	Sept. 2007
413		Weaver, David	Brighton	6	1/26/2007	$200		Dec.- 2006
414		Gumz, James/Michael	Johnson	250	12/20/1988			Sept.-1991
415	A	Czeshinski, Dennis	Frankfort	Abandonment	2002		N/A	Aug.-2003
416		Bangart, Charles & Judy	Day	1146	2/21/2007	$500	X	11/8/2007
417		Miller, Ervin	Holton	35	3/15/2007	$200		3/15/2007
418		DeJong, Jacob	Holton	26	5/1/2007	$100	X	5/8/2007
419	A	Schurman, Robert	Wien	Abandonment	5/3/2007	$100	N/A	June 2007
420		Rausch, Alan	Halsey	9,800	5/14/2007	$750	X	7/1/2009
421		Griesbach, William	Day	16	5/17/2007	$100	X	9/4/2007
422	A	Bangart, Charles & Judy	Day	Abandonment	6/4/2007	$100	X	11/8/2007
423		Breitenfeldt, Lorenz	Wausau	300	6/29/2007	$300	X	12/19/2007
424	A	Pope, Kayo	Holton	Abandonment	6/13/2007	$100	N/A	11/26/2007
425		Ruesch, Dave	Holton	51	6/19/2007	$200	X	12/1/2008
426	A	Asplund, Sandra	Frankfort	Abandonment	6/15/2007	$100	N/A	12/12/2007
427	A	Bade, Harvey	Berlin	Abandonment	6/26/2007	$100	N/A	June 2007
428	A	Bennett, Gordon	Bern	Abandonment	7/2/2007	$100	N/A	July 2007
429		Weaver, David	Birghton	464	7/3/2007	$300	X	8/9/2007
430		Leick, Chris	Day	569	7/6/2007	$350	X	12/18/2007
431	A	Novitzke, Jeff	Emmet	Abandonment	7/24/2007	$100	N/A	11/13/2008
438	A	Buckingham, Alvin	Holton	Abandonment	8/28/2008	$100	N/A	9/10/2008
451	A	Empey, Roger	Holton	Abandonment	5/29/2009	$200	NA	
464	A	Wittlinger, Verlyn	Holton	Abandonment	10/12/2007	$100	N/A	11/27/2007
501	A	Schmitt, Bonnie J.	Hull	Abandonment	6/9/2008	$100	N/A	9/1/2008
508	A	Carey, Michael	Brighton	Abandonment	8/18/2009	$200	N/A	
530	A	Lynn Bros. Farm	Brighton	Abandonment	8/14/2008	$200	N/A	10/21/2008
559	A	Swarey, Henry	Bern	Abandonment	10/22/2008	$100	NA	11/13/2008
577	A	Busse, Tom	Johnson	Abandonment	5/12/2009	$200	NA	
578	A	Beery, Daniel	Johnson	Abandonment	9/24/2008	$100	N/A	10/1/2008
599	A	Borntreger, Noah	Frankfort	Abandonment	7/7/2008	$100	N/A	9/4/2008
603	A	Beaufeaux and Caron	Frankfort	Abandonment	5/18/2009	$200	NA	
622	A	Weber, David	Eau Pleine	Abandonment	5/10/2008	$100	N/A	5/20/2008
623	A	Weiland, Jim	Eau Pleine	Abandonment	6/10/2008	$100	N/A	7/9/2008
627	A	Zuelke, Thomas	Eau Pleine	Abandonment	9/23/2008	$100	N/A	11/1/2008
651	A	Ort, David	McMillan	Abandonment	7/1/2002	N/A	N/A	9/18/2002
652	A	Ort, David	McMillan	Abandonment	7/1/2002	N/A	N/A	9/18/2002
709	A	McPherson, Claudia	Wien	Abandonment	5/1/2008	$100	N/A	7/2/2008
711	A	Bohman, Kenneth	Wien	Abandonment	7/8/2008	$100	N/A	8/4/2008
722	A	Bastman, Todd	Cleveland	Abandonment	8/8/2008	$100	N/A	8/25/2008
756	A	Franseen, John	Day	Abandonment	8/13/2008	$100	N/A	1/9/2009
770	A	Eldred Haehlke	Hamburg	Abandonment	10/13/2008	$100	N/A	10/28/2008
