

2011 Water Quality Management Plan Update

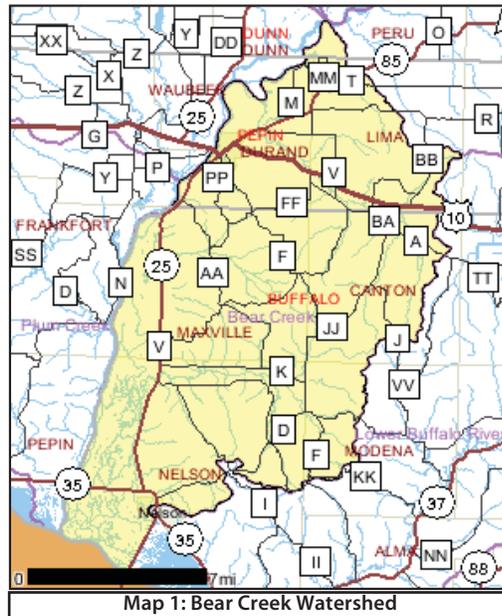
Lower Chippewa Basin, Wisconsin

December 2011

The Bear Creek Watershed covers 176.5 square miles in Buffalo and Pepin counties. Bear, Little Bear, and Spring creeks are the three primary sub-watersheds within the Bear Creek Watershed. The watershed drains rolling agricultural and wooded areas with many of the tributaries originating in steep coulees. The watershed also drains one urban area, the City of Durand. All streams within the Bear Creek Watershed drain the eastern slope of the Chippewa River Valley.

The Bear Creek Watershed contains typical steep topography characteristic of the driftless or un-glaciated area of the state. Because the most productive and level land is on the valley floor, most farming takes place immediately adjacent to streams. Former prairie and a portion of the forested lands have been converted to agricultural uses. The quality of trout streams in this watershed have improved or degraded as agricultural uses have diminished or increased.

Earlier editions of the Lower Chippewa River Water Quality Management Plan indicated the Nelson wastewater treatment plant and Nelson Cheese Factory discharged to the Lower Chippewa Basin. Due to a basin boundary change, both are in the Buffalo-Trempealeau River Basin. The majority of the wetlands in the watershed are adjacent to the Chippewa and Mississippi Rivers.



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**Watershed Details**

**Population and Land Use**

Land use in the Bear Creek Watershed is dominated by forest cover (40%) and agriculture (37%). Wetlands and open water encompass most of the remaining area in the watershed with 15% and six percent, respectively. Grasslands make up a little over one percent of the watershed’s total area, while urban and suburban land use is minimal with one-tenth of a percent and one-half a percent, respectively.

Land Use	Acres	Percent of Area
Forest	45,020.94	39.84%
Agriculture	41,954.12	37.13%
Wetland	16,642.92	14.73%
Open Water & Open Space	7,139.99	6.32%
Grassland	1,347.49	1.19%
Suburban	709.44	0.63%
Urban	143.89	0.13%
Barren	32.69	0.03%
Total Acres in Watershed	112,991.48	

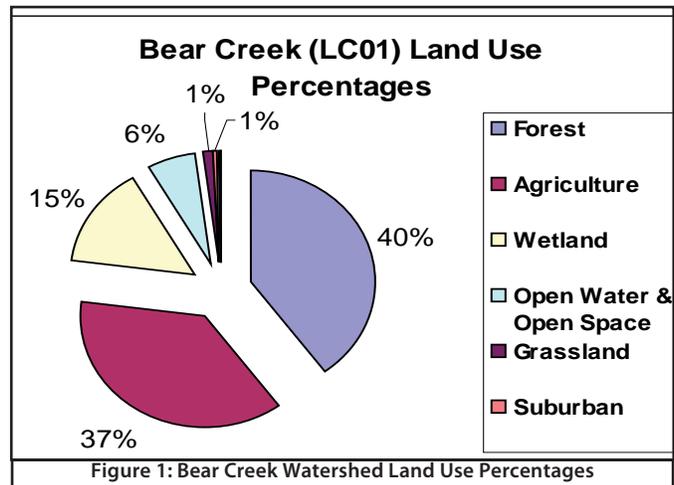
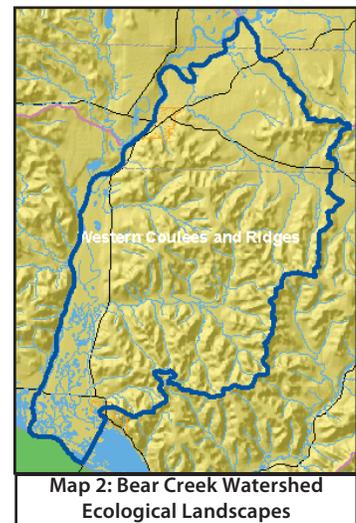


Figure 1: Bear Creek Watershed Land Use Percentages

## Hydrology

Streams within the Bear Creek Watershed have changed dramatically over the past century. Most streams during pre-settlement conditions likely contained self-sustaining native brook trout fisheries. During the early European settlement period, this region saw some logging for timber production and small dam building from milling operations. Following the logging and mill dam era, in the early and mid 1900's, intensive agricultural practices and severe flooding degraded stream habitat conditions and the health of the native coldwater fish communities. Flash floods have always been a problem on streams in west central Wisconsin due to the steep topography. Flooding conditions likely still impact stream resources, but they are not considered a main limiting factor because other streams within west central Wisconsin experience similar flood events and support very healthy coldwater fish communities. Within the past decade many streams in western Wisconsin have been improving. Changes in land use practices along with the installation of Best Management Practices (BMPs) in the watershed appear to be aiding in the recovery of coldwater fish communities (Heath M. Benike and Scott W. Peavy. Bear Creek Watershed Comprehensive Surface Water Resource Report Pepin and Buffalo Counties, Wisconsin, January, 2002).



## Ecological Landscapes

The Western Coulee and Ridges Ecological Landscape in southwestern and west central Wisconsin is characterized by its highly eroded, driftless topography and relatively extensive forested landscape. Soils are silt loams (loess) and sandy loams over sandstone residuum over dolomite. Several large rivers including the Wisconsin, Mississippi, Chipewewa, Kickapoo and Black flow through or border the ecological landscape.

Historical vegetation consisted of southern hardwood forests, oak savanna, scattered prairies, and floodplain forests and marshes along the major rivers. With Euro-American settlement, most of the land on ridgetops and valley bottoms was cleared of oak savanna, prairie, and level forest for agriculture. The steep slopes between valley bottom and ridgetop, unsuitable for raising crops, grew into oak-dominated forests after the ubiquitous pre-settlement wildfires were suppressed. Current vegetation is a mix of forest (40%), agriculture, and grassland with some wetlands in the river valleys. The primary forest cover is oak-hickory (51%) dominated by oak species and shagbark hickory. Maple-basswood forests (28%), dominated by sugar maple, basswood and red maple, are common in areas that were not subjected to repeated pre-settlement wildfires. Bottomland hardwoods (10%) are common in the valley bottoms of major rivers and are dominated by silver maple, ashes, elms, cottonwood, and red maple. Relict conifer forests including white pine, hemlock, and yellow birch are a rarer natural community in the cooler, steep, north-facing slope microclimates.

