

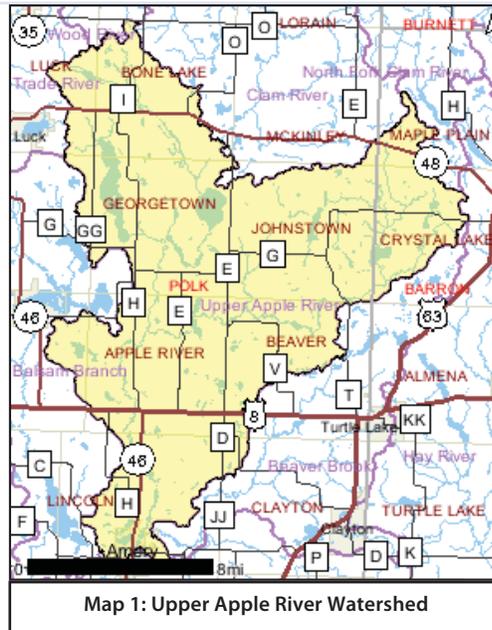
2011 Water Quality Management Plan Update

St Croix River Basin, Wisconsin

December 2011 (2015)

This watershed is located in east-central Polk County and contains the Apple River drainage upstream from below the Apple River Flowage dam in Amery. The watershed is approximately 125,074 acres in size and consists of 139 miles of streams and rivers, 7,663 acres of lakes and 16,247 acres of wetlands. The watershed is dominated by forest (50%), agriculture (32%), and open water and open space (10%). It is ranked high for nonpoint source issues affecting lakes and medium for nonpoint source issues affecting streams.

The Upper Apple River is a fertile warmwater stream which flows into what is known as the Apple River Flowage in the community of Amery. The Apple River Flowage has problems typical of man-made flowages including excessive siltation and nutrients which combine to create favorable conditions for nuisance aquatic plant growth.



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Watershed Details

Population and Land Use

Nearly half of the total area in the Upper Apple River Watershed is covered by forest. Almost another third (32%) of the area is reserved for agricultural purposes. Open water and space constitute a sizeable portion (10%) of the watershed, as well. Wetlands account for almost six percent of the total area. Grassland covers less than two percent of area in the watershed, while suburban and urban environments amount to only one-quarter of one percent and one-tenth of one percent, respectively.

Land Use	Acres	Percent of Area
Forest	62,036.37	49.60%
Agriculture	40,329.53	32.24%
Open Water & Open Space	12,678.06	10.14%
Wetland	7,484.92	5.98%
Grassland	2,128.54	1.70%
Suburban	304.01	0.24%
Urban	108.08	0.09%
Barren	3.34	0.00%
Total Acres in Watershed	125,072.86	

Hydrology

The hydrology of Apple River watershed is a reflection of the heterogeneous landforms and land uses within the watershed. Nearly half of the watershed consists of flat glacial plains that have been clear cut and drained to support intensive agricultural activities. The streams and rivers in agricultural regions of the watershed are flashy and erosive, carrying large sediment and nutrient loads to the watersheds lakes and reservoirs. However, the remainder of the watershed is covered with glacial moraines, kettle lakes and wetlands the majority of which are still forested. At these locations in the watershed there is considerably less runoff as precipitation can slowly infiltrate into the groundwater.

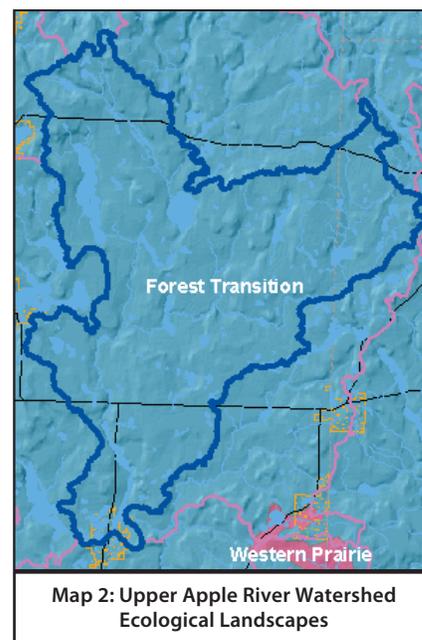
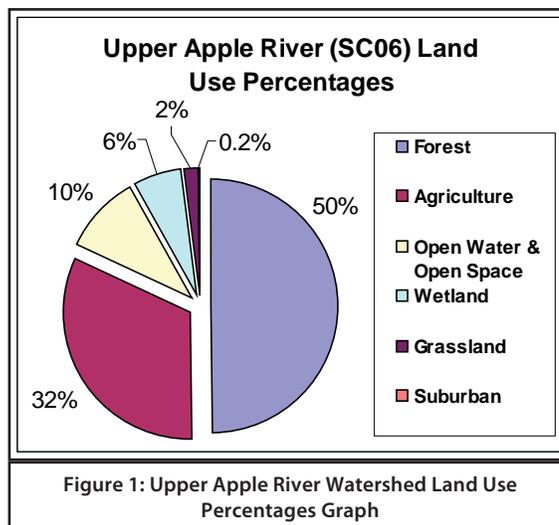
Ecological Landscapes

The Forest Transition Ecological Landscape lies along the northern border of Wisconsin's Tension Zone, through the central and western part of the state, and supports both northern forests and agricultural areas. The central portion of the Forest Transition lies primarily on a glacial till plain, deposited by glaciation between 25,000 and 790,000 years ago. The eastern and western portions are on moraines of the Wisconsin glaciation. The growing season in this part of the state is long enough that agriculture is viable, although climatic conditions are not as favorable as in southern Wisconsin. Soils are diverse, ranging from sandy loam to loam or shallow silt loam, and from poorly drained to well drained.

The historic vegetation of the Forest Transition was primarily northern hardwood forest. These northern hardwoods were dominated by sugar maple and hemlock, and contained some yellow birch, red pine, and white pine. Currently, over 60% of this ecological landscape is non-forested. Forested areas consist primarily of northern hardwoods and aspen, with smaller amounts of oak and lowland hardwoods. The eastern portion of the ecological landscape differs from the rest of the area in that it remains primarily forested, and includes some ecologically significant areas. Throughout the ecological landscape, small areas of conifer swamp are found near the headwaters of streams, and associated with lakes in kettle depressions on moraines. As this ecological landscape lies along the Tension Zone, ground flora show characteristics of both northern and southern Wisconsin.

Historical Note

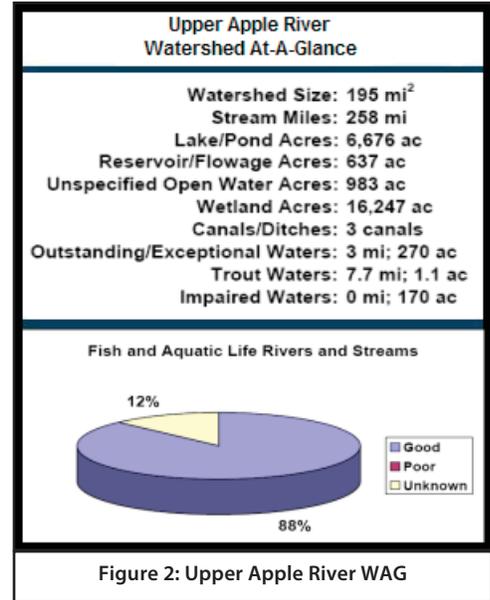
The City of Amery is located in the Upper Apple River Watershed in Lincoln Township, Polk County. The origin of Amery is closely associated with the lumbering industry. The first two settlers to arrive in the area (after following the Apple River) cut the first logs in the township of Lincoln and then floated them down the Apple River to Stillwater. In order to assure sufficient water for the drives, a big dam was built across the river just south of where CTH F crosses the water. Traces of the dam can still be seen. The community was known as Big Dam, and soon after the community was established, a store opened, followed by a saw mill, the railroad, and a depot. This development brought more settlers and the first hotel. A number of these early buildings are still in use today. In 1887, the community took the name of Amery, after William Amery who served as treasurer of Polk County. Between 1888 and 1893, the village grew and in 1919 the village became a city.



Watershed Condition

Overall Condition

The first two miles of Burns Creek and the first mile of Markee Creek are classified as Exceptional Resource Waters. Pipe Lake contributes 270 acres of Outstanding Resource Waters to the Upper Apple River Watershed. North Pipe Lake supports a naturally reproducing walleye population, as does Pipe Lake with the assistance of stocking. Furthermore, rice beds are present in Big Round Lake, White Ash Lake, and Rice Bed Creek. Fox Creek, Straight River, Bone Lake, and Little Blake Lake all serve as wadable nursery waters for small mouth bass. Small mouth bass can be found along segments of Beaver Brook, Apple River, Fox Creek, Little Round Lake, and Shiloh Flowage. These populations of small mouth bass are at least in part supported by stocking efforts along Apple River Flowage, Markee Spring, Rice Bed Creek, Big Blake Lake, Bone Lake, North and South Twin Lake, Big Round Lake, Staples Lake, Pike Lake, Vincent Lake, Pipe Lake, and Mud Lake. Since 1998, North Lake and Scott Lake have been 303(d) listed for mercury contamination from atmospheric deposition. (Figure 2)



River and Stream Condition

According to the WDNR's Register of Waterbodies (ROW) database, there are over 257 miles of streams and rivers in the Upper Apple River Watershed; 106 miles of these waters have been entered into the WDNR's assessment database. Of these 106 miles, the vast majority (88%) are meeting Fish and Aquatic Life uses and are specified as in "good" condition. The condition of the remaining stream miles is not known or documented.

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.

Table 2: Designated Use Support Summary for Upper Apple River Watershed Rivers and Streams (all values in miles)

Use	Supporting	Fully Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption				105.68	105.68
Fish and Aquatic Life	74.5	18		13.18	105.68
General				105.68	105.68
Public Health and Welfare				105.68	105.68
Recreation				105.68	105.68

Apple River

The Apple River is a high value warm water stream which supports a regionally noted recreational industry centered on tubing float trips. Recent data (2014) shows that the stream meets water quality standards for total phosphorus. However, the river is affected by nonpoint source pollution from agricultural and rural residential development which is increasing in this area. This stream and watershed should be considered a high priority for nonpoint source pollution control. The Apple River drains a large agricultural area and has moderate water quality impacts as a result of barnyard runoff, streambank erosion, cropland runoff and erosion. The Apple River Flowage has problems typical of man-made flowages including excessive siltation and nutrients combining to create favorable conditions for nuisance aquatic plant growth. The flowage also receives stormwater runoff from the community of Amery which serves as an additional source of nutrients. Implementation of nonpoint source controls in this watershed should include practices aimed at reducing pollution from both rural and urban sources.

Beaver Brook 2/1/92

Beaver Brook is a tributary to the Apple River Flowage. The stream is impacted by barnyard run-off, streambank and cropland erosion which result in sedimentation and loss of habitat in the stream and serves as a source of sediment to the flowage resulting in the deposition of a delta in the flowage.

Burns Creek 2/22/11

Burns Creek is a two mile-long tributary to the Apple River, which discharges at the Apple River Flowage near Lincoln in Polk County. This creek is recognized as an Exceptional Resource Water (ERW) and a cold Class I trout stream, as well.

Fox River 6/1/2015

Fox Creek is an 8-mile long tributary to Apple River that originates from a Bone Lake outlet in Polk County. The current use of Fox Creek is listed as a warm water forage fishery with a natural community of "warm water". Biological data (macroinvertebrate index of biological integrity) indicates that at Fox Creek Upstream Of Cth I condition is "fair" and a fish community survey from 2007 indicated "fair" conditions also through the warm water fish IBI tool.

Markee Creek 2/22/11

Markee Creek originates from Markee (Marquee) Springs and flows for a mile before discharging into the Apple River in the town of Apple River, Polk County. This stream is considered an Exceptional Resource Water (ERW) and a cold Class I trout water, as well.

Rice Bed Creek 2/22/11

The headwaters of Rice Bed Creek originate in Johnstown and flow for seven miles before discharging into the Apple River in Beaver, Polk County. From its mouth to 3.2 miles upstream, Rice Bed Creek is classified as a cold Class II trout water and the rest of the stream is considered a warm water forage fishery.