773	A	Valerie Stubbe	Hamburg	Abandonment	6/30/2009	$200	N/A	
775	A	Double P Dairy	Hamburg	Abandonment	6/18/2009	$200	NA	7/27/2009
799	A	Heil, Edward	Cassel	Abandonment	8/20/2008	$100	N/A	10/3/2008
821	A	Sondelski, Matthew	Emmet	Abandonment	9/11/2008	$100	N/A	11/18/2008
850	A	Paulson, James	Stettin	Abandonment			N/A	
865	A	Tryba, Clarence	Mosinee	Abandonment	N/A	N/A	N/A	10/15/2008
906	A	Bowers, Daniel	Hewitt	Abandonment	7/17/2009	$200	N/A	9/1/2009
935	A	Hubred, Tom	Plover	Abandonment	4/22/2009	$200	N/A	9/1/2009
964	A	Zoromski, Emerick	Franzen	Abandonment	5/5/2008	$100	N/A	5/30/2008
1000		Spindler, Mike	Day	500	8/7/2007	$300	X	11/1/2007
1001		UW Marshfield	McMillan	7	1/23/2008	$100	X	11/1/2008
1002		UW Marshfield	McMillan	7	1/23/2008	$100	X	
1003		UW Marshfield	McMillan	2,000	1/23/2008	$500	X	11/1/2008
1004		UW Marshfield	McMillan	52	1/23/2008	$100	X	11/1/2008
1005		UW Marshfield	McMillan	7	1/23/2008	$100	X	11/1/2008
1006		UW Marshfield	McMillan	1	1/23/2008	$100	X	11/1/2008
1007		Schairer Farms, Inc.	Norrie	28		$200	X	
1008		Martin, Merle	Hull	6	3/31/2008	$100	X	6/10/2008
1009		Rambling Acres (Dan Graff)	Holton	2,000	5/21/2008	$500	X	12/1/2008
1010		Totzke, Bros	Frankfort	3,615	6/2/2008	$500	X	10/30/2008
1011		Kottke, Ken	Halsey	182				6/26/2008
1012		Paul, Mark	Rib Falls	94	10/7/2008	$200	X	
1013		Weiland, Jim	Eau Pleine	566	6/1/2009	$300	X	7/27/2009
1014		Ruesch, Dave	Holton	1,200	6/13/2008	$350	X	11/1/2008
1015		Maple Ridge Dairy	Eau Pleine	500	8/19/2008	$300		11/1/2008
1016		Miltrim Farms	Johnson	9,300	7/9/2009	$850	X	
1017		Tryba, Clarence	Mosinee	411	8/25/2008	$300	X	10/1/2008
1018		Tesch, Ken	Holton	1023	10/3/2008	$350	X	
1019		Wussow, Thomas	Johnson	500	10/3/2008	$300	X	11/13/2008
1020		Krueger, George	Hull					
1021		Hill Crest Dairy	Brighton	4.2	11/7/2008	$100	X	11/14/2008
1022		Heeg Bros Dairy	Frankfort	<50	2/9/2009	$150	X	
1023		Heeg Bros Dairy	Frankfort	2267	2/9/2009	$600	X	
1024		Heeg Bros Dairy	Frankfort	2	2/9/2009	$150	X	
1025		Miltrim Farms	Johnson	27	7/9/2009	$150	X	
1026		Miltrim Farms	Johnson	<20	7/9/2009	$150	X	
1027		Buss, William	Norrie	1,233	7/17/2009	$600	X	
1028		Riehle, Roy	Rietbrock	1,170	7/21/2009	$600		
1029		Kingdom Haven	Cassel	55	7/27/2009	$300	X	
1030		Bredl, Ralph	Eau Pleine	2,240	8/17/2009	$600		
1031		Van Langen, Ron	Wien	916	9/8/2009	$450	X	
1032		Kingdom Haven Farm	Cassel	<5	9/18/2009	$150	X	
1033		Kingdom Haven Farm	Cassel	2.1	9/18/2009	$150	X	
1034		Baeseman, Harold	Rib Falls	15	10/16/2009	$150	X	
		Dairyland State Academy	Maine					
595	A	Streit, Walter	Frankfort	Abandonment	11/9/2009	$200	X	11/12/2009
		** For abandonments, check GIS database for facility ID#						

