BIG ROCHE A CRI LAKE CHARACTERISTICS

Lake Description

Big Roche Cri Lake is located in north central Adams County and has a surface area of 205 acres, a shoreline length of 6.1 mile, a volume of 6,993 acre feet, a maximum depth of 20 feet and a mean depth of 9 feet. The lake has a large tributary area and a relatively short detention time. Development occurs on most lots around the lake and the area around the lake is not serviced by a public sanitary system (Phase I Lake Study Report, 2000).

The Cottonville Dam impounds water to form the Big Roche Cri Lake. The dam is owned by Adams County who leases the operations to a private individual. The dam currently is operated to produce hydroelectricity.

Baseline water quality data was collected during a study in 1995 -1996. Using the Wisconsin Trophic Status Index, the lake was classified as mesotrophic - good water quality. (Big Roche A Cri Lake District Plan, 1996). Water quality testing will be conducted from 2004 to 2006.

A 1991 WDNR publication stated the lake contained good numbers of largemouth bass and panfish with northern pike also present. Suitable habitats for the spawning of bass and panfish occur in the shallow areas of the lake. Northern pike utilize flooded weedy areas like the inlet area of the lake. Walleyes in the lake were a result of a stocking program. A 1993 WDNR fish survey produced the following results: 139 largemouth bass with an average length of 9.2 inches; 6 northern pike with an average length of 11.7 inches; 3 walleye with an average length of 11.5 inches; 226 bluegill with an average length of 4.5 inches; 20 crappie average length of 7.3 inches.

The shoreline area, area within 1000 feet of lake, is primarily residential. It was reported in the Big Roche A Cri Lake District Plan that 239 residential lots bordered the lake with the typical lot having 66 feet of water frontage. There are public boat launches at the northwest corner of the lake and on the north side of the lake on the east side of State Highway 13. The northwest corner boat launch is managed by Adams County Parks and Recreation Department while the east end boat launch is managed by the Wisconsin Department of Transportation.

Climate

The climate in the Big Roche A Cri Lake area is classified in the continental climate type. The summers have warm but not excessively hot days and cool nights. Winters are long, cold, and snowy. Mean annual precipitation is almost 30 inches. In an average winter, snow cover on the ground and ice cover on the lakes lasts from December to April. The growing season generally extends from late May to early September, for an average frost-free growing season of 135 days. Prevailing winds come out of the northwest from late fall through spring, and from the South during the remainder of the year. The wind speed generally ranges from 4 to 15 miles per hour. (Adams County Land and Water Resource Management Plan)

Watershed

Historical land survey records show the original vegetation of the lake watershed consisted mostly of woodlands with some wetlands and grasslands distributed throughout the area. The Phase I Lake Study Report, 2000, stated the land use in the lake watershed was woodlands 29%, wetlands 13%, open spaces 25%, residential 2% and agriculture 31%. It should be noted the residential land uses are concentrated in the area immediately surrounding Big Roche A Cri Lake. The watershed area around the lake consists of nearly level to steep slopes, with well to moderately drained, sands and loamy sands. The upper watershed consists of nearly level to gently sloping, with well to somewhat poorly drained, sands and loamy sands. Total lake watershed acres is 40,320 acres.

Big Roche A Cri Creek supplies the water to Big Roche A Cri Lake. There is cold and warm water fish in the Big Roche A Cri Creek. The portion of Big Roche Cri creek upstream from County Highway W has been classified by the Wisconsin Department of Natural Resources (WDNR) as an Outstanding Resource Water. WDNR stocks brown trout annually in the Big Roche A Cri creek between County Highway C and County Highway W. Brook trout habitat has been installed in the upper watershed of the Big Roche A Cri creek by the WDNR. WDNR has monitored the Big Roche A Cri Creek and it's tributaries for water quality and fish habitat. The monitoring has identified streambank erosion as a limiting factor to fish habitat. The riparian buffers of the streams are generally well protected except Dry Creek has a reach between 6th Ave and 1st Ave that needs improvement. The

monitoring also shows excess nutrients available in portions of Dry Creek and Buckner Creek. Ditching for land drainage has also affected Dry and Buckner Creeks. An unnamed tributary to Buckner Creek has been identified by the WDNR as needing further investigating to determine the reason for the lack of fish. All streams, ditches, and lakes drain into the Castle Rock Flowage/Wisconsin River which WDNR has listed as an impaired water body 303(d)(1)(C), Clean Water Act.

Groundwater generally flows east to west towards the Wisconsin River. There are no high capacity drinking wells in this watershed and the Village of Hancock is the only municipality that discharges in this watershed. The Village of Hancock Wastewater Treatment Plant lies in the upper watershed. The village of Hancock wastewater treatment facility is an oxidation ditch with seepage cells that discharges to ground water. The plant was built in 1988 with an unknown design life. The average daily intake of wastewater is 66,800 gallons with 124 pounds of solids. (The State of the Central Wisconsin River Basin – DNR).