Straight River 2/22/11

The headwaters of the Straight River flow from an unnamed lake less than a mile west of Straight Lake. The river runs over 15 miles through Straight Lake, Big Round Lake, and Big and Little Blake Lake before finally discharging into Fox Creek. Mile 10.75 through 12.27 of Straight River is classified as a cold Class II trout stream, and further upstream the river is considered a warm water forage fishery.

Wood River 2/1/92

The Wood River flows through Dunham, Little Wood, and Wood Lakes and is impounded in the community of Grantsburg to form Mirror Lake.

Lake Health

The WDNR's ROW database shows that there are over 6,676 acres of lakes and ponds, 637 acres of reservoirs or impoundments, and another 983 acres of unspecified open water in the Upper Apple River Watershed. Bone Lake and Big Round Lake are the largest lakes in the watershed at over one thousand acres in size, each. Over 13,800 lake acres are entered into the state's assessment database. Over 38% of the 13,800 acres are indicated as supporting Fish and Aquatic Life uses; less than two percent are indicated as not supporting Fish and Aquatic Life uses. The remaining lake acres within the watershed have not been assessed for Fish and Aquatic Life use support. A small percentage of lake acres have also been assessed for Fish Consumption and Recreation uses.

Table 3: Designated Use Support Summary for Upper Apple River Watershed Lakes (all values in acres)

Use	Supporting	Fully Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption			440	13459.46	13899.46
Fish and Aquatic Life	9077.25	2940	153	1729.21	13899.46
General				13899.46	13899.46
Public Health and Welfare				13899.46	13899.46
Recreation	270		2747	10882.46	13899.46

Apple River Flowage

The apple river flowage was monitored at the deep hole from June 2010 to August 2014 and found to NOT meeting recreational use threshold (40 ug/l) (clearly exceeds) based on total phosphorus but clearly meeting for fish and aquatic life use threshold (100 ug/l) for this Shallow Lowland lake.

Beautiful Lake

Beautiful Lake is a landlocked lake with a fish population consisting of largemouth bass, bluegills, and bullheads. It lacks any public frontage, access roads or private development. It has 38 acres of wetlands where mallards and blue-wing teal may nest occasionally (Source: 1961, Surface Water Resources of Polk County Beautiful Lake T34N, R16W, Sec. 24 Surface Acres = 30.3, S.D.F. = 1.17, Maximum Depth = 17 ft., M. P. A. = 21).

Beaver 15

This is a landlocked lake subject to winter freeze-out conditions. It has no public lands, access roads or private developments. Six acres of nonwoody wetlands adjoin the lake. Mallards and blue-wing teal nest here (Source: 1961, Surface Water Resources of Polk County Beaver 15-8c T34N, R15W, Sec. 15 Surface Acres = 3.8, S.D.F. = 21.21, Maximum Depth = 3 ft., M.P.A. = 65).

Big Blake Lake (Blake) 2/1/92

This flow-through lake is located on the Straight River. A 1981 feasibility study documented a eutrophic body of water subjected to algae blooms and excessive vegetation growths. Recent contacts with this lake district have indicated a resurgent interest in lake management. This lake should be accorded a high priority for planning grants to help them in developing the long range management schemes to effectively utilize their lake within the limitations of the natural barriers present. A high priority should also be given to any funding for implementation practices which could reasonably achieve the alternatives suggested in the 1981 study. Big Blake Lake was monitored at the deep hole from August 2010 to August 2014 and found to NOT meet the recreational use threshold (40 ug/l) (clearly exceeds) based on total phosphorus but clearly meeting for fish and aquatic life use threshold (100 ug/l) for this Shallow Lowland lake.

Big Round Lake

Situated on the Straight River, the inlet and outlet of Big Round Lake (3 cubic feet per second) are navigable. Fish present include northern pike, walleyes, largemouth bass, bluegills, black crappies, perch, pumpkinseed, and bullheads. Forty percent of the shoreline is privately developed with seven resorts and 36 cottages. There are also two boat liveries. Public frontage on the lake consists of 3,956 feet of federal Indian lands, a 200-foot and a 60-foot unimproved platted access. There are no improved access roads at present. One hundred and eight acres of wooded wetlands adjoin the lake. Nesting waterfowl include mallards, blue-wing teal, greenwing teal, and ringneck ducks. Extensive use is made of the lake by migratory waterfowl. Ranging in importance from most to least use are coots, diving ducks (redheads and canvasbacks), puddle ducks, Canada geese, and whistling swans (Source: 1961, Surface Water Resources of Polk County Round Lake T35N, R16W, Sec. 13 Surface Acres = 1,031.0, S.D.F.=1.19, Maximum Depth = 15 ft., M. P. A. = 94).

The feasibility study for this lake (1980) documented a eutrophic body of water primarily influenced by in-lake recycling of sediment phosphorus. This lake district has been relatively inactive for several years but recently contacted us for help in combating recurring algae blooms and other eutrophic symptoms. This lake should receive high priority for a lakes planning grant to assess the priorities of the lake community and work toward a long range lake management plan. High priority should also be given for funding to implement recommendations from the 1980 study.

Blueberry Lake

Blueberry Lake is a soft water seepage lake with an intermittent outlet to Staples Creek. Its fish population is limited to forage minnows due to winter freeze-out conditions. It is a wilderness-type lake surrounded by upland hardwoods. A four-acre marshy wetland provides habitat for muskrats, nesting mallards, and wood ducks. It has no public frontage, access roads, or private development (Source: 1964, Surface Water Resources of Barron County Blueberry Lake T35N, R14W, Section 8 Surface Acres = 8.4, S. D. F. = 1. 20, Maximum Depth = 6 feet).

Bone Lake (T35n R16w S06) 2/1/92

Bone Lake (T35n R16w S06) is a lake management district was created around this lake in 1975. This large (1,781-acre) lake has experienced abundant vegetation growths and periodic algae blooms for many years. The feasibility study completed in 1980 documented this eutrophic condition, with in-lake recycling of phosphorus from deep-water sediments

targeted as the main nutrient source. Bone Lake has an excellent fishery with the muskellunge population one of the best in the district. The management alternatives for dealing with some of the trophic symptoms present on this lake have to be tempered with the caution necessary to preserve this high quality fishery resource. A high priority should be accorded this lake district for the development of long range management plans which help the lake community to control the products of eutrophication in certain high-use areas, but preserve the "sensitive areas" so necessary for the maintenance of the aquatic resource. Bone Lake T35n R16w S06 was monitored at the deep hole from June 2009 to September 2014 and found that it "may exceed" the recreational use threshold (40 ug/l) based on total phosphorus but clearly meets for fish and aquatic life use threshold (60 ug/l) for this Deep Lowland Lake.

Brusher Lake

Brusher Lake is a landlocked lake with a fish population of largemouth bass and pan fish. No public frontage, access roads, or private development here at present. Fifty-eight acres of predominantly nonwoody wetlands adjoin the lake and serve as a nesting area for mallards, blue-wing teal, and wood ducks (Source: 1961, Surface Water Resources of Polk County Brusher Lake T34N, R16W, Sec. 30, 29 Surface Acres = 67.4, S.D.F. = 1.37, Maximum Depth = 17 ft., M.P.A. = 72).

Clara Lake

Clara Lake is a landlocked lake containing northern pike, largemouth bass, bluegills, and bullheads. There are no public lands or access roads here. Private development consists of one resort. Mallards may nest here (Source: 1961, Surface Water Resources of Polk County Clara Lake T35N, R16W, Sec. 24, 25 Surface Acres = 52.7, S.D.F. = 1.30, Maximum Depth = 69 ft., M.P.A. = 19).

Clover Lake

Clover Lake is a landlocked lake with an overpopulation of bluegills. It has a 700-foot-long public frontage bordering an 18-acre county wayside park. The lake shore itself does not have a road access and it has no private development. Mallards and wood ducks may nest here. It is subject to winterkill conditions (Source: Clover Lake T34N, R16W, Sec. 32 Surface Acres=16.9, S.D.F.= 2.22, Maximum Depth=6 ft., M.P.A. = 14).

Dace Lake (Mud)

Dace Lake (Mud) is a landlocked bog lake subject to partial winter freeze-outs. Largemouth bass, bluegills, perch, and bullheads are present. There are no public lands, access roads, or private developments here. Twenty acres of wetlands adjoin the lake. A mallard, wood duck, and hooded merganser nesting area (Source: Dace Lake (Mud Lake) T35N, R15W, Sec. 11 Surface Acres=10.9, S.D.F.=1.25, Maximum Depth=15 ft., M.P.A. = 14).

Dahl Lake

Dahl Lake is a landlocked lake with minnows as its only fishery resource due to winterkill conditions. There are no public lands or access roads present. One cottage is the only private development here. Mallard, blue-wing teal, and wood duck nesting area (Source: Dahl Lake T36N, R16W, Sec. 27, 28, 34 Surface Acres = 32.3, S.D.F.=2.30, Maximum Depth=10 ft., M.P.A. 20).

Depot Lake

Depot Lake is a landlocked lake used mainly for stock watering. The lake lacks a fishery resource due to winterkill conditions. No public lands, access roads, or private development except farm buildings. Six acres of marsh wetlands adjoin it. Mallards and blue-wing teal use the lake for nesting areas (Source: 1961, Surface Water Resources of Polk County Bone Lake 27-16 (Depot Lake) T36N, R16W, Sec. 27 Surface Acres = 3.3, S.D.F. = 1.38, Maximum Depth = 8 ft., M.P.A. = 18).

East Lake (T34n R16w S18, Volga)

East Lake is a landlocked lake subject to winter freeze-out conditions. Fish species present include largemouth bass, bluegills, black crappies, and bullheads. It lacks public frontage, access roads, or private developments. Muskrats are significant and mallards and blue-wing teal may nest here (Source: Volga Lake (East Lake) T34N, R16W, Sec. 18 Surface Acres = 72.6, S.D.F.= 1.11, Maximum Depth = 6 ft., M.P.A.= 49).

Gilbert Lake

Gilbert Lake is a landlocked lake with a fish population consisting only of pan fish and forage fish. It has 0.54 acres of federal land with a 100-foot frontage. It has no improved access roads or private developments. Mallards and wood ducks may nest here. Gilbert Lake T33N, R15W, Sec. 10, 15 Surface Acres =13.9, S.D.F.=1.13, Maximum Depth=14 ft., M.P.A.= 22

Gibson Lake

Gibson Lake is a landlocked lake subject to an occasional partial winter fish kill. Largemouth bass, bluegills, pumpkinseed, and bullheads are present. There are no public lands, access roads or private developments here. Gibson Lake is important locally for swimming. Mallards and blue-wing teal may nest here (Source: Gibson Lake T34N, R16W, Sec. 34 Surface Acres =42.5, S.D.F.= 1.05, Maximum Depth=12 ft., M.P.A.=26).

Glovers Lake

Glovers Lake is a landlocked lake with no fishing resources because of winter freeze-out conditions. There are no public lands, access roads or private developments present. Mallards and blue-wing teal may nest here (Source: Johnstown 33-14 (Glovers Lake) T35N, R15W, Sec. 33 Surface Acres = 8.8, S.D.F. = 2.12, Maximum Depth = 7 ft., M.P.A. = 32).

Highland Lake

Highland Lake is a landlocked lake without fishery resource because of winterkill conditions. There are no public lands, access roads or private developments here. Twelve acres of marsh wetlands adjoin the lake. A mallard, blue-wing teal, and wood duck nesting area (Source: Highland Lake T35N, R15W, Sec. 24 Surface Acres= 11.4, S.D.F.=1.38, Maximum Depth=3 ft., M.P.A.= 42).

Johnson Lake

Johnson Lake is a landlocked lake with fish species consisting of largemouth bass, bluegills, perch, and bullheads. The lake is subject to periodic partial winter fish kills. There are no public lands, access roads or private development. Mallards and blue-wing teal nest here (Source: Johnson Lake (Johnson Lake) T36N, R16W, Sec. 28. Surface Acres = 31.8, S.D.F. = 1.46, Maximum Depth = 19 ft., M.P.A. = 29).

Lake Evelyn

Lake Evelyn is a bog lake with a non-navigable outlet (0.4 cfs) to Evelyn Creek and the Straight River. Green sunfish are common in this lake. It may periodically suffer a partial winter fish kill. There are no public lands, access roads, or private developments at present. Forty-five acres of wooded wetlands border the lake. Mallards, wood ducks, and hooded mergansers may nest here (Source: Georgetown 1-7 (Evelyn Lake) T35N, R16W, Sec. 1 Surface Acres = 2.5, S.D.F.=1.08, Maximum Depth=20 ft., M.P.A.= 69).