Appendix E

AG PERFORMANCE STANDARDS & PROHIBITIONS ("RUNOFF RULES")

UNDER *FARMLAND PRESERVATION PROGRAM* CONSERVATION STANDARDS

SUMMARY*

- **Cropland Soil Erosion Control**
  - Maintain soil erosion rates at or below Tolerable levels, "T"
  - Control gully erosion
- **Cropland Nutrient Management**
  - Annually develop and follow a Nutrient Management plan that meets Natural Resource Conservation Service Standard 590
- **Manure Storage Facilities:**
  - New Construction and Alterations must meet NRCS Standard 313.
  - Manure storage facilities must be closed within 2 years of abandonment according to NRCS Standard 360.
  - Manure storage facilities that are failing or leaking must be upgraded, replaced, or abandoned.

  Note: These activities all require an Animal Waste Management permit prior to beginning work.
- **Clean Water Diversion:** Divert runoff away from feedlots, manure storage, and barnyards: Applies to
  - Livestock Producers within Water Quality Management Areas (WQMA). - WQMA are areas within 300' of river or stream; areas within 1000' of lake, flowage or pond; and sites susceptible to groundwater contamination or potential direct conduit to groundwater.
- **Manure Management Prohibitions**
  - All Livestock Producers
    - No overflow of manure storage facilities
    - No unconfined manure piles in WQMA (see above for definition)
    - No direct runoff from feedlots or stored manure to waters of the State
    - No unlimited livestock access to waters of the State where sod or vegetative cover cannot be maintained

***** Informational Summary Only. See WI Administrative Codes ATCP 50 and NR 151 for complete codes and details.

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Appendix F
Farmland Preservation Program Participation

The following is the Exclusive Ag Acreage within the watershed by town:

Town of Brighton	3,210
Town of Eau Pleine	4,735
Town of Green Valley	740
Town of Hull	7,344
TOTAL	16,029

Appendix G
Soil Erosion Transect Survey Results

2008 Transect Survey Results

Average Soil Loss (Tons/Acre/Year)

Upper Big Eau Pleine: 2.1
Lower Big Eau Pleine: 2.5

Less Than or Equal to "T" (% of Sampled Fields)

Upper Big Eau Pleine: 91
Lower Big Eau Pleine: 71

Crop Type Distribution (% of Sampled Fields)

	Corn	Soybeans	Small Grains	Hay	CRP	Fallow
Upper Big Eau Pleine:	33	9	11	46	0	1
Lower Big Eau Pleine:	39	18	7	34	2	0

Tillage Type Distribution (% of Sampled Fields)

	Conventional	Mulch</=30	Mulch>30	No-Till	None
Upper Big Eau Pleine:	25	28	4	0	43
Lower Big Eau Pleine:	29	18	18	1	34

Appendix H
Marathon County Resolution

RESOLUTION #R-23 -09
To Address the Problems in the Big Eau Pleine Watershed

WHEREAS, the Environmental Resources Committee has as its charge protection of our environment; and

WHEREAS, the Land Conservation and Zoning Committee is responsible for supporting best management practices in the area of land and water resource management; and

WHEREAS, the Marathon County Park Commission strives to operate and maintain high quality parks including Big Eau Pleine Park on the Big Eau Pleine Reservoir; and

WHEREAS, Marathon County has a rich agricultural heritage and a long history of supporting sound agricultural practices; and