## Historical Note

Originally named Bear Creek, the City of Durand is located on the banks of the Chippewa River approximately 15 miles from its confluence with the Mississippi River, in the Bear Creek Watershed.

The Durand area was first settled in 1856 when 21-year-old Miles Durand Prindle came up the river in a keel boat named the "Dutch Lady", and took government land on the site of the present city. Durand was incorporated on April 12, 1887.

In 1873-74, the Old Courthouse building was constructed for the cost of \$7000. It served as the Pepin County Courthouse until 1985, except for the years 1882-1886. It and the jail next door are listed on the State and National Registers of Historic Places.



Figure 2: Old Pepin County Courthouse

## Watershed Condition

### Overall Condition

There are 39 miles of Class II trout streams dispersed over stretches of Center, Bear, the North Branch of Little Bear, Little Bear, Newton Valley (Shoe), and Spring creeks along with a tributary to the North Branch of Little Bear Creek, locally named Owen Valley Creek. A small unnamed creek and Weisenbeck Valley Creek contribute a total of eight miles of Class III trout streams for the watershed. The mouth of the Chippewa River is impaired by PCBs and has been 303(d) listed since 1998 for the pollutant. No Exceptional or Outstanding Resource Waters are listed for the Bear Creek Watershed. Wetlands cover a sizeable portion of land with over 16,000 acres in total.

### River and Stream Condition

According to the WDNR's Register of Waterbodies (ROW) database, there are over 636 miles of streams and rivers in the Bear Creek Watershed; 150 miles of which have been entered into the WDNR's assessment database. Of these 150 miles, about one-third (31%) are meeting Fish and Aquatic Life uses and are specified as in "good" condition; another 28% of streams are considered to be in "poor" condition and are listed as impaired. The condition of the remaining stream miles is not known or documented.

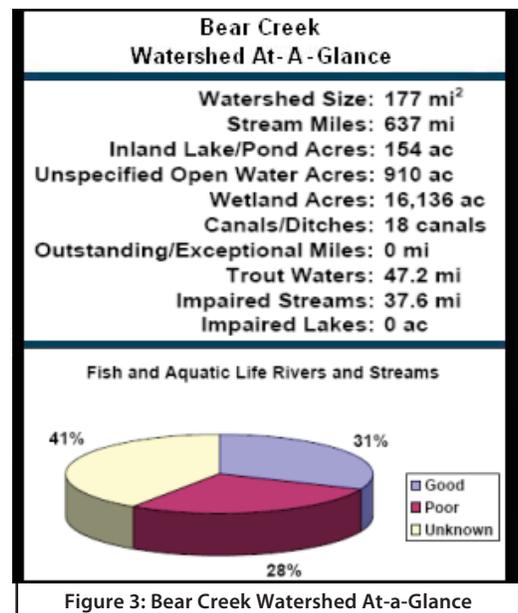


Figure 3: Bear Creek Watershed At-a-Glance

Table 2: Designated Use Support Summary for Bear Creek Watershed Rivers and Streams (all values in miles)

Use	Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption			149.67	149.67
Fish and Aquatic Life	47.1	41.93	60.64	149.67
General			149.67	149.67
Public Health and Welfare			149.67	149.67
Recreation			149.67	149.67

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Additional uses for which the waters are evaluated include Fish Consumption, General Uses, Public Health and Welfare, and Recreation. As Table 2 shows, these uses have not been directly assessed for the watershed. However, a general fish advisory for potential presence of mercury is in place for all waters of the state.

As part of the Lower Chippewa Basin Comprehensive Surface Water Resources Monitoring Program, the Bear Creek Watershed was sampled during the 1999 field season. The Bear Creek Watershed comprehensive stream survey was conducted to gather baseline data on fish habitat, sport and nongame fish communities, temperature regimes, and macroinvertebrate communities. From the information that was collected, streams within the Bear Creek Watershed have been improving. Coldwater IBI ratings of excellent were present at sites within each subwatershed. Some streams supported moderate levels of salmonid abundance and reproduction of wild brook trout. Habitat conditions on all streams in the watershed are limited by the absence of coarse substrates and an excessive sand bedload. This is likely due to past land use practices as well as the geological parent material found on the eastern slope of the Chippewa River Valley. Flooding is still a problem on streams within the Bear Creek Watershed but, are not considered a main limiting factor because all streams in west central Wisconsin within and outside the Bear Creek Watershed experience similar flooding and still support healthy coldwater fish communities. Stream habitat restoration activities on select sites could enhance habitat conditions for the coldwater fish community. Future management efforts should consist of modification of salmonid stocking practices, buffer installations, nutrient management, rotational grazing, and possible flood control efforts at select locations in the watershed. With improvements in land use and near shore habitat protection or restoration, it is likely that the overall health of the Bear Creek Watershed can be significantly improved. The following subwatershed details come from the Bear Creek Watershed Comprehensive Surface Water Resource Report Pepin and Buffalo Counties, Wisconsin (Heath M. Benike and Scott W. Peavy. January, 2002).

#### **Bear Creek Subwatershed**

The Bear Creek Subwatershed includes all surface waters that drain into Bear Creek (20 sites sampled in 1999) and one small unnamed tributary stream, Creek 1-3 (two sites sampled) that drains directly into the Chippewa River. Named tributaries streams within the Bear Creek Subwatershed are Newton Valley, Tiffany, and Fox Valley creeks and unnamed tributaries creeks 5-9, 3-5 (Prissel Valley), and 16-13. Geologic and soil conditions in the subwatershed vary considerably. The headwaters of Bear Creek originate in a marsh complex that is composed of wet organic and mineral soils. As it drains westerly towards the Chippewa River the stream channel cuts through silty (Bertrand/Jackson) and sandy (Plainfield/Sparta) soils of stream terraces (Gebken, 1972;1976). The parent material of the subwatershed does not allow for large quantities of coarse substrates, such as gravel and cobble, which are found on other streams in western Wisconsin.

From the information that was collected trout abundance is considered low to moderate on mainstem reaches of Bear Creek. Brook trout are the dominant salmonid within the subwatershed. Angler use is moderate on the mainstem reaches of Bear Creek. Coldwater IBI ratings are fair to poor and HBI ratings are excellent to very good. Habitat is generally fair to good and the main limiting factor is an excessive sand bedload and lack of coarse substrate. This is likely due to past land use practices as well as the geologic parent material in the subwatershed. Thermal monitoring data suggests that mainstem reaches of Bear Creek have the ability to support healthier coldwater fish communities and also higher overall trout abundance. Newton Valley Creek has the highest index ratings of all tributary streams in the Bear Creek Subwatershed, but trout abundance is low. Creek 1-3 has a small healthy brook trout fishery and should be protected.