Lake of the Woods

Lake of the Woods is a soft water seepage lake having an intermittent outlet to Staples Creek. The fish population consists of largemouth bass, bluegills, and bullheads. Most of the lakeshore is upland hardwood, except for about five acres of marshy wetlands, which provide habitat for muskrats and nesting mallards and wood ducks. It has only a private access with a boat rental and private development consisting of two dwellings. There is no public frontage (Source: 1964, Surface Water Resources of Barron County Bass Lake - Town of Crystal Lake T35N, R14W, Section 7 Surface Acres = 37.2, S.D.F. = 1.73, Maximum Depth = 61 feet).

Lincoln Lake

Lincoln Lake is a freeze-out lake with an intermittent outlet to Bull Brook. No fishery value, public land, access roads, or private development at present. Mallards and blue-wing teal may nest here (Source: Lincoln Lake T33N, R16W, Sec. 34 Surface Acres= 11.1, S.D.F.= 1.16, Maximum Depth = 3 ft., M.P.A.= 96).

Little Round Lake

Little Round Lake is a lake situated on the Apple River with a navigable inlet and navigable outlet (1.9 cfs). Fish species present here include northern pike, largemouth bass, bluegills, black crappies, and bullheads. It lacks public frontage, access roads, or private developments. The inlet and outlet serve as navigable water accesses. Mallards and blue-wing teal nest in its 12 acres of wetlands (Source: Little Round Lake T34N, R15W, Sec. 4-9 Surface Acres =66, S.D.F.= 1.20, Maximum Depth = 8 ft., M.P.A. 116).

Little Ward Lake

Little Ward Lake is a landlocked lake with no fishery resource because of winterkill conditions. There are no public lands, access roads, or private developments here. Mallards and wood ducks nest here (Source: Little Ward Lake T36N,

R16W, Sec. 23 Surface Acres = 17.5, S.D.F.=1.16, Maximum Depth = 7 ft., M.P.A. = 14).

Long Lake (Helbig)

Long Lake (Helbig) is a landlocked lake having largemouth bass, black crappies, bluegills, and bullheads. There are no public lands or access roads, and private development is limited to one farm dwelling. Mallards may nest here (Source: Helbig Lake (Long Lake) T35N, R15W, Sec. 26 Surface Acres= 60.5, S.D.F.=2.11, Maximum Depth=14 ft., M.P.A.= 42).

Long Lake T35n R14w S20

Long Lake (T35n R14w S20) is a soft water seepage lake, landlocked and having a fish population of northern pike, walleyes, largemouth bass, bluegills, pumpkinseeds, bullheads, and white suckers. It is subject to an occasional winterkill. It is surrounded by upland hardwoods, white pine, and cultivated lands. It also has an 82-acre wetland area adjoining the lake. Muskrats and nesting mallards, wood ducks, and mergansers use these wetlands. It is accessible from a town road access on the north end. There is no private development or any public frontage other than the access site (Source: 1964, Surface Water Resources of Barron County Long Lake - Town of Crystal Lake T35N, R14W, Section 20 Surface Acres = 39.9, S.D.F. = 2.41, Maximum Depth = 13 feet).

Lost Lake T35n R16w S15

This lake has a non-navigable outlet stream Lost Creek (0.7 cfs), which in turn flows into Blake Lake. Its fish species consist of northern pike, largemouth bass, bluegills, black crappies, perch, and bullheads. It has no public lands, access roads, or private development. Fifty-one acres of wooded wetlands adjoin it. Mallards and wood ducks nest here. A number of diving ducks also use the lake during spring and fall migrations, with lesser numbers of puddle ducks (Source: Lost Lake T35N, R16W, Sec. 15 Surface Acres = 60.0, S.D.F. = 1.29, Maximum Depth = 15 ft., M.P.A. = 48).

Markee (Marquee) Spring

Markee (Marquee) Spring is a spring pond with a navigable outlet, Marquee Creek. The pond is managed for brook trout. It has no public lands, access roads, or private developments. It has one navigable water access. Mallards may nest here (Source: 1961, Surface Water Resources of Polk County Marquee Springs T34N, R16W, Sec. 32 Surface Acres = 1.2, S.D.F. = 2.48, Maximum Depth 8 ft., M.P.A. = 138).

Martel Lake

Martel Lake is a landlocked lake with no fishery resources because of winterkill conditions. There are no public lands or access roads here. Private development consists of two dwellings. Thirty-two acres of wetlands, mainly nonwooded, adjoin the lake. Mallards, blue-wing teal, wood ducks, and hooded mergansers nest here (Source: Martel Lake T35N, R15W, Sec. 2 Surface Acres = 38.8, S.D.F. = 2.23, Maximum Depth = 4 ft., M.P.A. = 29).

Miller Camp Lake

Miller Camp Lake is a landlocked lake having only minnows as a fishery resource because of winter freeze-out conditions. No public lands, access roads, or private development here. It is bordered by 64 acres of wetlands. Mallards, blue-wing teal, wood ducks and hooded mergansers nest here (Source: Surface Acres = 11.8, S.D.F. = 1.31, Maximum Depth = 10 ft., M.P.A. = 18).

Moccasin Lake (Long)

Moccasin Lake (Long) is a landlocked lake subject to occasional partial winter fish kills. Fish species present include walleye, northern pike, largemouth bass, bluegills, pumpkinseed, perch, and bullheads. There are no public lands or access roads here. Private development consists of four cottages. Twenty acres of wetlands adjoin the lake. Mallards, blue-wing teal, and wood ducks nest here (Source: Moccasin Lake T36N, R16W, Sec. 20, 21 Surface Acres = 51.2, S.D.F. = 1.85, Maximum Depth = 25 ft., M.P.A. = 19).

Mud Lake (T34n R16w S18)

Mud Lake (T34n R16w S18) is a landlocked lake subject to winter freeze-out conditions. It has no public frontage, access road, or private development. Forty-five acres of nonwoody wetlands adjoin the lake. Mallards, blue-wing teal, and wood ducks may nest here (Source: 1961, Surface Water Resources of Polk County Apple River 18-16 (Mud Lake) T34N, R16W, Sec. 18 Surface Acres = 9.8, S.D.F. = 1.31, Maximum Depth = 4 ft., M.P.A. = 24).

Mud Lake (T35n R14w S16)

Mud Lake (T35n R14w S16) is a soft water seepage lake, landlocked and subject to an occasional partial winterkill. Its fish species consist of northern pike, largemouth bass, bluegills, pumpkinseeds, and bullheads. Fifty-three acres of cat-tail, tag alder, and marsh grass wetlands surround most of the lake and provide habitat for muskrats, nesting puddle ducks, and mergansers. The lake has no private developments, public frontage, or access roads (Source: 1964, Surface Water Resources of Barron County Mud Lake - Town of Crystal Lake T35N, R14W, Section 16 Surface Acres = 23.4, S.D.F. = 1.68, Maximum Depth = 11 feet).

Mullins Lake

Mullins Lake is a landlocked lake with fish species consisting of northern pike, largemouth bass, bluegills, and bullheads. No public lands, access roads, or private development present. Mallards and wood ducks nest here (Source: 1961, Surface Water Resources of Polk County Bone Lake 36-3 (Mullins Lake) T36N, R16W, Sec. 36, 25 Surface Acres = 7.4, S.D.F. = 1.18, Maximum Depth = 21 ft., M. P. A. = 14).

North Lake

North Lake is a soft water seepage lake having a fish population of northern pike, largemouth bass, bluegills, black crappies, bullheads, and white suckers. The surrounding lakeshore is mostly upland hardwoods and farmland. The marshy lake edge provides habitat for muskrats and nesting puddle ducks. Two dwellings on the lakeshore are the extent of its private development. It is accessible by county road access on the northeast shore. Public frontage amounts to 0.05 miles of county-owned shoreline (Source: 1964, Surface Water Resources of Barron County North Lake T35N, R14W, Section 9 Surface Acres = 88.6, S.D.F. = 1.54, Maximum Depth = 23 feet).

Palmer Lake

Palmer Lake is a landlocked freeze-out lake with no fishery resource, public lands, access roads, or private development. It has one acre of marsh wetlands adjoining it. Mallards and blue-wing teal may nest here (Source: Palmer Lake T33N, R15W, Sec. 7 Surface Acres = 14.5, S.D.F. = 1.29, Maximum Depth 2 ft., M.P.A. 27)

Pike Lake

North Twin, South Twin, and Pike lakes are located mostly within the City of Amery. A lake management district was formed in the 1970's and a feasibility study was completed in 1982. The management alternatives from this study stressed the problems that urban lakes experience from stormwater runoff. A planning grants project initiated in 1991 is monitoring inlet water quality as well as in-lake quality and the determination of watershed boundaries and street runoff gradients. Dependent on the results of this planning grants study, these lakes should receive high priority for implementation funding to carry out the recommendations of the current and the previous study to protect these waters from the degradations caused by urban runoff and the resultant nutrient loading.

Pike Lake has an outlet stream (0.9 cfs) to North Twin Lake. Northern pike, walleye, largemouth bass, bluegills, black crappies, perch, pumpkinseed, and bullheads are present in the lake. Public frontage consists of one unimproved platted access roadway of 75 feet width. A privately owned access road to the lake is located on the northwest shore. It is used by the public without charge. There are two resorts and seven cottages at present on the lake. Migratory waterfowl consists mainly of diving ducks, with some puddle ducks and coots. Mallards and blue-wing teal also nest here (Source: Pike Lake T33N, R16W, Sec. 21, 28, 29 Surface Acres = 147.5, S.D.F.= 2.81, Maximum Depth = 30 ft., M.P.A. = 130).

Pipe Lake

Pipe Lake is a landlocked lake with a non-navigable channel to North Pipe Lake. The lake is managed for walleyes, northern pike, largemouth bass, bluegills, black crappies, pumpkinseed, perch, rock bass and bullheads. Some small-mouth bass are also present. Public frontage on the lake includes an unimproved platted access (75 feet) on the northeast corner and approximately 1,650 feet of frontage on the east shore presently owned by Polk County. A private access road with limited parking at the northwest corner is used by the public. Sixty-five acres of wooded wetlands adjoin the lake. Mallards, blue-wing teal, wood ducks, and hooded mergansers may nest here. Migratory waterfowl includes mainly diving ducks, with a few puddle ducks and coots also (Source: Pipe Lake T35N, RISW, Sec. 10, 15, 22 Surface Acres = 270.0, S.D.F.= 2.34, Maximum Depth = 70 ft., M. P. A. = 54). Pipe Lake was monitored at the deep hole from June

2010 to August 2014 and found that it “may meet” the recreational use threshold (30 ug/l) based on total phosphorus but clearly meets for fish and aquatic life use threshold (60 ug/l) for this Deep Headwater lake.

Pipe Lake, North

North Pipe Lake is a landlocked lake having a non-navigable channel to Pipe Lake. Northern pike, walleyes, largemouth bass, bluegills, black crappies, perch, pumpkinseed, and bullheads are present. There are no public lands or access roads here. Private development consists of one resort and three cottages. Twelve acres of wooded wetlands adjoin it. Mallards and wood ducks use the lake as a nesting area (Source: North Pipe Lake T35N, R15W, Sec. 10 Surface Acres = 54.8, S.D.F. = 1.57, Maximum Depth = 39 ft., M.P.A. = 59). Pipe Lake, North was monitored at the deep hole from June 2010 to September 2014 and found that it “may meet” the recreational use threshold (40 ug/l) based on total phosphorus but clearly meets for fish and aquatic life use threshold (60 ug/l) for this Deep Headwater lake.

Pogo Lake (Big)

Pogo Lake (Big) is a landlocked lake with fish species consisting of walleyes, northern pike, largemouth bass, bluegills, black crappies, and bullheads. There are no public lands or access roads present. Private development is limited to one cottage. One hundred and thirty acres of wooded wetlands adjoin the lake. Mallards, blue-wing teal, and wood ducks nest here (Source; Pogo Lake (Big Lake) T36N, R16W, Sec. 33 Surface Acres = 14.0, S.D.F. = 1.49, Maximum Depth 17 ft., M.P.A. = 5).