WHEREAS, Marathon County, many agricultural producers and state agencies have invested significant funds in installing best management practices in the Big Eau Pleine watershed; and

WHEREAS, Marathon County also has a long history of providing high quality recreational opportunities for its residents and visitors; and

WHEREAS, the Environmental Resources Committee, the Land Conservation and Zoning Committee and the Marathon County Parks Commission have witnessed the large fish kill on the Big Eau Pleine Reservoir; and

WHEREAS, the fish kill has direct and indirect negative impacts to Marathon County, including loss of tourism, nuisance impacts on residents, as well as negative impacts on agricultural producers; and

WHEREAS, the fish kill is symptomatic of resource management problems related to water quality in the Big Eau Pleine watershed, and

WHEREAS, Marathon County has been in discussions with various state agencies and other entities regarding water quality in the Big Eau Pleine watershed for the past several years; and

WHEREAS, these discussions have been of an informal, collegial nature, with no significant results; and

WHEREAS, Marathon County recognizes the authority and responsibility of the Wisconsin Department of Natural Resources (DNR) to manage the waters of the State and the fishery resources of the State; and

WHEREAS, Marathon County recognizes that the authority and responsibility of Wisconsin Valley Improvement Company (WVIC) to regulate flow of the Big Eau Pleine Reservoir through a Federal Energy Regulatory Commission (FERC) license; and

WHEREAS, Marathon County recognizes the authority and responsibility of the Wisconsin Department of Agriculture Trade and Consumer Protection (DATCP), to support agriculture through providing funds for installation of best management practices to reduce runoff and improve the environment; and

WHEREAS, the situation on the Big Eau Pleine Reservoir has risen to a critical point in terms of environmental degradation;

NOW, THEREFORE BE IT RESOLVED that the Board of Supervisors of the County of Marathon does hereby resolve and ordain as follows: to direct the Environmental Resources Committee to convene a meeting with Wisconsin Department of Natural Resources (DNR), Wisconsin Department of Agriculture Trade and Consumer Protection (DATCP) and Wisconsin Valley Improvement Company (WVIC) in order to develop a plan to:

- assess the short term impacts of the fish kill,
- provide an assessment of the factors contributing to the fish kill,

STATE OF WISCONSIN)
)SS.
COUNTY OF MARATHON)

I, Nan Kottke, County Clerk in and for Marathon County, Wisconsin, hereby certify that the attached Resolution #R-23-09 was adopted by the Marathon County Board of Supervisors at their Organizational meeting which was held April 21, 2009.

Nan Kottke

SEAL

Nan Kottke
Marathon County Clerk

- compile an inventory of all data sets maintained by all agencies, public and private,
- identify all existing regulatory requirements and their efficacy,
- catalogue best management practices that have been instituted in the watershed since the 1970's,
- provide an overall assessment of water quality in the watershed,
- provide cost estimates to improve the water quality of the watershed,
- provide specific actions and funding sources to improve the water quality to provide fishable and swimmable waters in the Big Eau Pleine watershed for Marathon County.

BE IT FURTHER RESOLVED that the Board of Supervisors of the County of Marathon does hereby resolve and ordain: to direct the Environmental Resources Committee to ensure that the Wisconsin Department of Natural Resources (DNR), Wisconsin Department of Agriculture Trade and Consumer Protection (DATCP) and Wisconsin Valley Improvement Company (WVIC) be represented by senior level managers who can shape policy and have the authority to make decisions for their agencies.

BE IT FURTHER RESOLVED that the Board of Supervisors of the County of Marathon does hereby resolve and ordain: the Clerk is directed to send this resolution to all area legislators, our federal legislators, and appropriate State agency directors.

Dated this 21st day of April 2009.

EXECUTIVE COMMITTEE

ENVIRONMENTAL RESOURCES COMMITTEE

LAND CONSERVATION and ZONING COMMITTEE

PARK COMMISSION

Fiscal Impact: None at this time. If a study is developed, there may be costs associated with staff time and data compilation.