#### **Chippewa River**

The Lower Chippewa River impoundments effectively trap suspended sediment by reducing flow velocities, allowing the solids to settle. The Chippewa River below the last impoundment, Dells Dam in Eau Claire, takes on a very different character from the upstream-impounded areas. Active bank erosion between the Dells Dam and Mississippi River shapes the channel and aquatic habitat. The river meanders its way to Caryville, where the channel starts to become braided. At Durand, the river is less sinuous, but braids again near its mouth. The erosion of coarse-grained glacial outwash contributes large quantities of sand to the Chippewa River. Deposition of this sand causes braiding of the sinuous reaches. It is estimated that the sediment load at the HWY 35 bridge near Lake Pepin is 940,000 tons of sediment per year (Simons, D. B. and Associates, 1998). The transport of sand and gravel occurs from Dells Dam to Caryville, though the particle size decreases to sand by Durand. This change in particle density occurs due to the braided channel between the two cities, which slows water velocity (Voss, Karen and Sarah Beaster. 2001. The State of the Lower Chippewa

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River Basin. PUBL-WT-554 2001. Wisconsin Department of Natural Resources, Madison, WI).

The Chippewa River segment in this watershed is very significant for endangered resources. Rare dragonflies, two listed fish species, and several other Wisconsin Special Concern species have been found here. Many populations of rare species have been declining in the Chippewa River (Bureau of Endangered Resources). It is thus important to identify water quality or habitat threats and reduce any degradation of water quality in the Chippewa River.

As part of Settlement Agreements with the Federal Energy Regulatory Commission, Xcel Energy, DNR, and other parties agreed to new operating regime for hydropower facilities in the Red Cedar (2002) and Chippewa (2001) rivers. As a result, daily flow fluctuations in the river have been reduced and aquatic habitat quality enhanced as a result of greater hydrologic stability.

#### **Little Bear Creek Subwatershed**

Little Bear Creek Subwatershed includes the main stem of Little Bear Creek and all its tributary streams from its headwaters downstream to the Chippewa River in Buffalo County (17 sites sampled). It includes named tributaries Weisenbeck Valley Creek, North Branch of Little Bear Creek, Norwegian Valley Creek, Cascade Valley Creek, Center Creek, and two unnamed tributaries, creeks 31-10 and 23-3. By-Golly Creek is also considered part of the little Bear Creek Subwatershed (two sites sampled). It is a small coulee stream that drains into the Chippewa River bottoms near Nelson. Geologic and soil conditions in the subwatershed consist of silty soils of rolling uplands (Dubuque/Fayette) and sandy soils of stream terraces (Plainfield/Sparta) along the valley floor. The parent material of the subwatershed does not allow for large quantities of coarse substrates, such as gravel and cobble, which are found on other streams in western Wisconsin.

From the information that was collected trout abundance is considered moderate on the headwaters of Weisenbeck Valley Creek and one site on the mainstem reaches of Little Bear Creek. Brook trout are the dominant salmonid within the subwatershed. These brook trout were not stocked and are likely wild fish that are reproducing in the subwatershed at low levels. Brown trout densities are low, but the potential to grow larger brown trout exists on the lower reaches of the mainstem of Little Bear Creek, where thermal conditions are less optimal for brook trout and ample forage is available. Angler use is moderate on the mainstem reaches of Little Bear Creek. Coldwater IBI ratings are excellent to poor and HBI ratings are excellent to very good. Two primary factors that currently limit habitat conditions in the subwatershed are lack of coarse substrates and an excessive sand bedload. Thermal monitoring data suggests that the North Branch of Little Bear Creek has the ability to support healthier coldwater fish communities and overall trout abundance as well as trout reproduction. In addition, mainstem reaches of Little Bear Creek likely have the potential to provide a put-grow-and-take salmonid fishery where angling pressure is moderate. Based on thermal data collected, By-Golly and Norwegian Valley creeks may have to ability to support a coldwater fish community.

#### **Spring Creek Subwatershed**

The Spring Creek Subwatershed includes the mainstem of Spring Creek (three sites sampled) and all its tributary streams from central Buffalo County downstream to the Chippewa River. It includes one unnamed tributary Creek 8-13 (one site sampled). Geologic and soil conditions in the subwatershed consist of silty soils of rolling uplands (Dubuque/Fayette) and sandy soils of stream terraces (Plainfield/Sparta) along the valley floor (Gebken 1976). The parent material of the subwatershed does not allow for large quantities of coarse substrates, such as gravel and cobble, which are found on other streams in western Wisconsin.

Coldwater IBI ratings ranged from excellent to very poor. Mainstem reaches of Spring Creek at one site received the only excellent score. Habitat ratings ranged from fair to good at all sites in the subwatershed. The main factors limiting habitat conditions on streams within the Spring Creek Subwatershed are the lack of coarse substrates and an excessive sand bedload.

No stocking occurs in the Spring Creek Subwatershed. Currently a low density brook trout fishery exists near the headwater reaches of Spring Creek. Further sampling should be conducted to determine the status of the Spring Creek brook trout fishery. Habitat conditions on streams in the Spring Creek Subwatershed are limited by an excessive sand bedload and an absence of coarse substrates.

## Lake Health

The WDNR's ROW database shows that there are over 154 acres of lakes and ponds and over 910 acres of other unspecified open water in the Bear Creek Watershed. Of these, approximately 209 acres are entered into the state's assessment database. No lakes in the watershed have been assessed for fish and aquatic life use or any other use. Browning, Stump, and Duck lakes are the only named lakes in the watershed. Stump and Duck lakes are categorized as shallow seepage lakes.

### Duck Lake

Duck Lake is a seepage lake having slightly alkaline, soft, medium brown colored water of low transparency. It is located within the Tiffany Wildlife Area and is better suited to wildlife than to fish. The lake suffers from annual winterkill conditions, but fish, including northern pike, largemouth bass, bluegill, and pumpkinseed enter the lake during high water periods on the Chippewa River. There is wilderness access from the Chippewa River. Beaver are present and muskrats are significant. Migrating waterfowl use the water and mallard, teal, and wood ducks nest at the lake (Source: 1976, Surface Water Resources of Buffalo County Duck Lake, (Bennets), T23N, R14W, S11 Surface Acres = 14.8, S.D.F. = 2.22, Maximum Depth = 3 feet).