Round Lake (Heath)

Round Lake (Heath) is a landlocked lake containing bluegills and bullheads. There are no public lands or access roads here. Private development consists of one cottage. Twenty-five acres of marsh wetlands adjoin the lake. Mallard, blue-wing teal, and wood duck use the lake as a nesting area (Heath Lake (Round Lake) T35N, R15W, Sec. 23 Surface Acres= 23.2, S.D.F.=2.22, Maximum Depth= 20 ft., M.P.A.=26).

Scott Lake

Scott Lake is a landlocked soft water seepage lake with a fish population of northern pike, walleyes, largemouth bass, perch, bluegills, black crappies, pumpkinseeds, bullheads, and white suckers. Most of the lakeshore is upland hardwoods and open fields. The 54 acres of adjoining wetlands offer habitat for muskrats, nesting mallards, and wood ducks. It is accessible off County Highway G , at the public boat landing. Private development consists of one resort and boat rental place and one farm home. There is no other public frontage (Source: 1964, Surface Water Resources of Barron County Scott Lake T35N, R14W, Section 16 Surface Acres = 77.7, S.D.F. = 1.60, Maximum Depth = 25 feet).

Shiloh Lake

Shiloh Lake is a flowage with a navigable inlet to outlet (83.2 cfs), on the Apple River. Its water level is maintained by a 13-foot dam. Fish species present consist of northern pike, largemouth bass, bluegills, rock bass, and bullheads. There is no public frontage or access road. Three cottages make up the private development. Mallards, blacks, blue-wing teal, wood ducks and hooded mergansers nest here (Shiloh Flowage T34N, R16W, Sec. 28, 29 Surface Acres = 18.6, S.D.F.= 2.37, Maximum Depth = 12 ft., M.P.A. = 108).

Silver Lake

Silver Lake is a landlocked lake having northern pike, largemouth bass, and pan fish. Public lands include a 66-foot-long town access road. There are two private cottages on the lake. Mallards and blue-wing teal may nest here (Source: Silver Lake T34N, R15W, Sec. 14, 15 Surface Acres = 27.5, S.D.F. = 1.71, Maximum Depth = 26 ft., M.P.A. = 12).

Square Lake

Square Lake is a landlocked lake with a fish population consisting of largemouth bass, bluegills, perch, and bullheads. No public lands, access roads, or private developments here at present. Mallards and blue-wing teal may nest here (Source: Square Lake T34N, R16W, Sec. 3,4,9,10 Surface Acres = 33.2, S.D.F.= 1.08, Maximum Depth = 12 ft., M. P. A.).

Staples Lake

Staples Lake is a soft water drainage lake on the Polk County border. It has an inlet, Staples Creek, and an outlet that is the headwaters of the Apple River. The fish population consists of northern pike, walleyes, largemouth bass, bluegills, black crappies, pumpkinseeds, bullheads, and perch. The shoreline vegetation is mainly upland hardwood with some

scattered white pine and open farmland. Sixty-five acres of wetland near the lake offer habitat for muskrats, nesting puddle ducks, mergansers, and coot. A few Canada geese use the lake during migratory seasons. A public access is located on the northwest side of the lake and is the only public frontage. Private development consists of two resorts and boat rental places and 12 cottages and homes (Source: 1964, Surface Water Resources of Barron County Staples Lake T35N, R14W, Section 19 Surface Acres = 336.8, S.D.F. = 1.31, Maximum Depth = 15 feet). Staples Lake was monitored at the deep hole on August and be close to exceeding total phosphorus standards but more data is needed.

Straight Lake

Straight Lake has a navigable outlet (2.7 cfs), the Straight River. Its fish population consists of northern pike, largemouth bass, bluegills, perch, and bullheads. No public frontage, access roads, or private developments here at present. Muskrats are common. The lake has an adjoining 58 acres of wetlands, where mallards, wood ducks, and hooded mergansers nest (Source: Straight Lake T36N, R17W, Sec. 13 Surface Acres = 107, S.D.F. = 1.48, Maximum Depth = 12 ft. M. P. A. = 85).

Twin Lake, North

North Twin Lake has a navigable inlet from Pike Lake and a navigable outlet (1 cfs) to South Twin Lake. The lake contains northern pike, walleyes, largemouth bass, bluegills, black crappies, pumpkinseed, perch, and bullheads. Public frontage consists of 350 feet of city street frontage where boats may be launched, but it is without an adjacent parking area. Also, two unimproved platted access roadways with 30 feet and 4 feet width of frontage. There are eight cottages at present. Nineteen acres of marsh wetlands adjoin the lake. Mallards and blue-wing teal nest here. Fall migratory waterfowl are more abundant in numbers than spring birds due to a restrictive ordinance on hunting within the city limits of Amery where this lake is located. Diving ducks are most common with puddle ducks and coot present in lesser numbers (Source: North Twin Lake T33N, R16W, Sec. 28, 29 Surface Acres = 135.0, S.D.F. = 1.66, Maximum Depth = 15 ft., M.P.A. = 129).

Twin Lake, South

South Twin Lake has a navigable inlet stream from North Twin Lake and a non-navigable outlet (1.1 cfs) stream to the Apple River. The lake contains northern pike, walleyes, largemouth bass, bluegills, black crappies, pumpkinseed, perch, and bullheads. Public frontage consists of 200 feet of public swimming beach with facilities and park area (without boat launching access). There are 14 cottages and one resort developing 20% of the lake shore frontage. Twelve acres of marsh wetlands adjoin the lake. Mallards and blue-wing teal nest here. Use of firearms is restricted by local ordinance (Source: South Twin Lake T33N, R16W, Sec. 32 Surface Acres = 73.5, S.D.F.= 1.23, Maximum Depth = 12 ft., M. P. A. = 135).

Vincent Lake

Vincent Lake is a landlocked lake having walleyes, bluegills, black crappies, perch, bullheads, and a few northern pike. The lake is subject to an occasional partial winter freeze-out. Public frontage on the lake consists of an unimproved platted access (50 feet) on the southeast shore. Private developments include four cottages. Thirty-two acres of wooded wetlands adjoins the lake. Muskrats are present. Mallards, wood ducks, and hooded mergansers may nest here (Source: Vincent Lake T35N, R16W, Sec. 4 Surface Acres = 60.3, S.D.F. = 2.28, Maximum Depth = 20 ft., M.P.A. = 70).

White Ash Lake 2/1/09

White Ash and North White Ash Lakes are connected and are located along and adjacent to the Apple River. The feasibility study conducted for this lake in 1980 documented shallow, sediment filled basins eutrophic in nature with no quick-fix solutions to weed and algae problems. High priority should be accorded for developing a long range lake management plan predicated on the priorities and needs of the lake community and tempered by the demand to protect the natural resource values that presently exist.

This lake is likely naturally eutrophic. White Ash Lake is high in both Total Phosphorus and TSI-chlorophyll. The average Total Phosphorus concentration is 0.12 mg/L (2007-2008), which exceeds the threshold of 0.04 mg/L for shallow lowland lakes. Using the Carlson TSI calculation for 2004-2008, average TSI-chlorophyll is 73, which also exceeds the threshold of 71 for shallow lowland lakes. However, there are several sources of documentation that Polk County has both higher than normal groundwater phosphorus concentrations and high soils/geologic phosphorus concentrations, with high-nutrient glacial outwash till. These contribute to naturally eutrophic conditions in many of the lakes in the area. Previous White Ash Lake monitoring, modeling, and management planning efforts are limited and tend to focus only on aquatic plants. We recommend additional monitoring and investigation into whether there are any anthropogenic sources that

may be contributing to phosphorus levels (e.g., taking sediment core to determine changes in lake phosphorus levels overtime, etc.). Additionally, this lake currently has high macrophyte growth rather than being algae dominated. The lake needs to be managed to maintain macrophyte-driven system and prevent it from converting to an algae-driven system. Since extensive harvesting programs have been initiated on North White Ash, monitoring to determine whether secchi and chlorophyll concentrations have changed post-harvesting would be beneficial. This lake was monitored at the deep hole from June 2010 to September 2014 and found to be clearly exceeding total phosphorus standards for recreational use (40 ug/l) but clearly meets its fish and aquatic life use (100ug/l) for this shallow headwater lake.

White Ash Lake, North

This lake was monitored at the deep hole from June 2010 to September 2014 and found to be clearly exceeding total phosphorus standards for recreational use (40 ug/l) but may exceed its fish and aquatic life use (100ug/l) for this shallow headwater lake.

Wickerts Lake

Wickerts Lake is a soft water seepage lake, landlocked and subject to an occasional winter fish kill. Northern pike, large-mouth bass, bluegills, black crappies, and bullheads are present. The surrounding lakeshore is upland hardwood and farmland. A channel connects this lake with North Lake. The marshy lake edge provides habitat for muskrats, nesting mallards, wood ducks, and mergansers. There is no private development, public frontage, or access road (Source: 1964, Surface Water Resources of Barron County Wickerts Lake T35N, R14W, Section 9 Surface Acres = 13.4, S.D.F. = 1.35, Maximum Depth = 12 feet).



Scrub/Shrub - These areas, which included bogs and alder thickets, are characterized by woody shrubs and small trees such as tag alder, bog birch, willow, and dogwood.

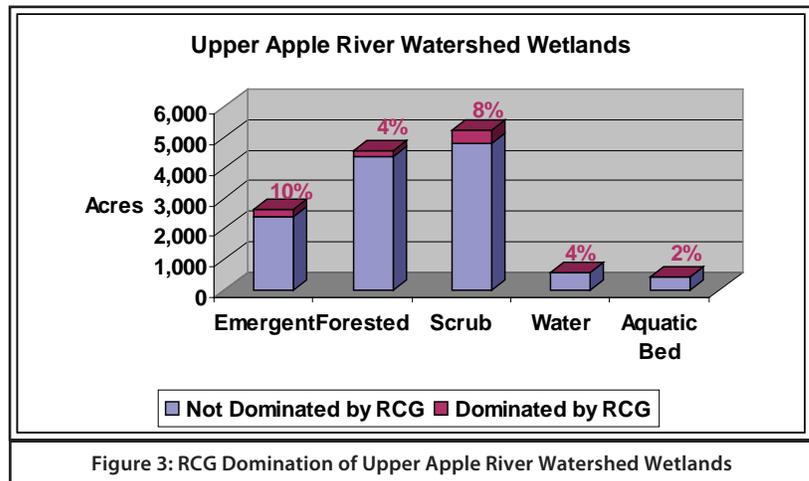


Figure 3: RCG Domination of Upper Apple River Watershed Wetlands

Wild Goose Lake

Wild Goose Lake is a landlocked lake occasionally subject to partial winter fish kills. Fish species present include large-mouth bass, bluegills, black crappies, and bullheads. There are no public lands, access roads, or private developments on the lake. Thirty-eight acres of marsh wetlands can be found along the lake perimeter. The lake is used as a nesting area for ring-necked ducks, mallards, and blue-wing teal. Other puddle and diving ducks are common during migratory seasons (Source: Wild Goose Lake T34N, R17W, Sec. 13 Surface Acres = 181.0 S.D.F.= 1.42, Maximum Depth 12 ft., M. P. A. 64).

Wetland Health

Wetland Status

The Upper Apple River Watershed is located in east-central Polk County. An estimated 11% of the current land uses in the watershed are wetlands. Currently, about 66% of the original wetlands in the watershed are estimated to exist. Of these wetlands, the majority include scrub (39%), forested wetlands (34%), and emergent wetlands (20%), 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 10% of the existing emergent wetlands, eight percent of the scrub area, and four percent of the remaining forested wetlands (See Figure 3). Reed canary grass domination inhibits successful establishment of native wetland species.

Wetland Restorability:

Of the 6,979 acres of estimated lost wetlands in the watershed, approximately 95% 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 Polk County (from Protecting Wisconsin's Groundwater through Comprehensive Planning website, <http://wi.water.usgs.gov/gwcomp/>), which roughly approximates to the Upper Apple River Watershed.

Amery is the only municipal water system in the Upper Apple River Watershed that has a wellhead protection plan. In addition, Polk County has adopted an animal waste management ordinance.

From 1979 to 2005, total water use in Polk County has increased from about 5.4 million gallons per day to about 10.9 million gallons per day. The increase in total water use over this period is due to primarily to increases in domestic, aquaculture, and public use and losses usage. The proportion of county water use supplied by groundwater has consistently been above 98% during the period 1979 to 2005.