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Appendix I
Bibliography of Studies Pertaining to Big Eau Pleine River Watershed and Reservoir

Source: Dept. of Natural Resources Website – http://dnr.wi.gov/org/water/fhp/lakes/info/1427400.htm#lkbib

"Bibliography for Big Eau Pleine Reservoir, Marathon County, Wisconsin

--- This bibliography is being build. Don't assume it is complete. ---
--- If you know of other related references for this lake, please tell us.---

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Appendix J
List of Information or Inventory Needs

1. How much winter manure is spread? See Shaw's study for primary cause. Utilize SNAP+ modeling and landowner report capabilities to track fields and actual applications. Compare applications to weather and field conditions (saturation and frozen soil conditions).
2. Project monitoring should include stream sampling and soil conditions during fall, winter, and spring distribution periods.
3. How many cheese factories (1974 fish kill thought to be whey) still processing and disposing waste in watershed? Contribution to pollutant load? What are their respective treatment systems?
4. No distinction made relative to dynamics of delivery between liquid or solid manures. Is the increase in the presence of liquid waste (a function of feeding and waste water generation) creating a different pollutant loading and water chemistry dynamic?
5. How about the waste water contributions for farmers? Are the increasingly wet nature of the waste stream recognized? How about feed leachate contributions?
6. Determine the number of BMP's still in-place? No current inventory exists to determine how many BMP's still performing as designed.
7. How many farm facilities abandoned?
8. Determine condition of BMP's?
9. Find and evaluate the subwatershed monitoring of water parameters and habitat (if they exist).
10. Find annual and close-out summary of pollutant reductions as a result of BMP installation for all conservation initiatives.
11. Note the history of BEP Watershed Organization: 1956 (landowners and farmers).

12. Is proposed North Breeze Dairy located in BEP watershed?
13. Operational Plan – Does plan provide guidance to WVIC for drought conditions? In 2/26/1995 news article by *Wausau Daily Herald,* the following condition combinations assessed and identified over previous 16 years that would minimize fish kills:
    a. Reservoir volume at start of winter drawdown > 60%
    b. Base flow on BEP River = or > 6 fps
    c. Drawdown to a level below 10 ft below capacity (which triggers scouring and promotes oxygen sag) did not occur until Feb 1.
14. The aeration system in BEP reservoir was first in state for a reservoir. Do we have experiences today of other similar attempts to aerate a reservoir where water levels fluctuate?
15. How does FERC license provide balance between hydropower and other public benefits such as fisheries, recreation, flood control and wastewater permitting?
16. Before Natzke project, how many practices (Waste Storage Facilities, barnyards, filter strips installed)?
17. Can we reduce flashiness through wetland developments and vegetated corridor work? Do we need to know the resuspension impact to water quality upstream? Is this load comparable to the reservoir loading due to re-suspension?
18. Using Appendix B & C can we do an assessment of BMP condition, utilization, and effectiveness of investments?
19. Do not know which landowners/sites were distinguished as eligible or eligible nonessential. Did the critical sites get the funding assistance?
20. Summary of livestock concentration trends, waste volume trends, and waste characteristics (liquid and solid).

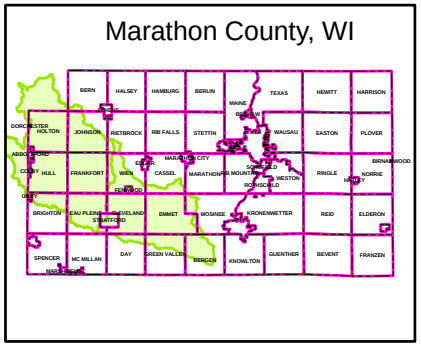
21. Did the Upper and Lower BEP Watershed projects account for the extensively developed drainage system in the definition of “unsuitable” winterspreading acres? Note that the definition is used to qualify eligible landowners/sites for waste storage facilities.