### Stump Lake

Stump Lake is a seepage lake subject to flooding by the Chippewa River. It has soft, alkaline, medium brown colored water of low transparency. It is freeze out water, but during high water periods, fish enter the lake from the river. Species usually present include northern pike and largemouth bass and probably various panfish species. Wilderness access is possible from the Chippewa River. The lake is located within the Tiffany Wildlife Area. Beaver are present and muskrats are significant. Mallard and teal broods may be observed. Migrant waterfowl use the lake (Source: 1976, Surface Water Resources of Buffalo County Stump Lake, T24N, R14W, S13 Surface Acres = 6.5, S.D.F. = 1.56, Maximum Depth = 1.0 foot).

## Wetland Health

### Wetland Status

The Bear Creek Watershed is located in northwest Buffalo County and south central Pepin County. An estimated half of the current land uses in the watershed are wetlands. Currently, over 95% of the original wetlands in the watershed are estimated to exist. Of these wetlands, the majority include forested wetlands (46%), and emergent wetlands (34%), which include marshes and wet meadows.

### Wetland Condition

Little is known about the condition of the remaining wetlands but estimates of reed canary grass (RCG) infestations, an opportunistic aquatic invasive wetland plant, into different wetland types has been estimated based on satellite imagery. This information shows that reed canary grass dominates 34% of the existing emergent wetlands, but only one percent of the remaining forested wetlands (See Figure 5). Reed canary grass domination inhibits successful establishment of native wetland species.



Figure 4: Forested Wetlands  
(Photo courtesy of WDNR)

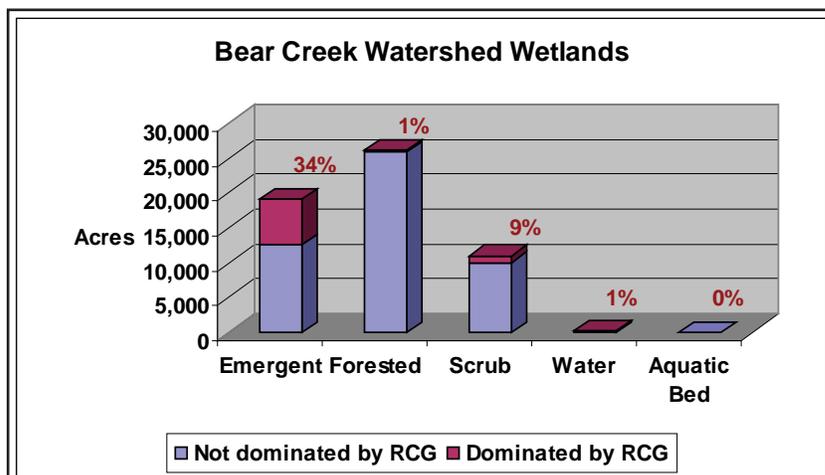


Figure 5: Reed Canary Grass Domination of Bear Creek Watershed Wetlands

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### **Wetland Restorability**

Of the 2,728 acres of estimated lost wetlands in the watershed, only about one-quarter (24%) are considered potentially restorable based on modeled data, including soil types, land use and land cover (Chris Smith, DNR, 2009).

### **Groundwater**

The following groundwater information is for Buffalo and Pepin counties (from Protecting Wisconsin's Groundwater through Comprehensive Planning website, <http://wi.water.usgs.gov/gwcomp/>), which roughly approximates to the Bear Creek Watershed.

Durand is the only municipal water system in the Bear Creek Watershed that has a wellhead protection plan or a wellhead protection ordinance. A wellhead protection plan uses public involvement to delineate the wellhead protection area, inventory potential groundwater contamination sources, and manage the wellhead protection area. Buffalo and Pepin counties have both adopted animal waste management ordinances, as well.

From 1979 to 2005, total water use in Buffalo County has increased from approximately 3.0 million gallons per day to 7.3 million gallons per day in 2000, and decreased to five million gallons per day in 2005. The increase by 2000 and decrease in 2005 in total water use over this period is due to irrigation use. The proportion of county water use supplied by groundwater has fluctuated from 98% to 95% over this period.

In Pepin County, total water use has increased from about 1.2 million gallons per day to about 3.0 million gallons per day from 1979 to 2005. The increase in total water use over this period is due primarily to an increase in irrigation use and industrial use after 2000. The proportion of county water use supplied by groundwater has consistently been about 98% during the period 1979 to 2000, and decreased to 55% in 2005.

### **Private Wells**

Ninety percent of 184 private well samples collected in Buffalo County and 81% of 59 private well samples collected in Pepin County from 1990 to 2006 met the health-based drinking water limit for nitrate-nitrogen. Land use affects nitrate concentrations in groundwater. An analysis of over 35,000 Wisconsin drinking water samples found that drinking water from private wells was three times more likely to be unsafe to drink due to high nitrate in agricultural areas than in forested areas. High nitrate levels were also more common in sandy areas where the soil is more permeable. In Wisconsin's groundwater, 80% of nitrate inputs originate from manure spreading, agricultural fertilizers, and legume cropping systems.

A 2002 study estimated that 52% of private drinking water wells in the region of Wisconsin that includes Buffalo and Pepin counties contained a detectable level of an herbicide or herbicide metabolite. Pesticides occur in groundwater more commonly in agricultural regions, but can occur anywhere pesticides are stored or applied. There are no atrazine prohibition areas in either county.

### **Potential Sources of Contamination**

Two dairy Concentrated Animal Feeding Operations (CAFOs) can be found near Durand, including Weiss Family Farms, Inc., which is part of the Natural Resources Conservation Service's (NRCS) Conservation Security Program (CSP). To help protect local water and soil quality the Weiss family use several conservation practices on their farm, including contouring planting, nutrient and pest management, grass waterways, and crop rotations. No licensed landfills or Superfund sites are located within the watershed.

WDNR's Remediation and Redevelopment (RR) Program oversees the investigation and cleanup of environmental contamination and the redevelopment of contaminated properties. The RR Program provides information about contaminated properties and other activities related to the investigation and cleanup of contaminated soil or groundwater in Wisconsin through its Bureau for Remediation and Redevelopment Tracking System (BRRTS) database (WDNR 2010e). The database shows one site in the Bear Creek Watershed that is classified as "open", meaning "contamination has affected soil, groundwater, or more and the environmental investigation and cleanup need to begin or are underway." This Environmental Repair (ERP) site is located at Countryside Cooperative in Durand. There are six remediation activities and one waste activity underway at this location. The activity was transferred to the Wisconsin Department of

Agriculture, Trade & Consumer Protection (DATCP) in 2003.

The Petroleum Environmental Cleanup Fund Award (PECFA) program was created in response to enactment of federal regulations requiring release prevention from underground storage tanks and cleanup of existing contamination from those tanks. PECFA is a reimbursement program returning a portion of incurred remedial cleanup costs to owners of eligible petroleum product systems, including home heating oil systems. As of May 31, 2007, \$4,166,767 have been reimbursed by the PECFA fund to clean up 43 petroleum-contaminated sites in Buffalo County. This equates to \$300 per county resident, which is greater than the statewide average of \$264 per resident. Over \$700,000 has been spent on petroleum cleanup in Pepin County from leaking underground storage tanks, which equates to \$99 per county resident.