Private Wells

Ninety-one percent of 783 private well samples collected in Polk County from 1990 through 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 one-quarter of private drinking water wells in the region of Wisconsin that includes Polk County 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 Polk County. Ninety-four percent of 18 private well samples collected in Polk County met the health standard for arsenic.

Potential Sources of Contamination

There are no concentrated animal feeding operations (CAFOs) in the Upper Apple River Watershed; nor are there any licensed landfills or Superfund sites 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 that there are 10 sites in the Upper Apple River Watershed that are specified as "open", meaning "contamination has affected soil, groundwater, or more and the environmental investigation and cleanup need to begin or are underway." These sites include seven Leaking Underground Storage Tank (LUST) sites and three Environmental Repair (ERP) sites; many of which are located in Amery. A summary of these sites is included in the table below.

There are a few more open-status sites in Amery and Balsam Lake that have contaminated groundwater and/or soil, which lie just outside the watershed area.

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Table 4: Open-status Bureau for Remediation and Redevelopment Tracking System (BRRTS) sites in the Upper Apple River Watershed

WDNR BRRTS #	Site Name, Location	Start Date	Activity Type	Remediation Activities	Waste Activities	Substance
349557000	Priority Sales/Amery Ford Mercury, Amery	05/05/2011	LUST	2	1	Petroleum - Unknown Type
349556942	Amery Regional Medical Center (ARMC) Fitness, Amery	04/13/2011	LUST	1	0	Petroleum - Unknown Type
349514936	Lou John Appraisal Service, Amery	04/01/2003	LUST	1	0	Free Product
349223213	Pap's General Store, Apple River	06/28/1999	LUST	1	0	Diesel Fuel & Gasoline (Petroleum)
249194277	Gorres Oil Co. Bulk Plant [Exxon Mobil (Former) Bp 48104], Amery	08/01/1998	ERP	1	2	Volatile Organic Compounds (VOC); Petroleum - Unknown Type
349127886	Amery Amoco, Amery	05/14/1997	LUST	1	1	Gasoline (Petroleum)
349000795	Amoco Oil Co. Bulk Plant, Amery	08/04/1994	LUST	1	0	Diesel Fuel & Gasoline (Petroleum)
349000776	Amery Professional Building, Amery	07/08/1994	LUST	1	0	Petroleum - Unknown Type
249000114	Burman, William Property, Lincoln	02/17/1994	ERP	1	0	Unspecified (Landfill Transferred to Solid Waste Program)
203000539	Crystal Lake Town Landfill - #1457, Crystal Lake	01/01/1980	ERP	1	0	Unspecified (Transferred to Solid Waste Program)

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, \$8,296,889 has been reimbursed by the PECFA program to clean up 96 petroleum-contaminated sites in Polk County. This equates to \$195 per county resident, which is less than the statewide average of \$264 per resident.

Point and Nonpoint Pollution

The Upper Apple River Watershed is ranked as a low priority overall for nonpoint source (NPS) pollution and is similarly ranked for groundwater NPS pollution. Lakes within the watershed are ranked as being at a high risk for NPS pollution and streams are ranked as medium priority for NPS pollution. Twin Lake, Pike Lake, Apple River Flowage, Big Blake Lake, Big Round Lake, Bone Lake, White Ash Lake, and Staples Lake have all been ranked as high lakes for NPS pollution.

Fish kill Investigations

Within the Upper Apple River Watershed four fish kill events have been documented since 2007 in Staples Lake, Big Round Lake, and Wild Goose Lake. In each case an investigation by Heath Benike concluded that the cause of the fish kills was a natural infectious agent, *Columnaris*.

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.

The first two miles of Burns Creek and the first mile of Markee Creek are classified as Class I trout waters. Another acre of Class I trout water is found at the headwaters of Markee Creek, Markee (Marquee) Spring. Rice Bed Creek is classified as a Class II trout water for the first three miles upstream from its mouth. A one-and-a-half-mile section of Straight River is also considered a Class II trout fishery. The table below lists the waterbodies and stream segments (starting from the mouth at mile 0) where these trout waters can be found.

WADRS ID	Official Waterbody Name	Local Waterbody Name	WBIC	Start Mile	End Mile	Trout Class	Trout ID
16551	Burns Creek	Burns Creek	2626100	0	2	CLASS I	1311
16552	Markee Creek	Markee Creek	2626200	0	1	CLASS I	1312
903190	Markee Spring	Markee (Marquee) Spring	2626300	null	null	CLASS I	1313
16569	Rice Bed Creek	Rice Bed Creek	2628900	0	3.18	CLASS II	2666
16556	Straight River	Straight River	2626900	10.75	12.27	CLASS II	2665

Outstanding and Exceptional Resource Waters

The first two miles of Burns Creek and the first mile of Markee Creek are classified as Exceptional Resource Waters. Pipe Lake contributes 270 acres of Outstanding Resource Waters to the Upper Apple River Watershed.

WADRS ID	Official Waterbody Name	Local Waterbody Name	WBIC	ORW/ERW	ORW/ERW ID	Start Mile	End Mile	Code Reference
16528	Pipe Lake	Pipe Lake	2490500	ORW	714	null	null	102.10(1m)12
16551	Burns Creek	Burns Creek	2626100	ERW	744	0	2	102.11(1)(a)
16552	Markee Creek	Markee Creek	2626200	ERW	745	0	1	102.11(1)(a)

Impaired Waters

Both North Lake and Scott Lake are on the 303(d) list for mercury contamination from atmospheric deposition since 1998.

WB ID Code	Local Waterbody Name	Start Mile	End Mile	Impaired Water Priority	Impaired Water Category	Pollutants	Impaired Water Status	Impairments	Sources
2630800	North Lake	0	89	Low	Atm. Deposition	Mercury	303(d) Listed	Contaminated Fish Tissue	Atmospheric Deposition - Toxics
2630700	Scott Lake	0	81	Low	Atm. Deposition	Mercury	303(d) Listed	Contaminated Fish Tissue	Atmospheric Deposition - Toxics

Fish Consumption

Currently, there are no specific fish consumption advisories in effect for any waterbodies within this watershed. However, a general fish consumption advisory for potential presence of mercury is in place for all waters of the state.

Aquatic Invasive Species

Aquatic Invasive Species are pervasive in the Upper Apple River Watershed. Banded mystery snails have been documented in Big Blake Lake, Bone Lake, and Staples Lake since 2007. Chinese mystery snails have also been found in Big Blake Lake, Bone Lake, North Lake, North Twin Lake, North White Ash Lake, Pipe Lake, Scott Lake, Staples Lake, White Ash Lake, and the Lake of the Woods. The Apple River Flowage, Big Blake Lake, Big Round Lake, Bone Lake, White Ash Lake, Staples Lake, North Twin Lake, and Pike Lake have all been found to support populations of curly-leaf pondweed. Big Blake Lake is also home to Eurasian water-milfoil. Furthermore, rusty crayfish have been verified and vouchered in Wood River and Apple River.

Table 8: Upper Apple River Watershed Aquatic Invasive Species

Database Key	Waterbody Name	Bio. Common Name	Status	Start Date	WBIC
22560211	Big Blake Lake	Banded Mystery Snail	Verified and Vouchered	12/31/2007	2627000
22560514	Bone Lake	Banded Mystery Snail	Verified and Vouchered	12/31/2007	2628100
22562361	Staples Lake	Banded Mystery Snail	Verified and Vouchered	12/31/2007	2631200
22560212	Big Blake Lake	Chinese Mystery Snail	Verified and Vouchered	12/31/2007	2627000
22560362	Bone Lake	Chinese Mystery Snail	Verified and Vouchered	12/31/2007	2628100
22561806	North Lake	Chinese Mystery Snail	Verified and Vouchered	12/31/2007	2630800
22561843	North Twin Lake	Chinese Mystery Snail	Verified and Vouchered	12/31/2007	2623900
22561860	White Ash Lake	Chinese Mystery Snail	Verified and Vouchered	12/31/2007	2628800
22561899	Pipe Lake	Chinese Mystery Snail	Verified and Vouchered	12/31/2007	2490500
22562168	Scott Lake	Chinese Mystery Snail	Verified and Vouchered	12/31/2007	2630700
22562360	Staples Lake	Chinese Mystery Snail	Verified and Vouchered	12/31/2007	2631200
22562806	White Ash Lake	Chinese Mystery Snail	Verified and Vouchered	12/31/2007	2628600
29169757	Lake of the Woods	Chinese Mystery Snail	Verified and Vouchered	12/31/2007	2632100
22218867	Apple River Flowage	Curly-Leaf Pondweed	Verified and Vouchered	12/31/1977	2624200
22218978	Big Blake Lake	Curly-Leaf Pondweed	Verified and Vouchered	12/31/1979	2627000
22219071	Big Round Lake	Curly-Leaf Pondweed	Verified and Vouchered	12/31/1978	2627400
22219105	Bone Lake	Curly-Leaf Pondweed	Verified and Vouchered	-	2628100
22219303	White Ash Lake	Curly-Leaf Pondweed	Verified and Vouchered	12/31/1978	2628600
28449556	White Ash Lake	Curly-Leaf Pondweed	Observed	07/08/2008	2628800
31240716	Staples Lake	Curly-Leaf Pondweed	Verified and Vouchered	06/30/2009	2631200
34912669	North Twin Lake	Curly-Leaf Pondweed	Verified and Vouchered	06/26/1980	2623900
34912695	Pike Lake	Curly-Leaf Pondweed	Verified and Vouchered	06/30/1980	2624000
35013994	Big Blake Lake	Eurasian Water-Milfoil	Verified and Vouchered	-	2627000
22565904	Wood River	Rusty Crayfish	Verified and Vouchered	-	2642900
22582759	Apple River	Rusty Crayfish	Verified and Vouchered	-	2614000

Species of Special Concern

The following table contains federally-listed Threatened, Endangered, Proposed, and Candidate species found in Polk County, in which the Upper Apple River Watershed is located. A full list of special concern plants and animals for this watershed can be found on the state's Natural Heritage Inventory (NHI).

Table 9: Federally-Listed Threatened, Endangered, Proposed, and Candidate Species in Polk County

Species	Status	Habitat	Taxa
Gray wolf (<i>Canis lupus</i>)	Endangered	Northern forested areas	Mammal
Whooping crane (<i>Grus americana</i>)	**Non-essential experimental population	Open wetlands and lakeshores	Bird

**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>).

State Natural and Wildlife Area

Loon Lake Wildlife Area

Loon Lake Wildlife Area is a 3,123-acre property located mostly in Barron County with a small portion in Polk County. It consists of rolling upland oak, maple, and aspen forest, grass fields, waterfowl flowages, pothole lakes, lowland brush, and the Apple River. Find it four miles north of Turtle Lake or four miles south of Cumberland.

Loon Lake Wildlife Area was established in the 1960's for waterfowl and forest wildlife management. Ducks, geese, deer, ruffed grouse, woodcock, gray squirrels, black bear, and furbearers are the main species of interest for hunting or wildlife viewing. A large concentration of sandhill cranes can be seen on cropfields on the west side of the property in the fall.



Loon Lake State Wildlife Area

Over 100 acres of flowages have been developed along with small dug potholes for waterfowl management. Approximately 600 acres of grassland habitat developed for waterfowl and grassland birds is burned and mowed periodically to maintain habitat quality. An extensive trail system is maintained for walking hunter access and wildlife viewing.

Loon Lake Woods

The gently rolling terrain of Loon Lake Woods supports a second-growth southern mesic hardwood forest of sugar maple and basswood with large red oaks common. Associates include red maple, white ash, white oak, paper birch, and yellow birch. Tall shrubs include beaked hazelnut, alternate-leaved dogwood, and arrow-wood, which is generally sparse to moderate in density. Ironwood and American hop-hornbeam are present as small trees in the understory. The groundlayer contains species such as maidenhair fern, zigzag goldenrod, large-flowered bellwort, sessile-leaved bellwort, bishop's-cap, wild geranium, interrupted fern, violets, and sedges. Several ephemeral kettle ponds are scattered through the area with black ash, alder, and wetland herbs, including sensitive fern, marsh marigold, wild calla, water-parsnip, blue flag iris, and common water-hemlock. Birds include broad-winged hawk, least flycatcher, yellow-throated vireo, northern waterthrush, veery, scarlet tanager, and blackpoll, Tennessee, chestnut-sided, and Canada warblers. Loon Lake Woods is owned by the DNR and was designated a State Natural Area in 2003.