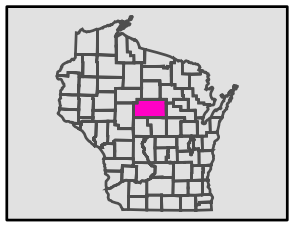
List of Maps

WESTERN MARATHON COUNTY, WI
Big Eau Pleine River
Upper & Lower Watershed Areas

Features

- Big Eau Pleine Watersheds
- Flowages-Lakes
- Streams-Rivers
- Streets
- Sections
- Municipal Boundary





WESTERN MARATHON COUNTY, WI
Big Eau Pleine River
Upper & Lower Watershed Areas

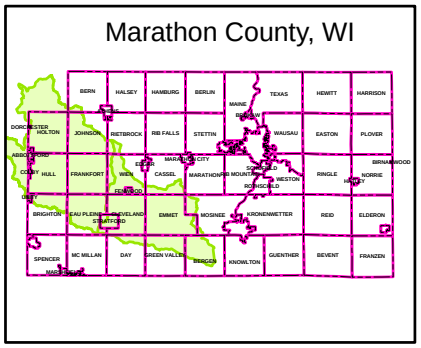
Prime Farmland Soils

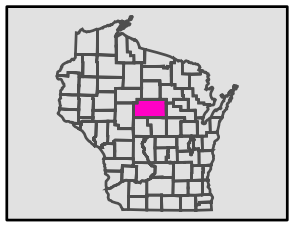
Features

- Flowages-Lakes
- Streams-Rivers
- Municipal Boundary

Prime Farmland Soils

- Group 1
- Group 2
- Big Eau Pleine Watersheds





WESTERN MARATHON COUNTY, WI
Big Eau Pleine River
Upper & Lower Watershed Areas

Soil Erosion Rates by Watershed

Features

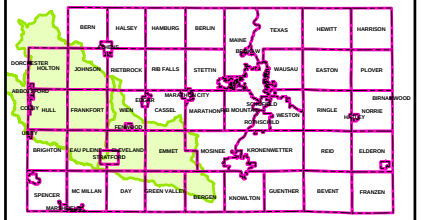
- Flowages-Lakes
- Streams-Rivers
- Municipal Boundary
- Big Eau Pleine Watersheds

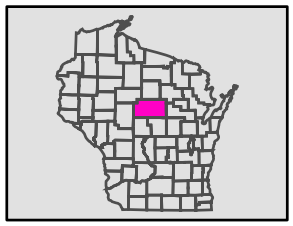
Soil Erosion Rates

Tons-Acres-Year

- 1.1 - 2.0
- 2.1 - 3.0

Marathon County, WI



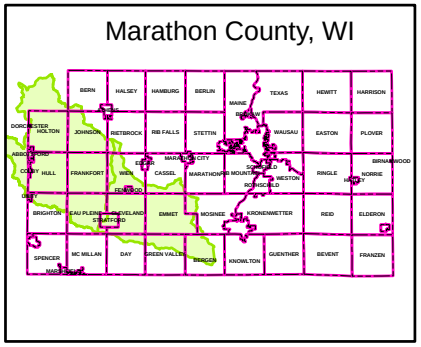


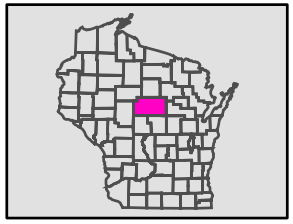
WESTERN MARATHON COUNTY, WI
Big Eau Pleine River
Upper & Lower Watershed Areas

Hydrological Features

Features

- Flowages-Lakes
- Streams-Rivers
- Municipal Boundary
- Wetland Areas - WIDNR
- Big Eau Pleine Watersheds



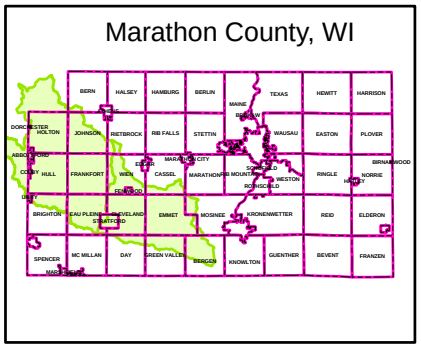


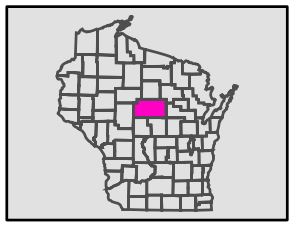
WESTERN MARATHON COUNTY, WI
Big Eau Pleine River
Upper & Lower Watershed Areas