## Point and Nonpoint Pollution

Little Bear Creek and the North Branch of Little Bear Creek are both ranked as high streams and are thus likely to respond to Best Management Practices (BMPs).

### Runoff Events

Fishkill Investigations #56 and #58 07/13/2005

Construction equipment inadvertently damaged a valve associated with a liquid manure transfer system resulting in the accidental discharge of 20,000 to 25,000 gallons of liquid manure into Weisenbeck Valley Creek and then into Little Bear Creek; Land Use: Agriculture; Activity: Heavy equipment operation and expansion of a dairy farm; Recommended Action: To be determined.

## Waters of Note

### Trout Waters

Class I trout streams are high quality trout waters that have sufficient natural reproduction to sustain populations of wild trout, at or near carry capacity. Consequently, streams in this category require no stocking of hatchery trout. These streams or stream sections are often small and may contain small or slow-growing trout, especially in the headwaters. Class II trout streams may have some natural reproduction, but not enough to utilize available food and space. Therefore, stocking is required to maintain a desirable sport fishery. These streams have good survival and carryover of adult trout, often producing some fish larger than average size. Class III trout waters are marginal trout habitat with no natural reproduction occurring. They require annual stocking of trout to provide trout fishing. Generally, there is no carryover of trout from one year to the next (<http://dnr.wi.gov/topic/fishing/trout/streammaps.html>).

Thirty-nine miles of Class II trout streams are dispersed over stretches of Center, Bear, the North Branch of Little Bear, Little Bear, Newton Valley (Shoe), and Spring creeks, along with a tributary to the North Branch of Little Bear Creek, locally named Owen Valley Creek. A small unnamed creek and Weisenbeck Valley Creek contribute a total of eight miles of Class III trout streams for the watershed. The table below lists the waterbodies and stream segments (starting from the mouth at mile 0) where these trout waters can be found.



## Outstanding and Exceptional Resource Waters

No Exceptional or Outstanding Resource Waters are listed for the Bear Creek Watershed.

Table 3: Bear Creek Watershed Trout Waters

WADRS ID	Official Waterbody Name	Local Waterbody Name	WBIC	Start Mile	End Mile	Trout Class	Trout ID	Counties
15581	Bear Creek	Bear Creek	2061900	1.5	7.5	CLASS II	2394	Pepin
15582	Bear Creek	Bear Creek	2061900	7.5	10	CLASS III	3163	Buffalo, Pepin
15573	Center Creek	Center Creek	2048300	0	4.35	CLASS II	2365	Buffalo
1469715	Unnamed	Creek 1-3	2063000	0	1	CLASS II	2398	Pepin
1446718	Little Bear Creek	Little Bear Creek	2048000	4.35	13.17	CLASS II	2364	Buffalo
1469684	Unnamed	Newton Valley Creek (Shoe Creek)	2062200	0	4.27	CLASS II	2492, 2493	Buffalo, Pepin
18760	North Branch Little Bear Creek	North Branch Little Bear Creek	2048400	0	5.4	CLASS II	2366	Buffalo
15574	North Branch Little Bear Creek	North Branch Little Bear Creek	2048400	5.4	6.79	CLASS II	2366	Buffalo
15576	Unnamed	Owen Valley Creek (31-10) Trib. to North Branch of Little Bear Creek	2048700	0	2.16	CLASS III	3160	Buffalo
1493340	Spring Creek	Spring Creek	2049400	2.61	5.49	CLASS II	2368	Buffalo
15583	Unnamed	Unnamed Cr T24n R12w S5 (5-9)	2062400	0	3.27	CLASS II	2397	Buffalo
15575	Unnamed	Weisenbeck Valley Creek T23n R13w S2 (2-3)	2048500	0	5.15	CLASS II	2367	Buffalo

### Impaired Waters

About a 38-mile section of the Chippewa River has been listed as impaired by PCBs and mercury since 1998, including a 20-mile stretch that was also listed for high mercury levels. New fish data, collected from 2000 through 2005, suggested removing Mercury Specific Advisory for this stretch of the Chippewa River.

Table 4: Bear Creek Watershed Impaired Waters

WB ID Code	Waterbody Name	Start Mile	End Mile	Impaired Water Priority	Impaired Water Category	Pollutants	Impaired Water Status	Impairments	Sources
2050000	Chippewa River	0	20.73	Low	Atmospheric Deposition, Contaminated Sediment	PCBs, Mercury	Pollutant Removed, 303(d) Listed	Contaminated Fish Tissue	Contaminated Sediments
2050000	Chippewa River	20.73	37.58	Low	Contaminated Sediment	PCBs	303(d) Listed	Contaminated Fish Tissue	Contaminated Sediments

### Fish Consumption

Wisconsin's fish consumption advisory is based on the work of public health, water quality and fisheries experts from eight Great Lakes states. Based on the best available scientific evidence, these scientists determined how much fish is safe to eat over a lifetime based on the amount of contaminants found in the fish and how those contaminants affect human health. Advisories are based on concentrations of the following contaminants along with angler habits, fishing regulations and other factors.

A fish consumption advisory for polychlorinated biphenyls (PCBs) has been placed on the Chippewa River downstream

of the dam at Holcombe to its confluence with the Mississippi River since January of 2010. Pool 4 of the Mississippi River has also had a fish consumption advisory in effect for PCBs and perfluorooctanesulfonic acid (PFOs) since January of 2010.

Studies indicate that people exposed to PCBs are at greater risk for a variety of health problems. Infants and children of women who have eaten a lot of contaminated fish may have lower birth weights and be delayed in physical development and learning. PCBs may affect reproductive function and the immune system and are also associated with cancer risk. Once eaten, PCBs are stored in body fat for many years. Each time you ingest PCBs the total amount of PCB in your body increases (Proposed Guidance For the Classification, Assessment, & Management of Wisconsin Surface Waters, Lowndes & Helmuth, March 12, 2007).

### Aquatic Invasive Species

No aquatic invasive species have been documented in this watershed.