Demographics

Big Roche A Cri Lake is in the Town of Preston, Adams County, Wisconsin. In 1980, the population in the Town of Preston was 967 people with 62% between the ages of 18 to 65 and 11% over the age of 65. In 1990, the population of the Town of Preston was 1,057 people with 55% between the ages of 18 to 65 and 21% over the age of 65. In 2000, the population of the Town of Preston was 1,360 people with 61% between the ages of 18 to 65 and 20% over the age of 65. (Big Roche A Cri Lake District Plan, 1996), (U.S. Census Bureau, Census 2000)

In 1980, there were 806 housing units compared to 847 in 1990, of which 420 were occupied year round. In 2000, there were a total of 960 housing units with 561 of those units being occupied year round. Eighty percent of the housing units were built before 1980. (Big Roche A Cri Lake District Plan, 1996), (U.S. Census Bureau, Census 2000)

It can be concluded that the population of the Town of Preston will continue to increase at a moderate rate and the people who purchase property in the township will be seeking recreational opportunities.

Big Roche A Cri Lake District

The Big Roche A Cri Lake District was formed in 1988. In 1996, there were 200 property owners paying $2.1 per $1,000 of value and a special charge of $70 per year. The district employed 3 people who performed annual aquatic plant harvesting. Approximately 260 to 290 loads (convert to pounds) of aquatic plants were harvested annually. The district owned one aquatic plant harvester, a tow vehicle, and a storage building. (Big Roche A Cri Lake District Plan, 1996)

In 2004, it was determined there are 197 property owners who pay $1.95 per $1,000 of value and a special charge of $150 per year. The district employs 8 employees who are responsible for harvesting. The district now owns 3 aquatic plant harvesters, a transport barge, pickup truck, storage shed, and a tow vehicle.

Regulations

Adams County has a Comprehensive Zoning Ordinance that regulates land use, a Shoreland Protection Ordinance that regulates activities in areas within 300 feet of a stream and 1,000 feet of a lake, a Sanitary Ordinance that regulates on-site sanitary systems, Floodplain Ordinance that regulates activities within the flood plain, Land Division Ordinance that regulates division of properties and a Building/Construction Ordinance that regulates building and construction activities. The Town of Preston utilizes the Adams County Planning and Zoning and their ordinances to regulate activities. Big RocheA Cri Lake has a no-wake ordinance.

LAKE STUDY RESULTS

1995-1996 Study

The North Central Wisconsin Regional Planning Commission prepared a lake plan based on inventories of resources and lake residents. They also obtained basic water quality data in 1995-1996. It was recommended the Town of Preston and the Big Roche A Cri Lake District implement the plan.

To inventory lake district membership a survey was sent to 188 members of which 103 responded. The survey reported 99% owned lake front property, 29% were permanent residents, the average length of ownership was 12 years, and 75% use a conventional septic system. The five most popular activities identified by the survey were fishing 88%, swimming 54%, boating 52%, water skiing 40%, ice fishing 38%. Major problems identified by the membership were weeds 87%, water level control 79%, algae 58%, lake depth 55%.

The plan indicated shoreland erosion was not a major problem but erosion is expected to increase as lake use increases resulting in sedimentation of the lake. The plan recommended the Town of Preston expand its existing boating ordinance to limit boat speeds; educate humans to limit disturbances in shoreline areas and shoreland protection structures; prohibit dredging and placement of materials within the lake; and mark ecologically sensitive areas with buoys and signs to help with enforcement. These recommendations were discussed by the lake district board but none were implemented.

Nonpoint source pollution from the upper watershed was identified as a potential source of nutrients entering into the lake. The plan recommended preserving wetlands in the watershed using zoning ordinances.

Stormwater runoff and septic systems within the shoreline area were identified as potential sources of pollution entering the lake. The plan recommended: the Town of Preston and the Big Roche A Cri Lake District

educate the public about alternative forms of lawn and garden care, household chemical use, and stormwater management; a program to test private septic systems should be established. This recommendation was not implemented.

The plan also identified increased lake congestion that was due to the long and narrow character of the lake and the increase of lake usage by boats and water skiing. The plan recommended the Town of Preston amend its Boating Ordinance to limit high speed boating activities to the deeper waters of the lake and impose slow-no-wake speed restrictions on motor boats near the shoreline. The lake district board decided water skiing should be allowed on the lake.

The plan identified a need and recommended a regular water quality monitoring program to help identify trends in water quality. The district contributed money towards the purchase of a water quality monitor by the Adams County Land and Water Conservation Department who has been monitoring water quality.

An inventory of aquatic plants and the development of an aquatic plant management plan were recommended. The monitoring of aquatic plants to identify invasive species was also recommended. The plan stated aquatic plant growth needed to be controlled and weed-cutting efforts should be increased to maintain recreational uses. It was recommended that a second weed harvester be secured. The lake district pursued and obtained a second aquatic plant harvester soon thereafter.