Beds Creek State Wildlife Area

Omer Springs

Omer Springs is a 55-acre property located in Polk County. The property consists of a spring pond, open fields, and upland forest. Find it five miles west of Range on Highway 46 or a little over one mile northeast of

Amery. The following recreational opportunities exist at Omer Springs: hunting, trapping, snowmobiling, fishing, berry picking, wildlife viewing, and bird watching.

Rice Beds Creek Wildlife Area

Rice Beds Creek Wildlife Area is a 3,181-acre property located in Polk County. It consists of rolling oak, aspen, and maple upland forest, lowland forest, stream, and ponds. Rice Beds Creek Wildlife Area was established in 1951 to acquire and protect deer wintering habitat. Later, the project was expanded for multiple use benefits such as upland game, waterfowl, and furbearers. The area is popular with deer and grouse hunters because of favorable habitat created by forest management.

Today, there is an active multiple use forest management program designed to benefit all wildlife but especially deer and ruffed grouse. A well maintained trail system is accessible from the main parking lot on Highway G. Access is by foot traffic only.

Straight Lake Wildlife Area

Straight Lake Wildlife Area is a 1,325-acre property located in Polk County. Straight Lake Wildlife Area and State Park are contiguous properties. Much of the Straight Lake Wildlife Area is upland and consists mostly of oak (white and red), red maple, sugar maple, and basswood. The upland forest type consists primarily of red oak overstory and an understory of sugar maple, basswood, ironwood, and white birch. Smaller stands of aspen, red pine, and swamp hardwood also are present. The property also contains three flowages and associated wetlands and grasslands.

Historically, this area was a mix of northern hardwoods with a predominance of red oak and white pine. The natural disturbance regime prior to European settlement was mostly fire and some wind-throw. Fire, at longer intervals of 100 years, maintained the red oak, white and red pine, and white birch component in this area. Existing northern hardwood/oak stands are 90-plus years of age and were established at the turn of the century during the cut-over era. There is some evidence of fire from the charred stumps existing in the area. Once the area was settled, fire suppression stopped the natural fire regime of the region.

Watershed Actions

Grants and Projects

Lake Planning – Bone Lake Aquatic Plant Management Public Outreach 04/01/2008– Complete

- Bone Lake Management District sponsored a project to expand public outreach and participation in development of its aquatic plant management plan. Project activities included: providing a draft plan summary to all lake residents, advertising/noticing the draft plan in local media, and making the draft plan widely available via website, CD, or in print. The project also included public meetings and newsletter articles about native plants and aquatic plant management strategies. The final deliverables for this project were a draft and final aquatic plant management plan (in print & CD format), a plan summary, and documentation of the public outreach and participation. This scope was intended to summarize the detailed scope provided in the grant application and does not supersede grant application specifics. Data, records, and reports, including GIS-based maps and digital images, were submitted to the Department in a format specified by the regional Lake Coordinator. Special Conditions: 1) WDNR’s Aquatic Plant Management in Wisconsin guidance was to be followed for point-intercept survey monitoring and aquatic plant management plan development; 2) The WDNR Aquatic Plant Management Strategy (2007) was utilized in plan development.

Lake Planning – Bone Lake Comprehensive Plan 04/01/2008 – Complete

- Bone Lake Management District sponsored a project to complete a comprehensive lake management plan. This project reviewed historic studies, collected additional in-lake and tributary water quality information, and established lake management goals. Public participation drove goal and plan development. Project activities included: updating watershed land use and loading information; lake phosphorous response modeling (i.e. WiLMS modeling); wild rice mapping; shoreline assessment and development of shoreline restoration program. The final deliverable for this project was a comprehensive lake management plan with specific management recommendations. This scope was intended to summarize the detailed scope provided in the grant application and does not supersede grant application specifics. Data, records, and reports, including GIS-based maps and digital images, were submitted to the Department in a format specified by the regional Lake Coordinator.

Lake Planning – Wild Goose Lake Water Quality & Biological Monitoring
04/01/2008 – Active

- The Polk County Land and Water Resources Department is completing a second appraisal study and report on Wild Goose Lake. This project will compare results to the 2003 appraisal project. Project activities included: water quality trend monitoring, phytoplankton and zooplankton community snapshots, macrophyte point-intercept monitoring and mapping, macroinvertebrate assessment, lake level and precipitation monitoring, and watershed mapping and WiLMS modeling. The final deliverable for this project was a compilation of results from the various studies and a comprehensive report with specific management recommendations.



Apple River

Historic monitoring data, including Citizen Lake Monitoring Network information, was included in the trends analyses. The draft report was submitted to regional Lake Coordinator for review before finalization. This scope was intended to summarize the detailed scope provided in the grant application and does not supersede grant application specifics. Data, records, and reports, including GIS-based maps and digital images, were submitted to the Department in a format specified by the regional Lake Coordinator.

Lake Planning – Bone Lake Management Plan-Finalization Project – 04/01/2007 - Complete

- Bone Lake Management District sponsored a project to complete an aquatic plant survey and management plan. The APM Plan will become a significant component of a future comprehensive lake management study and plan. Special Conditions: 1) WDNR’s Aquatic Plant Management in Wisconsin guidance was to be followed for point-intercept survey monitoring and aquatic plant management plan development. 2) Draft public surveys were to be reviewed and approved by the Department before being initiated. This scope was intended to summarize the detailed project scope provided in the application and does not supersede those application tasks/deliverables. Data, records, and reports, including GIS-based maps and digital images were submitted to the Department in a format specified by the regional Lake Coordinator. Grantee or consultant provided DNR Lake Coordinator with a draft for comment on report adequacy prior to making final payment to the consultant. DNR received both paper and electronic copies of the final report along with, or prior to submission of grantee’s final payment request.

Lake Planning – Sediment & Core Analysis Project 04/01/2007 – Complete

- The Big Round Lake Protection and Rehabilitation District conducted a project to analyze a sediment core from the deep area of Big Round Lake. The analysis of this sediment core may help to evaluate the history of water quality in the lake and possibly help in making the following determinations: 1) Determine impact of installation of the dam on the lake’s ecosystem. 2) Determine changes in nutrients during the last 130 years. 3) Determine if the frequency of algal blooms has increased during the last century, and 4) Determine if the macrophyte growth has changed during the last century. Project deliverables included a final report detailing the findings of the core analyses and a listing of any past significant water quality or lake ecosystem “changes” that are revealed from these analyses. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles. This scope was intended to summarize the detailed project scope provided in the application and does not supersede those application tasks/deliverables. Data, records, and reports, including GIS-based maps and digital images, were submitted to the Department in a format specified by the regional Lake Coordinator. Grantee or consultant provided DNR Lake Coordinator with a draft for comment on report adequacy prior to making final payment to the consultant. DNR received both paper and electronic copies of the final report along with, or prior to submission of grantee’s final payment request.

Lake Planning – Pipe & North Pipe Lakes-Lakeshore & Subwatershed Analysis-#1 & #2 04/01/2007 – Complete

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- Pipe and North Pipe Lakes Protection and Rehabilitation District sponsored a two-phase watershed, shoreline, and aquatic plant community assessment, action planning, and implementation project. The final deliverable was a report containing collected data summaries, aquatic plant and shoreline assessments, nutrient loading and modeling results, public outreach summary and presentations, and an implementation plan that included preliminary watershed best-management-practice designs, feasibility, and cost estimates/comparisons. The purpose of this project was to determine where and what lake protection activities are needed. Phase 1 included: 1) Field reconnaissance, photographing, and mapping of tributary, wetland, and erosion areas. 2) Ground truthing of previous (sub)watershed delineation and refinement of water quantity (HydroCAD) and quality models (WiLMS, etc.) using collected data and various land use predictions/scenarios. 3) Watershed BMP alternatives analysis and action planning, including estimated costs, funding sources, and schedules for prioritized recommendations. 4) Communications with landowners about easements for potential BMP implementation. 5) Stakeholder meetings and updates. Data, records, and reports, including GIS-based maps and digital images, were submitted to the Department in a format specified by the regional Lake Coordinator. The Department of Natural Resources was provided with both a paper and an electronic copy of the final report. Phase 2 included: 1) Whole-lake shoreline assessment, including identification and mapping of areas of erosion and inadequate buffering. 2) Point-intercept aquatic plant surveys (one for each lake) and two voucher specimen collections, following WDNR's Aquatic Plant Management in Wisconsin guidance. 3) Early-season curly-leaf pondweed survey. 4) Written summary of aquatic plant survey, results, and recommendations, including a comparison to historic surveys. 5) Stakeholder meetings and updates. Special Condition: Shoreline assessment methodology was approved by the Department before survey takes place. Data, records, and reports, including GIS-based maps and digital images, were submitted to the Department in a format specified by the regional Lake Coordinator. The Department of Natural Resources was provided with both a paper and an electronic copy of the final report.

Lake Protection Grant – Amery Lakes Management Plan Implementation 09/01/2006 – Active

- The City of Amery in partnership with the Amery Lakes District developed a storm water management plan/ordinance and implemented run-off control best management practices in priority (i.e. high nutrient load) sub-watersheds. Specifically, the city: 1) Updated existing ordinances and developed a storm water management plan to reduce nonpoint source pollution; 2) Designed/built wetland basins and rain gardens at Soldier's Field; 3) Designed/built rain gardens at Flagpole Park; 4) Selected and installed storm water control (e.g. rain gardens and barrels, shoreline buffers, porous pavement, and/or infiltration trenches) practices at demonstration sites within city limits; 5) Developed example storm water education materials that will be applicable to other small cities; 6) Inventoried and measured in-lake habitat, including undeveloped shoreline and critical areas and developed plans for long-range protection and for measuring success of storm water control BMPs. Special conditions: * Project design plans needed approval before project began, and applicable water regulation permits were issued before construction activities commenced. * Best management practices installed at Soldier's Field and Flagpole Park will be maintained for a minimum of 10 years. * An operation and maintenance plan were developed for care of the BMPs. A final report in PDF format summarizing the results of the project as well as copies of databases, maps, GIS files, guidebooks, ordinances or any other products resulting from the project was provided to the Department for review prior to final payment.

Lake Planning –Limnological Institute: Little Blake Water Quality & Plankton Monitoring Project 04/01/2004 – Complete

- The Limnological Institute in cooperation with the Little Blake Lake Association and the Polk County LWCD proposed to conduct monitoring to assess and characterize the water quality, phytoplankton and zooplankton community structure, and other related factors on Little Blake Lake in Polk County. Specific conditions for this grant project included frequency of sampling, parameter lists, and methodologies as identified and agreed to in correspondence between the Department and the Limnological Institute. Specific deliverables for this grant project included: * A report describing the ecological significance and importance of algae and zooplankton populations; * A copy of the quality assurance protocol for the multi-sensor probe; * A final report compiling all information collected during the project activities listed above. Ongoing project activities were disseminated via newsletter (s), meeting (s), and final report mailings. The Department was provided with both a paper copy and an electronic copy of the final report.

Lake Planning – Little Blake Aquatic Plant & Invertebrate Monitoring Project 04/01/2004 – Complete

- The Limnological Institute assessed and characterized the current aquatic plant community structure, littoral aquatic macroinvertebrate community structure, and shoreline land use for Little Blake Lake in Polk County. An aquatic plant management plan was developed including a comprehensive management strategy focusing on the control and prevention of exotic plants and enhancing the native plant community. All aquatic plant transect data, including

reporting the Relative Abundance & Frequency of Occurrence and other basic statistics (including the Floristic Quality Index), were summarized and reported in table format in the final report. Aquatic macroinvertebrate monitoring was conducted twice in 2004 to assess possible impacts of monotypic aquatic plant beds on the density and diversity of aquatic insects. The macroinvertebrate community structure for all samples was broken down to Lowest Practical Taxonomic Unit (LPTU) using Hilsenhoff's most current taxonomic key for each habitat type (treated vs. untreated for the following: high density crispus beds, mixed beds, and native beds). A unit independent measure of the variability of samples coming from each specific habitat type (six in all) using the coefficient of variation reported in table format was also provided. The methodology for the shoreline/riparian zone survey was submitted to Jim Cahow, by June 15, 2004 and was summarized in the project final report. Recommendations on how to decrease negative impacts from existing shoreland management were made to the lake district and property owners. Shoreline restoration goals were established, impacted shoreland areas contributing nonpoint source pollution were prioritized, and exotic species were mapped.