### Species of Special Concern

The Lower Chippewa River downstream from the Dells Dam harbors 70% of the states fish species and is one of the most diverse fisheries in the Upper Midwest (LCRSNA, 1999). Recent and historic fisheries assessments on this section of river have documented the presence of many rare and unique fish species. Three species, crystal darter, goldeye, and black redhorse are on the state’s endangered species list. Four species, paddlefish, blue sucker, river redhorse, and greater redhorse are on the state’s threatened species list. And the western sand darter, American eel, mud darter, and lake sturgeon are on the state’s special concern list. Common game fish in this section of river include smallmouth bass, walleye, sauger, northern pike, muskellunge, lake sturgeon, and channel and flathead catfish (Benike, 2000). Other common non-game fish species include shorthead, silver, and golden redhorse, smallmouth and bigmouth buffalo, carpsuckers, mooneye, and gizzard shad (Benike, 2000). Currently, no commercial fishing is allowed in the Lower Chippewa River. Past commercial fishing in the river, primarily for buffalo, resulted in the incidental catch of paddlefish and sturgeon. No fish stocking occurs in the free-flowing sections of the river (Voss, Karen and Sarah Beaster. 2001. The State of the Lower Chippewa River Basin. PUBL-WT-554 2001. Wisconsin Department of Natural Resources, Madison, WI).

The following table contains federally-listed Threatened, Endangered, Proposed, and Candidate species found in Buffalo and Pepin counties, in which the Bear Creek Watershed is located.

Species	Status	Habitat	Taxa
Eastern massasauga ( <i>Sistrurus catenatus catenatus</i> )	Candidate	Open to forested wetlands and adjacent upland areas	Reptile
Higgins eye pearlymussel ( <i>Lampsilis higginsii</i> )	Endangered	Mississippi River	Mussel
Whooping crane ( <i>Grus americanus</i> )	**Non-essential experimental population	Open wetlands and lakeshores	Bird
Prairie bush-clover ( <i>Lespedeza leptostachya</i> )	Threatened	Dry to mesic prairies with gravelly soil areas	Plant

\*\*Whooping Crane - On June 26, 2001, a nonessential experimental population of the whooping crane was designated in a 20-state area of the eastern United States. The first release of birds occurred in Wisconsin in 2001, and the counties listed are those where the species has been observed to date. It is unknown at this time which counties the species will occupy in the future, as the birds mature and begin to exhibit territorial behavior. For purposes of section 7 consultation, this species is considered as a proposed species, except where it occurs within the National Wildlife Refuge System or the National Park System, where it is treated as a threatened species (<http://www.fws.gov/midwest/endangered/lists/wisc-spp.html>).



Figure 6: Big Swamp Wildlife Area, WDNR Photo

## State Natural and Wildlife Areas

### **Big Swamp Wildlife Area**

Big Swamp Wildlife Area is a 796-acre property in Buffalo County. Find it five miles west of Mondovi, south of Highway 10. Currently access is only available from County Highway A on the south side of the property. The property consists of upland hardwoods and marsh. Acquisition began on the property in 1956 with the goal of protecting winter pheasant cover for pheasants. The Big Swamp Wildlife Management Area (WMA) has since grown to 796 acres in size. Management on the property is limited as much of the acreage

consists of tamarack swamp and lowlands, although there is a mix of upland hardwoods on the property. The property is surrounded by private lands so it is important that users know and respect the property boundaries.

### **Lower Chippewa River**

The Lower Chippewa River State Natural Area features the largest concentration of remaining prairies and savannas in the state. At the time of European settlement, Wisconsin had over 7.7 million acres of native prairie but today only about 8,000 acres remain. This extensive project contains over 2,000 acres of prairie, which equals 25% of all known remaining prairie in the entire state. Lying along and interspersed within the river channels are islands of floodplain savanna and forest while the surrounding hillsides contain prairie and savanna. The largest contiguous floodplain forest in the Midwest is located just south of Durand within this natural area. A large diversity of bird species thrive in these extensive forests including six state-threatened species: red-shouldered hawk (*Buteo lineatus*), Acadian flycatcher (*Empidonax virescens*), cerulean warbler (*Dendroica cerulea*), hooded warbler (*Wilsonia citrina*), Kentucky warbler (*Oporornis formosus*), and yellow-crowned night heron (*Nyctanassa violacea*). Additionally, 70% of all the fish species in the state find suitable habitat in the Chippewa and Red Cedar rivers including the rare paddlefish, blue sucker, crystal darter, and goldeye. The Chippewa River is one of three places in the world home to the endangered Pecatonica River mayfly (*Acanthametropus pecatonica*). Lower Chippewa River State Natural Area is owned by the DNR and was designated a State Natural Area in 2002.

### **Nelson-Trevino Bottoms**

Located below the confluence of the Chippewa and Mississippi Rivers, Nelson-Trevino Bottoms features an extensive, undisturbed wilderness portion of the largest delta floodplain forest in the upper Midwest. Roadless except for a short trail at the southwest corner, the bottoms are a maze of forested floodplain and ever-changing oxbow meanders, marshes, sloughs, and ephemeral ponds. Silver maple, river birch, American elm, and cottonwood dominate wooded areas. Additional canopy species include swamp white oak, bur oak, willow, and green and white ashes. Red osier dogwood occurs in small, scattered fringes and thickets. Herbaceous understory species include wood nettle, partridgeberry, Ontario aster, swamp loosestrife, cut-leaved coneflower, and northern water-horehound. Vines are abundant with poison ivy, common moonseed, Virginia creeper, and bristly greenbriar. Groundcover of open marsh and abandoned stream channels include river bulrush, prairie cord grass, blue-joint grass, and sedges. The remoteness combined with a highly productive delta system has allowed extensive and large wildlife populations to flourish. The site is home to many rare or uncommon species such as great egret (*Ardea alba*), red-shouldered hawk (*Buteo lineatus*), northern harrier (*Circus cyaneus*), cerulean warbler (*Dendroica cerulea*), prothonotary warbler (*Protonotaria citrea*), pileated woodpecker, blue-gray gnatcatcher, and yellow-throated vireo. Other animals include wood duck, kingfisher, broad-winged hawk, mink, otter, and numerous reptiles and amphibians. Nelson-Trevino Bottoms is owned by the U.S. Fish and Wildlife Service and was designated a State Natural Area in 1970.

### **Nine Mile Island**

Nine Mile Island is located within an extensive river ecosystem that includes the Chippewa River and Nine Mile Slough and features two high quality native plant communities, oak barrens and floodplain forest. Most of the island is an extensive floodplain forest of silver maple, river birch, green ash, swamp white oak, elms, hackberry, and yellow bud hickory. Understory species include hop hornbeam, common winterberry, and herbs, such as cut-leaved coneflower and fox, bur, and swollen sedges. On the island's northeast corner, the sandy, gravelly soils support excellent oak barrens maintained through the scouring action of floods and other disturbances, such as fire and grazing. Canopy trees are mostly Hill's oak, along with a number of bur and red oaks. There are also a few scattered red cedar and white pine.