The plan identified the need for more public access for non-boating activities. It was recommended the development of a park that would adjoin the lake. This recommendation was not followed by the lake district.

Groundwater was not identified as a high priority but it was recommended that additional studies be conducted in the future. The lake district hired a private firm in 1999 to study the nutrient loading due to groundwater.

The 1996 Big Roche A Cri Lake management plan established 5 goals based on inventories and recommendations:

1) to protect and maintain public health, and promote public comfort and convenience in concert with the natural resource, through environmentally sound management of the vegetation, fishery and wildlife populations in and around Big Roche A Cri Lake;

2) to promote a quality water based experience for residents and visitors to Big Roche A Cri Lake consistent with the policies and objectives of the Wisconsin DNR;

3) to manage the lake in an environmentally sound manner, to preserve and enhance its water quality and biotic communities, their habitats, and essential structure and function in the water body and adjacent areas;

4) to effectively control the quantity and density of aquatic plant growth in portions of Big Roche A Cri Lake to better facilitate water-related recreation, improve the aesthetic value of the resource;

5) to collect base data and identify areas for further study.

1999-2000 Study

In 1999-2000, Foth and VanDyke obtained water quality data, determined the groundwater flow, determined the impact of septic systems on lake water quality, and analyzed watershed land use and associated phosphorus runoff from the watershed.

Water quality data results concluded: the lake remains mixed almost year around so the temperature of the water remains stable, therefore oxygen is distributed throughout the lake; the dissolved oxygen levels ranged from 5 - 11 milligrams/liter which is adequate for fish growth and survival; the average Total Phosphorus measured at 3 sample points ranged from 24 – 44 micrograms/liter. It should be noted that Total Phosphorus exceeded 30 micrograms/liter (the amount needed for algae blooms) at all sample points at some time in the year; the average "chlorophyll a" measured was 2.6 – 7.0 micrograms/liter with higher levels recorded in the shallower depths; Secchi depth readings showed water clarity depth ranged from 5 – 9.5 feet indicating a water quality as mesotrophic (moderate); very little

orthophosphates were found; and total nitrogen exceeded 3 milligrams/liter which is higher than most values for natural lakes. Overall, the report stated phosphorus and nitrogen concentrations are high enough to encourage excessive weed growth while conditions for aquatic life and fish are favorable.

Groundwater flow was measured by installing piezometers along the lakeshore in 4 locations. Results showed the groundwater flows into the lake at the east end and at the west end of the lake, the groundwater flows away from the lake, due to the dam causing the lake level to be artificially high above the groundwater.

The report stated septic systems on the east end of the lake will have an impact on lake water quality due to the groundwater moving into the lake, therefore, improvements and monitoring should be focused on the end of the lake. The report also stated many residents in the area where the groundwater flows away from the lake have septic systems between the lake and their drinking wells. This situation may contribute to nitrate and/or coliform bacteria in their drinking wells. A sanitary survey was distributed to all property owners to collect input regarding private wastewater systems. Fifty percent of the surveys were returned. Field observations were also conducted. Conclusions drawn from the survey and observations were: most septic systems were located well away from and above the lake having little impact on the lake; on the northwest end of the lake, lots are only 5 – 10 feet above lake level but this area has groundwater flowing away from the lake therefore septic system discharge flows away from the lake; and no failing systems or problem systems were identified. The report concluded septic systems do not appear to be a significant source of pollutants to the lake.

Phosphorus that enters into Big Roche A Cri Lake was estimated using land use acres and WDNR unit area loads by land use. It should be noted erosion and runoff was not measured in the watershed and the following figures are estimates only. It was estimated agriculture and woodlands contributed 1,665 pounds of phosphorus per year, thus providing an impact on the lake. The report also identified domestic wastewater as a significant source of phosphorus. Approximately 15% of phosphorus in wastewater is removed by septic systems, while the soil adsorbs the rest. All soils have a finite capacity for retaining and adsorbing phosphorus and when this capacity is

reached, phosphorus will pass through the soil into the groundwater. The report stated due to the impact of watershed and future septic system loading, phosphorus removal measures done in the lake will have little impact on the phosphorus concentrations in the lake. Alternatives listed to reduce nutrient loading from the watershed were: educate landowners on how to reduce surface water runoff and controlling soil erosion; maintain natural vegetation along shorelines; limited use of fertilizers/pesticides and/or use of no-phosphorus fertilizer on lawns and gardens that are within shoreline areas; divert storm water runoff to areas that can absorb the water into the ground; relocate new septic systems away from the lake; develop an ordinance to record pumping of septic systems to encourage proper system maintenance; continue annual weed harvesting; further study of dredging areas within the lake; reduce agricultural and woodland nonpoint source pollution.