Non-metallic Mining Sites

Features

- Flowages-Lakes
- Streams-Rivers
- Municipal Boundary
- Big Eau Pleine Watersheds
- Non-Metallic Mining Active Sites





WESTERN MARATHON COUNTY, WI
Big Eau Pleine River
Upper & Lower Watershed Areas

Exclusive Agriculture Contract Areas

N
W E
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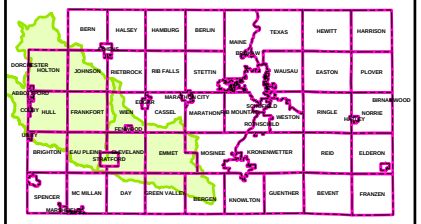
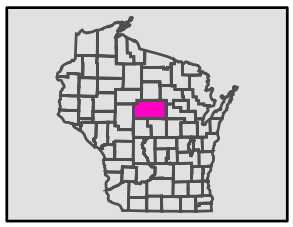
Features

- Flowages-Lakes
- Streams-Rivers
- Municipal Boundary
- Big Eau Pleine Watersheds
- Parcels with Exclusive Ag

Marathon County, WI





WESTERN MARATHON COUNTY, WI
Big Eau Pleine River
Upper & Lower Watershed Areas

Animal Waste Storage Facilities

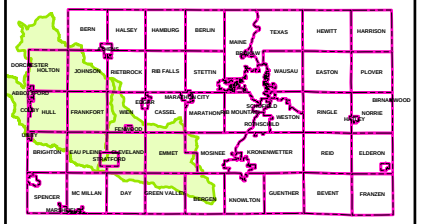
Features

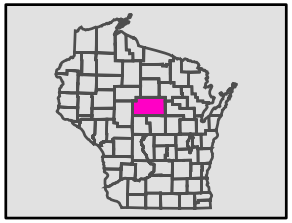
- Flowages-Lakes
- Streams-Rivers
- Municipal Boundary
- Big Eau Pleine Watersheds

Animal Waste Storage Facility

- Active
- Abandonded

Marathon County, WI



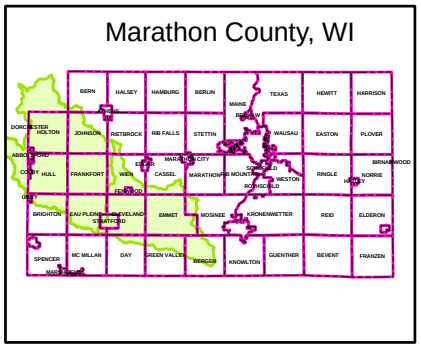


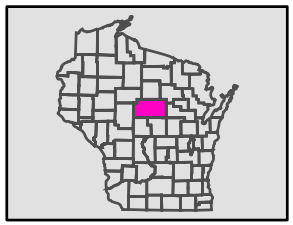
WESTERN MARATHON COUNTY, WI
Big Eau Pleine River
Upper & Lower Watershed Areas

Private Onsite Wastewater Treatment Systems

Features

- Flowages-Lakes
- Streams-Rivers
- Municipal Boundary
- Big Eau Pleine Watersheds
- POWTS Locations





WESTERN MARATHON COUNTY, WI
Big Eau Pleine River
Upper & Lower Watershed Areas

Large Farm Operations

Features

- Flowages-Lakes
- Streams-Rivers
- Municipal Boundary
- Big Eau Pleine Watersheds

Large Farm Operations

- > 1000 Animal Units
- 300 - 1000 Animal Units
- < 300 Animal Units
- CASH CROP