In some areas with 70 to 80% shading, the groundlayer still harbors an excellent and diverse prairie component, including cream and white wild indigo, stiff goldenrod, bush-clover, rough blazing-star, prairie thistle, whorled milkweed, and asters. Grasses are dominated by big and little blue-stem with lesser amounts of Indian grass, needle grass, June grass, prairie cord grass, and three species of drop-seed. The area has been identified as having an exceptionally diverse fauna with a number of rare species including the largest population of the state-endangered beak grass (*Diarrhena obovata*). Other rare species include three freshwater mussel species, nine species of fish, and numerous animals, such as the red-shouldered hawk (*Buteo lineatus*) that prefers unfragmented floodplain forest as habitat. Nine Mile Island is owned by the DNR and was designated a State Natural Area in 1990.

### Tiffany Bottoms

Tiffany Bottoms State Natural Area is a small portion of the most extensive river delta in the Midwest and contains a representative portion of the larger Tiffany Bottoms floodplain forest. The site captures the transition between typical floodplain forest of silver maple, river birch, ashes, and basswood in the southern portion and the more oak-dominated forest in the northern part (swamp white, bur, and black). Soil types also change, from sandy outwash in the north to sand with accumulations of silty alluvium in the south. The bottoms abound in wildlife. Besides the typical game species, the area contains rare and uncommon birds, such as red-shouldered hawk (*Buteo lineatus*), great egret (*Ardea alba*), cerulean warbler (*Dendroica cerulea*), prothonotary warbler (*Protonotaria citrea*), great-blue heron, pileated woodpecker, and blue-gray gnatcatcher. The State Natural Area is part of an extensive 8,000-acre beaver/otter closed area, which has been maintained on the Tiffany Wildlife Area since 1956. The closed area was established in recognition of the fact that beaver are a very important habitat altering species that can have very positive impacts on other wetland dependent plants and animals. Maintaining this closed area is an important tool to maintaining this diverse wetland complex. Tiffany Bottoms is owned by the DNR and was designated a State Natural Area in 1958.



Figure 7: Nine Mile Island, Photo by E. Epstein (WDNR photo)

### Tiffany Wildlife Area

Tiffany Wildlife Area is a 13,000-acre property in Buffalo County. Find it 45 minutes south of Eau Claire and 90 minutes north of La Crosse. It is located along the Chippewa River between Nelson and Durand; west of State Highway 25 and mostly north of State Highway 35. About one-sixth of the property lies west of the Chippewa River in Pepin County. The rest lies east of the Chippewa River in Buffalo County. The area contains one of the state's largest, continuous bottomland hardwood forests. Beaver dams on sloughs and old river meanders create a maze of ponds and wetlands. Timber harvests help maintain aspen and oak in a diverse pattern of size and age classes. This variety in woodland composition and structure provides food and shelter for a wide variety of wildlife including deer, ruffed grouse, and beaver. Dead trees with dens are left to provide wildlife homes. Oaks with superior potential for producing acorns are preserved to provide high energy wildlife food. DNR staff periodically mow and use controlled burning to maintain meadow and grassland habitat at Tiffany Wildlife Area for waterfowl nesting cover and a number of other upland birds. Burning also maintains native prairie and savannah plants that existed before white settlement.



Figure 8: Tiffany Bottoms, Photo by Thomas Meyer (WDNR photo)

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## Watershed Actions

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### Grants and Projects

NPS Grant - Buffalo County - LCD: LBC Project #1 01/01/2004– Complete

Cost-share design and installation of manure management and barnyard runoff practices to address farm operations not in compliance with the agricultural performance standards and prohibitions dealing with manure and nutrient management, clean water diversions, and prevention of direct runoff from a feedlot or stored manure into waters of the state under NR 151.

NPS Grant – Little Bear Creek Barnyard 01/01/2003– Complete

Cost-shared (@70% paid by state) design and installation of manure management and barnyard runoff practices to address farm operations not in compliance with the agricultural performance standards and prohibitions.

NPS Grant - LBC Manure Storage 01/01/2003– Complete

Cost-shared (@70% paid by state) design and installation of manure management and barnyard runoff practices to address farm operations not in compliance with the agricultural performance standards and prohibitions dealing with manure and nutrient management, clean water diversions, and prevention of direct runoff from a feedlot or stored manure into waters of the state under NR 151.

NPS Grant - Prissel Farm NOI 01/01/2003– Complete

Cost-shared (@90% paid by state due to economic hardship eligibility) design and installation of manure management and barnyard runoff practices and development of a manure storage Notice of Intent (NOI) to address farm operations not in compliance with the agricultural performance standards and prohibitions dealing with manure and nutrient management, clean water diversions, and prevention of direct runoff from a feedlot or stored manure into waters of the state under NR 151.

River Protection Grants - Durand Sportsman's Club: Bank Restoration of Chippewa River 07/01/2002 – Complete

The Durand Sportsman Club, based in Pepin County, proposed to continue its bank stabilization efforts along the Chippewa River, working its way from the Durand area upriver towards Meridean. Key elements of this project included establishment of agreements with riverfront property owners to allow bank stabilization and riprapping according to DNR standards.

### Monitoring

#### **Rivers and Lakes Baseline and Trends Monitoring**

River Monitoring to comply with Clean Water Act implementation - water quality standards: use designations, criterion, permit issuance and compliance, assessments, and impaired waters management.

Fisheries projects include a wide variety of “baseline” monitoring and targeted fieldwork to gain specific knowledge related to Wisconsin’s fish communities. In close cooperation with UW Extension and Wisconsin Sea Grant, education efforts focus on working with resource professionals and citizens statewide to teach boaters, anglers, and other water users how to prevent transporting aquatic invasive species when moving their boats. Additional initiatives include monitoring and control programs.

### Basin/Watershed Partners

- Pepin & Buffalo Land Conservation Departments
- USFWS Upper Mississippi Wildlife Refuge
- Chippewa Valley Motor Car Association
- UW Eau Claire Confluence Center
- Lower Chippewa River Alliance
- Lower Chippewa River Conservation Fund
- Several local sportsman’s clubs
- Federal conservation agencies

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## Recommendations

### **Bear Creek Subwatershed Management Recommendations**

1. Fish stocking practices on Bear Creek should be changed. Currently the mainstem of Bear Creek receives low numbers of fingerling brown trout and their abundance is very low. Stocking practices should be changed to promote a put-grow-and-take brook trout fishery because they are currently the dominant salmonid in the subwatershed. Wild brook trout fingerlings would be preferred, but the current supply of wild fingerlings from hatcheries is very limited. At this time it is recommended that stocking quotas should be increased to 13,200 domestic brook trout spring fingerlings on an annual basis. This change is consistent with the recommended stocking guidelines on a per acre basis. In the future, if wild brook trout fingerlings become more readily available from Department hatcheries, it is recommended that wild brook trout fingerlings replace the domestic strain due to better survivorship (Avery, Nieber and Vetrano, 2001). Additional brook and brown trout stocking could be allowed when surplus fish are available from hatcheries. The stocking of surplus brown trout would allow for a few fish to possibly reach larger quality size ranges (>14 inches) for local anglers due to ample forage and good growth rates. Holdover (> 8 inches) brook trout should also be stocked into the mainstem of Bear Creek to provide anglers with harvestable fish consistent with past stocking practices. If the fingerling brook trout stocking is successful, it is recommended that holdover brook trout stocking be eliminated in the future. The goal is to obtain fish densities at 750 to 1,000 fish per mile at all locations on the mainstem of Bear Creek.