Lake Planning – Big Blake Aquatic Plant & Invertebrate Monitoring Project 04/01/2004– Complete

- The Blake Lake Protection and Rehabilitation District assessed and characterized the current seasonal changes in the aquatic plant community structure, littoral aquatic macroinvertebrate community structure, and shoreline land use for Blake Lake in Polk County. The current aquatic plant community was compared with previous data. An updated aquatic plant management plan was developed, including a comprehensive management strategy focusing on the control and prevention of exotic plants and enhancing the native plant community. All aquatic plant transect data including reporting the Relative Abundance & Frequency of Occurrence and other basic statistics, including the Floristic Quality Index, were summarized and reported in table format in the final report. Aquatic macroinvertebrate monitoring was conducted twice in 2004 to assess possible impacts of monotypic aquatic plant beds on the density and diversity of aquatic insects. The macroinvertebrate community structure for all samples was broken down to Lowest Practical Taxonomic Unit (LPTU) using Hilsenhoff's most current taxonomic key for each habitat type (treated vs. untreated for the following: high density crispus beds, mixed beds, and native beds). A unit independent measure of the variability of samples coming from each specific habitat type (six in all) using the coefficient of variation reported in table format was also provided. The methodology for the shoreline/riparian zone survey was submitted to Jim Cahow, by June 15, 2004 and was summarized in the project final report. Recommendations on how to decrease negative impacts from existing shoreland management were made to the lake district and property owners. Shoreline restoration goals were established, impacted shoreland areas contributing nonpoint source pollution were prioritized, and exotic species were mapped.

Lake Planning – Big Blake Water Quality & Plankton Monitoring Project 04/01/2004– Complete

- The Blake Lake Protection and Rehabilitation District proposed to conduct monitoring to assess and characterize the water quality, phytoplankton and zooplankton community structure, and other related factors on Big Blake Lake in Polk County. Ongoing project activities were disseminated via newsletter(s), meeting(s), and final report mailings. Specific conditions for this grant project included frequency of sampling, parameter lists, and methodologies as identified and agreed to in correspondence between the Department and the Limnological Institute. Specific deliverables for this grant project included: * A report describing the ecological significance and importance of algae and zooplankton populations; * A copy of the quality assurance protocol for the multi-sensor probe; * A final report compiling all information collected during the project activities listed above. The Department was provided with both a paper copy and an electronic copy of the final report.

Lake Planning – Bone Lake Water Quality & Biological Monitoring Project 04/01/2004 – Complete

- The Bone Lake Protection and Rehabilitation District proposed to conduct monitoring to assess and characterize the water quality, phytoplankton and zooplankton community structure, and other related factors on Bone Lake in Polk County. Ongoing project activities were disseminated via newsletter(s), meeting(s), and final report mailings. Specific conditions for this grant project included frequency of sampling, parameter lists and methodologies as identified and agreed to in correspondence between the Department and the Limnological Institute. Specific deliverables for this grant project included: * A report describing the ecological significance and importance of algae and zooplankton populations; * A copy of the quality assurance protocol for the multi-sensor probe; * A final report compiling all information collected during the project activities listed above.

Lake Planning – Bone Lake Aquatic Plant Monitoring Project 04/01/2004 – Complete

- The Bone Lake Management District assessed and characterized the current aquatic plant community structure, littoral aquatic macroinvertebrate community structure, and shoreline land use for Bone Lake in Polk County. An aquatic plant management strategy was developed and incorporated into the Bone Lake Management Plan. The strategy provided baseline data for the development of an aquatic plant management plan. All aquatic plant transect data, including reporting the Relative Abundance & Frequency of Occurrence and other basic statistics, including the Floristic Quality Index, will be summarized and reported in table format in the final report. Aquatic macroinvertebrate monitoring was conducted twice in 2004 to assess possible impacts of monotypic aquatic plant beds on the density and diversity of aquatic insects. The macroinvertebrate community structure for all samples was broken down to Lowest Practical Taxonomic Unit (LPTU) using Hilsenhoff's most current taxonomic key for each habitat type (treated vs. untreated for the following: high density crispus beds, mixed beds, and native beds). A unit independent measure of the variability of samples coming from each specific habitat type (six in all) using the coefficient of variation reported in table format was also provided. The methodology for the shoreline/riparian zone survey was submitted to Jim Cahow, by June 15, 2004 and was summarized in the project final report. Recommendations to reduce shoreline development impacts to the lake were made to the lake district and property owners.

Lake Planning – Riparian Stewardship & Education Project 04/01/2004 – Complete

- The Polk County Land and Water Resources Department sponsored a project in cooperation with the Polk County Association of Lakes and Rivers (PCALR) and Wisconsin Association of Lakes. The project included a multimedia education project targeting lakefront property owners, other residents, and visitors to Polk County. The project included the development of a series of posters, two brochures, updates to the "Who's Who: Contacts for your Waterfront Property Question", public service announcements, an E-Lake Letter, a link to the county web site. The project also served to increase participation in the PCALR. PCALR also set up a display at the 2005 Annual Lakes Convention summarizing their project and the success of it. Specific deliverables for this project included a summary report detailing the number of people reached and a review of the success of the project, in addition to copies of the educational materials developed for the project.

Lake Planning – Polk County: Non-Point Education for Municipal Officials Project 04/01/2003 – Complete

- The Polk County Land and Water Resources Department conducted a nonpoint source pollution education program in the St. Croix Basin area of northwestern Wisconsin. This project identified one "Pilot" community from the municipalities, counties, and towns of the project area. A "build out" analyses of a representative community was undertaken utilizing GIS technology to build a portrayal of what that community will look like if subjected to maximum development under current zoning scenarios. A customized presentation was developed and shown to groups of officials, local organizations, and other local land use decision-makers from that community. It was hoped that this type of initial customized presentation would "open the door" for working with other communities to provide important and useful information to lake residents, lake association representatives, lake leaders, and the general public about the negative impacts of uncontrolled nonpoint source pollution on the lakes and waters of the St. Croix Basin area. Specific deliverables for this project included one prototype presentation that focuses on a small urban community in a water-rich watershed that can be used throughout the region to engage and educate policy makers about the links between land use and water quality. The DNR was provided with both a paper copy and an electronic copy of the final report.

Lake Planning – Apple River Flowage Aquatic Plant Management Study 04/01/2003 – Complete

- The Polk County Land and Water Resources Department, in cooperation with the Apple River Protection & Rehabilitation District, conducted an Aquatic Macrophyte Plant Survey, and conducted a public education workshop, and developed an Aquatic Macrophyte Management Plan on and for the Apple River Flowage in Polk County. Activities involved with this project included; two aquatic plant distribution surveys during the summer of 2003, an aquatic plant education workshop, an on-going information and education program, and a project report including a plant management plan. Specific deliverables for this project included; * Final report that addressed the findings of the lake macrophyte surveys and an aquatic plant management plan. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Planning – Pipe Lake Comprehensive Management Plan 04/01/2003 – Complete

- The Pipe Lake Property Owners Association conducted a comprehensive lake management planning project involving a study and evaluation of Pipe Lake in Polk County. Project activities included; conducting an in-lake water

quality monitoring survey, conducting an aquatic plant survey, conducting a watershed runoff survey, conducting a shoreland habitat conditions survey, conducting a wildlife observation survey, conducting a watershed analysis and developing a nutrient budget, developing a model for calculating lake response to phosphorus loadings, conducting an information and education program, and the development of a comprehensive lake management plan. Specific deliverables for this grant project included: 1) A final technical comprehensive lake management plan and report that covers all project activities. 2) A final non-technical summary report in a newsletter form that can be widely distributed to lake users and lake residents. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Planning – Big Round Lake Comprehensive Management Plan Project 04/01/2003 – Complete

- The Big Round Lake Protection and Rehabilitation District conducted a comprehensive lake management planning project involving a study and evaluation of Big Round Lake in Polk County. Project activities included; conducting an in-lake water quality monitoring survey, conducting an aquatic plant survey, conducting a watershed runoff survey, conducting a shoreline septic leachate survey, conducting a shoreland habitat survey, conducting a wildlife observations survey, conducting a watershed analysis and developing a nutrient budget, developing a model for calculating lake response to phosphorus loadings, conducting an information and education program, and the development of a comprehensive lake management plan. Specific deliverables for this grant project included: A final technical comprehensive lake management plan and report that covers all project activities and recommendations. A final non-technical summary report in a newsletter form that can be widely distributed to lake users and lake residents. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Planning – North Pipe Lake Comprehensive Management Plan 04/01/2003 – Complete

- The Pipe Lake Property Owners Association conducted a comprehensive lake management planning project involving a study and evaluation of North Pipe Lake in Polk County. Project activities included; conducting an in-lake water quality monitoring survey, conducting an aquatic plant survey, conducting a watershed runoff survey, conducting a shoreland habitat conditions survey, conducting a wildlife observation survey, conducting a watershed analysis and developing a nutrient budget, developing a model for calculating lake response to phosphorus loadings, conducting an information and education program, and the development of a comprehensive lake management plan. Specific deliverables for this grant project included: 1. A final technical comprehensive lake management plan and report that covered all project activities. 2. A final non-technical summary report in a newsletter form that was widely distributed to lake users and lake residents. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Planning – Amery Lakes Comprehensive Management Plan Development Project 10/01/2002 – Complete

- The Amery Lakes Protection District conducted a comprehensive lake management planning project involving a study and evaluation of the three Amery Lakes (Pike Lake and North and South Twin lakes) in Polk County. This three-phase project included the following activities; Phase I - project kick-off news release and meetings, lake sediment and water quality sampling, and watershed data review & mapping; Phase II - field data collection, septic system survey, watershed delineation and evaluation, macrophyte survey, sensitive area survey, lake modeling, and compilation of draft lake management plan; Phase III - preparation of final project results and best management practice recommendations, preparation of Final Lake Management Plan and, release of project results. Specific deliverables for this grant project included: A comprehensive final report, including the results of all of the project activities and the developed management strategies. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Planning – Polk County: Lost Lake Assessment Study 04/01/2002– Complete

- The Polk County Land & Water Resources Department conducted a comprehensive lake management planning project involving a study and evaluation of Lost Lake in Polk County. Project activities included: delineating the watershed, conducting a comprehensive in-lake water quality survey, conducting an exotic species inventory, compiling a land use and soils inventory, monitoring lake level and precipitation, conducting a lake sediment survey, conduct-

ing a biodiversity survey, and conducting a lake modeling assessment to determine hydrologic and nutrient budgets for the lake. The project data was utilized to generate a final project report. Specific deliverables for this grant project included: 1) A comprehensive final report, including the results of all of the project activities and the developed management strategies. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Planning – Wild Goose Lake Planning - Phase I 04/01/2001 – Complete

- The Polk County Land & Water Resources Department conducted a comprehensive lake management planning project involving two phases of study and evaluation on Wild Goose and East Lakes in Polk County. Phase 1 project activities included: delineating the watershed, compiling of historical data, conducting a comprehensive in-lake water quality survey, conducting a critical habitats survey, compiling a comprehensive land use and soils inventory with phosphorus loadings estimates, monitoring lake level and precipitation, conducting a lake bottom hydrographic survey update, conducting a shoreline video documentation survey, compiling fisheries census and management data, and conducting an on-going public participation, media involvement, and information and education program. The results of the Phase 1 and Phase 2 study projects were combined to generate a comprehensive lake management plan for Wild Goose Lake and East Lake and the watershed. Specific deliverables for this grant project included: complete records of all phase 1 project activities listed above and in the application project description. Specific deliverables for this phased grant project (Phase 1 and Phase 2) included: A comprehensive lake management plan for Wild Goose Lake and East Lake and the watershed. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Planning – Wild Goose Lake Planning - Phase II 04/01/2001 – Complete

- The Polk County Land & Water Resources Department conducted a comprehensive lake management planning project involving two phases of study and evaluation on Wild Goose Lake and East Lake in Polk County. Phase 2 project activities included; conducting a watershed biodiversity survey, conducting an exotic species inventory, conducting a sociological landowner survey, conducting a watershed inflow storm event sampling survey, developing hydrologic and nutrient budgets and a computer lake response model, conducting a lake sediment dredge sample and analysis survey, conducting an on-going public participation, media involvement, and information and education program, and completing a comprehensive lake management plan. The results of the Phase 1 study project were combined with this Phase 2 study project to generate a comprehensive lake management plan for Wild Goose Lake and East Lake and the watershed. Specific deliverables for this grant project included: 1.) Complete records of all phase 2 project activities listed above and in the application project description. 2.) A comprehensive lake management plan for Wild Goose Lake and East Lake and the watershed. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

River Planning Grant – Polk County: Apple River Association Development & I&E Project 10/18/2000 – Complete

- The Polk County Land & Water Resources Department conducted an organizational development and informational & educational project in the Apple River Watershed in Polk County. Activities involved with this project included; organization of a Citizen Forum to collect local input on river threats, etc., assist in the creation of an Apple River Association, development of outreach materials and assist in the development of an Apple River Association newsletter, conducting a sociological land owner survey, conducting public meetings and generating news releases on project status and results, and conducting a shoreline video survey. Reports of ongoing project activities were disseminated via brochures(s), meeting(s) and workshop(s), and the preparation of a final report. Specific deliverables for this grant project included: A final report that summarizes the grant project activities and included examples of outreach materials that were developed. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by brochure(s), public meeting(s), and local newspaper articles.