2. Trout angling regulations for all coldwater streams in the Bear Creek Subwatershed should be changed to category four waters. The category four regulation changes would protect existing and future brook trout fisheries, allow harvest of spring holdover brook trout, and protect a few brown trout that would be stocked when available. In addition, it would simplify regulations for anglers in the local area.

3. Bear Creek can be upgraded to Class II brook and brown trout water for 6.0 miles, from Pepin County Highway V to State Highway 85, and be changed to Class III brook and brown trout water from Pepin County Highway V upstream 2.0 miles. Creek 1-3 should be classified as Class II brook trout water from the mouth upstream to Pepin County Highway M.

4. Trend thermal monitoring should occur on select sites in the Bear Creek Subwatershed. The trend thermal data would provide additional data on thermal regimes during the stocking evaluation period.

5. The Department should work with local Conservation clubs, Pepin County Land Conservation office, and the local NRCS office on potential habitat restoration and protection activities. Potential projects could consist of spring restorations on Newton Valley Creek and instream habitat restoration activities on the mainstem of Bear Creek. By initiating these activities it is likely that spawning and nursery habitat, as well as overhead cover, could be significantly enhanced and would aid in the recovery of the coldwater fish community.

6. The Department should consider adding the mainstem of Bear Creek to the stewardship streambank protection program. In addition the Department should pursue acquisition of Creek 1-3 through the Lower Chippewa River State Natural Area. It contains a native coldwater brook trout fishery.

7. The Department, Pepin County, and the NRCS should promote BMPs for nutrient, riparian, and near shore habitat management on all streams in the Bear Creek Subwatershed. Efforts should be targeted at buffer installations, rotational grazing, and flood control as well as barnyard and nutrient management.

8. Beaver activity should be monitored and if deemed necessary a trapping and removal program should be initiated. If beaver densities increase, it is likely thermal degradation would occur.

### **Little Bear Creek Subwatershed Management Recommendations**

1. Stocking practices should be initiated in the Little Bear Creek Subwatershed and be evaluated on an annual basis. Wild brook trout fingerlings should be introduced into North Branch of Little Bear Creek. It is recommended that 4,300 spring fingerlings be stocked into the North Branch of Little Bear Creek. This is the recommended stocking rate for wild trout fingerlings for 10 acres of water. Domestic brook trout fingerlings should be stocked on the mainstem of Little Bear Creek where current brook trout levels are low to moderate and angling pressure is moderate. This stocking will

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help supplement variable recruitment and provide a put-grow-and-take brook trout fishery. It is recommended that 7,600 domestic spring fingerlings be stocked at stations three, four, and five on the mainstem of Little Bear Creek. This is the recommended stocking rate for spring domestic fingerlings for 12 acres of water. If wild brook trout fingerlings become more readily available from Department hatcheries in the future it is recommended that stocking quotas be switched to wild brook trout fingerlings due to better survivorship when compared to domestic strains (Avery, Nieber and Vetrano 2001). Brown trout fingerlings should also be stocked on the lower reaches of Little Bear Creek where thermal conditions are not optimal for brook trout and the potential to produce quality sized brown trout (> 14 inches) exists. It is recommended that 3,600 fall fingerling brown trout be stocked at stations two and three. An annual stocking evaluation should occur at select sites to determine the success of initiating stocking practices in the Little Bear Creek Subwatershed. The goal is to obtain fish densities at 750 to 1,000 fish per mile by 2005 at all locations. In addition, the goal for the North Branch of Little Bear is to provide a viable, self-sustaining brook trout fishery.

2. Trout angling regulations for coldwater streams in the Little Bear Creek Subwatershed should be changed to category four waters. The category four regulation changes will protect existing and future brook trout fisheries and protect a few brown trout that would be stocked on the lower sections of Little Bear Creek. In addition, it would simplify regulations for anglers in the local area.

3. Little Bear Creek should be classified as Class II brook and brown trout water for 7.1 miles, from Buffalo County Highway F to Little Bear Creek Road. North Branch of Little Bear Creek should be upgraded and reclassified as Class II brook trout water for its entire length (4.7 miles). Weisenbeck Valley Creek should be classified as Class II brook trout water for its entire length of 3.1 miles

4. Trend thermal monitoring should occur on select sites in the Little Bear Creek Subwatershed. This trend thermal data will provide additional data on thermal regimes during the stocking evaluation period.

5. The Department should work with local clubs, landowners, Buffalo County Land Conservation Office and the local NRCS office on potential habitat restoration activities within the Little Bear Creek Subwatershed. Potential projects could consist of in-stream habitat improvement activities on North Branch of Little Bear Creek, Weisenbeck Valley Creek and the mainstem of Little Bear Creek.

6. The Department should consider adding North Branch of Little Bear Creek and a portion of the mainstem of Little Bear Creek to the stewardship streambank protection program.

7. The Department, Buffalo County Land Conservation office, and the local NRCS office should promote BMPs for nutrient, riparian, and near shore habitat management and protection on all streams in the Little Bear Creek Subwatershed. Efforts should be targeted at buffer installations, rotational grazing, and flood control as well as barnyard and nutrient management.

8. Beaver activity should be monitored and if necessary, a trapping and removal program should be initiated. If beaver densities increase, it is likely thermal degradation would occur.

9. The Department should evaluate possible brook trout re-introductions into By-Golly and Norwegian Valley creeks within the Little Bear Creek Subwatershed.

#### **Spring Creek Subwatershed Management Recommendations**

1. Additional survey work should be conducted at select sites within the Spring Creek Subwatershed. This survey work should attempt to identify remnant brook trout populations and the location of springs and should allow the Department to effectively manage Spring Creek. No stocking is recommended at this time.

2. Spring Creek should be classified as Class II brook trout water from 1.1 miles upstream of Buffalo County AA and continue downstream 1.0 miles from Buffalo County AA.

3. The Department, Buffalo County Land Conservation Office, and the local NRCS Office should promote BMPs for nutri-

ent, riparian, and near shore habitat management and protection on all streams in the Little Bear Creek Subwatershed. Efforts should be targeted at buffer installations, rotational grazing, and flood control as well as barnyard and nutrient management.

4. Beaver activity is present and should be targeted for trapping and removal efforts

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Little Bear Creek, Bear Creek Watershed

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# Bear Creek Watershed