Lake Planning –North Pipe: Lake & Watershed Study & Management Plan 04/01/2000– Complete

- The Polk County Land Conservation Department conducted a comprehensive lake water quality monitoring, sociological survey, watershed evaluation, lake modeling, etc. study of North Pipe Lake in Polk County. Project activities included: compiling watershed map, conducting a landowner survey, digitizing watershed land uses and estimating

P loadings, collecting lake water quality samples, monitoring and mapping groundwater, monitoring lake level and precipitation, monitoring tributary and outlet water quality, updating lake bottom topography, conducting a shoreline video survey, compiling fisheries census data, continuing a project information & education program via newsletter(s), meeting(s), and news release(s), and compiling a final report, including a comprehensive lake management plan. Specific deliverables for this grant project included: 1) A final report compiling all information collected during the project activities listed above. 2) A comprehensive lake management plan. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Planning – Polk County: Pipe: Lake & Watershed Study, Lake Management Plan 04/01/2000 – Complete

- The Polk County Land Conservation Department conducted a comprehensive lake water quality monitoring, sociological survey, watershed evaluation, lake modeling, etc. study of Pipe Lake in Polk County. Project activities included: compiling watershed map, conducting a landowner survey, digitizing watershed land uses and estimating P loadings, collecting lake water quality samples, monitoring and mapping groundwater, monitoring lake level and precipitation, monitoring tributary and outlet water quality, updating lake bottom topography, conducting a shoreline video survey, compiling fisheries census data, continuing a project information & education program via newsletter(s), meeting(s), and news release(s), and compiling a final report, including a comprehensive lake management plan. Specific deliverables for this grant project included: 1) A final report compiling all information collected during the project activities listed above. 2) A comprehensive lake management plan. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Planning – Milltown Comp. Land Use Plan, Phase 3 Analysis & Recommendations 10/01/1999 – Complete

- The Town of Milltown proposed to conduct a three-phase project to develop a comprehensive land use plan. Phase 2 of the project - Inventory and Research Existing Conditions, was proposed to be conducted under a concurrent Lake Planning application. This grant involved the proposal of the Town of Milltown to conduct Phase 3 of this Comprehensive Land Use Plan - Analysis & Recommendations for Preferred Future Conditions. Specific activities of this Phase 3 project included, (1) Analysis of the products of the phase 1 & 2 projects, (2) Designation of land uses necessary to implement water quality protection recommendations, (3) Identification of land uses needed for future developmental demand, and (4) Recommendation of implementation strategies and tools. Specific deliverables for this grant project included: * A comprehensive land use plan document, complete with maps, recommendations, and an implementation strategy. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Planning – Milltown Comp. Land Use Plan-Phase 2, Inventory & Research 04/01/1999 – Complete

- Town of Milltown Comprehensive Land Use Plan - Phase 2: Inventory & Research Existing Conditions Project: the Town of Milltown proposed to conduct a three-phase project to develop a comprehensive land use plan. This grant involved the proposal of the Town of Milltown to conduct Phase 2 of this Comprehensive Land Use Plan - Inventory and Research Existing Conditions. Specific activities of this Phase 2 project included, (1) Analysis of township demographic structure, (2) Evaluation of Physical and Biological characteristics, including wetlands, lakes, watersheds, sensitive areas, etc., (3) Review of county, state, and federal resource management programs to determine current and potential town impact, and (4) Updating land use map to current conditions. Specific deliverables for this grant project included: maps of existing land uses, land and resource protection programs and natural areas, and physical and biological characteristics, statistical data presented as tables and graphs, narrative text, charts and presentation materials from public information meetings. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Protection Grant – Barron County Land Use Plan, 1998-99 09/01/1998 – Complete

- Barron County proposed to develop a land use plan to assist the county in protecting its valuable land and water resources. The Barron County Land Use Plan had the following components; 1) Inventory and Analysis of the Natural Environment, 2) Inventory and Analysis of the “Built” Environment, 3) Plan Development, 4) Plan Implementation, 5) Public Involvement/Education, and 6) On-Going Education. The preparation of the Barron County Land Use Plan

involved a variety of stakeholders, including town associations, realtors, lake associations, property owners, etc. A planning committee, which was representative of these interested parties, was established. Project deliverables included the final land use plan. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles. The Department of Natural Resources was provided with periodic reports on the progress of the plan development.

Lake Protection Grant – Barron County: Riparian Purple Loosestrife Control Project 04/01/1998 – Complete

- Barron County proposed to conduct a county wide lakes project to control and significantly reduce the population of purple loosestrife in the riparian areas of the Barron County. This two year project included the following activities; 1) checking historic information on purple loosestrife locations and doing a re-inventory of possible sites to treat, 2) removing seed heads and treating with RODEO herbicide, 3) treating with biological means (Galerucella beetles) where needed, 4) landowners were visited and given information on why the purple loosestrife control is needed. The final report was made available to all participants. Two copies of the final report were given to the Department before final payment approval was granted. Electronic copies were made available upon request of all final reports and maps.

Lake Planning –Bone Lake-Phase 3 Lake Management Plan 04/01/1998 – Complete

- The Bone Lake Management District proposed to develop and complete a comprehensive lake management plan, which would constitute a Phase 3 project in the process towards the development of a comprehensive Lake Management Plan for Bone Lake, Polk County. The project activities included; 1) establishment of long term water quality goals for Bone Lake, 2) modeling and evaluating potential watershed management measures, septic systems loading, and internal loading, 3) identifying and evaluating riparian management practices, and 4) preparing the Bone Lake Management Plan. Project deliverables included a comprehensive lake management plan for Bone Lake. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Planning – North White Ash Lake Macrophyte Management Planning 04/01/1997 – Complete

- White Ash Lake Protection and Rehabilitation District proposed to develop a macrophyte management plan for North White Ash Lake. Project activities also included a macrophyte survey and a lake district membership survey.

Lake Planning – White Ash Lake Macrophyte Management Planning 04/01/1997 – Complete

- The White Ash Lake Protection and Rehabilitation District proposed to develop a macrophyte management plan for White Ash Lake. Project activities included a macrophyte survey and a lake district membership survey.

Lake Planning – Blake Lake Macrophyte Survey and Management Plan 04/01/1997 – Complete

- Blake Lake Protection and Rehabilitation District proposed to conduct a macrophyte survey and develop a macrophyte management plan for Blake Lake. Project activities included conducting two macrophyte surveys in June and August of 1997, conducting a survey of shoreland property owners, and completing a macrophyte management plan.

Lake Protection Grant - Polk County Watershed Protection land Use Plan & Ordinances 02/25/1997 – Complete

- Polk County proposed to develop a comprehensive land use management plan to protect its lakes, streams, wetland, and ecosystems. Project activities included 1) community involvement, 2) socioeconomic inventory and analysis, 3) physical features analysis and mapping, 4) plan development, and 5) plan implementation.

Lake Planning – Barron County Lakes Data Collection and Classification 03/28/1996 – Complete

- Barron County proposed to create a database of information on the county's lakes. A document was produced suitable for the public's use that included information about each lake. They also classified the county's lakes according to land uses, water quality, and sensitivity to development.

Lake Planning – Bone Lake Water Quality Study 09/29/1995 – Complete

- 1) Monitored the water quality of Bone Lake. 2) Prepared time-depth isopleth diagrams of temperature, dissolved oxygen and phosphorus. 3) Prepared maps depicting early and late summer macrophyte growth. 4) Collected lake level and precipitation data. 5) Evaluated land use within the watershed. 6) Completed surveys to investigate conflicts in water use, fishing, and boating. 7) Prepared a final report addressing the results of the above tasks. 8) Disseminated information on the project results to the public by newsletter and newspaper articles.

Lake Planning – Bone Lake Hydrologic and Phosphorus Budget Development 09/29/1995 – Complete

- Determined hydrologic and nutrient budgets and the sediment-phosphorus release rates for Bone Lake: 1) Collected sediment cores from the lake and conducted sediment-phosphorus release analyses. 2) Developed annualized hydrologic budget for the lake. 3) Developed annualized phosphorus budget for the lake. 4) Prepared a final report summarizing the results of tasks 1-3. 5) Disseminated information on the project results to the public by newsletter, and local newspaper articles.

Lake Protection Grant – City of Amery: Pike Lake - York Acquisition 03/02/1994 – Complete

- The City of Amery acquired approximately 32.7 acres of land along the northwest side of Pike Lake. Project costs included the cost of the parcel (\$160,500) and the appraisal cost (\$950).

Monitoring

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.

Loon Watch Monitoring Study

LoonWatch, a program of the Sigurd Olson Environmental Institute, protects common loons and their aquatic habitats through education, monitoring, and research. Though our primary focus is Wisconsin, our education and research activities extend to Upper Great Lakes region, such as Michigan and Minnesota. We also lend support to North American conservation efforts by working with loon conservation organizations.

Volunteer Monitoring

The Citizen Lake Monitoring Network, the core of the Wisconsin Lakes Partnership, involves over 1,000 citizen volunteers statewide. The goals are to collect high quality data, to educate and empower volunteers, and to share this data and knowledge. Volunteers measure water clarity, using the Secchi Disk method, as an indicator of water quality. This information is then used to determine the lakes trophic state. Volunteers may also collect chemistry, temperature, and dissolved oxygen data, as well as identify and map plants, watch for the first appearance of Eurasian water-milfoil near boat landings, or alert officials about zebra mussel invasions on Wisconsin lakes. Monitoring work in this watershed consists of lake monitoring and surveys for water quality, aquatic plants, aquatic invasive species, and ice observations.

Stream Volunteer Monitoring - Water Action Volunteers

There are no citizen monitors in the SC06-Upper Apple River Watershed. For information on how to become a Volunteer Stream Monitor, visit-<http://watermonitoring.uwex.edu/index.html>.

Basin/Watershed Partners

Blake Lake Protection & Rehabilitation District, Bone Lake Management District, Amery Lakes Protection & Rehabilitation District, White Ash Lake Protection & Rehabilitation District, Pipe & N. Pipe Lake Protection & Rehabilitation District, Big Round Lake Protection And Rehab District, Apple River Protection & Rehabilitation District

Recommendations

- The City of Amery should monitor for pollutants which may be present in the wastewater influent stream as a result of industrial contributors discharging process wastewater to the municipal wastewater treatment plant (Type A).
- Self-help monitoring and participation in the Lakes Planning Grants program should be actively encouraged on those lakes ranked high for these activities and applications for these programs from lakes not ranked should be evaluated on a case by case basis.

- Aquatic plant management “sensitive areas” should be designated for the 14 lakes ranked high for this activity.
- Water quality assessment monitoring should be conducted on the 10 lakes recommended as high priority for this activity.
- Basic waters inventory monitoring should be conducted on the twenty lakes recommended for this activity.
- WRM should work with the White Ash Lakes District to initiate the long range lake management planning process and assist them to implement the recommendations of the 1980 feasibility study.
- WRM should monitor the present water quality conditions in Staples to assess any changes which may have occurred since the implementation work of the early 1980’s.
- WRM should encourage the Pipe Lake Association to apply for a Lakes Planning Grant to document the current water quality status, assess watershed conditions, and initiate the lake management plan process. Lakes Implementation Grant funding for protection purposes should also be a high priority.
- WRM should provide assistance to the Bone Lake District in pursuing the implementation of the management recommendations contained in the 1980 study.
- WRM should assist the Big Blake Lake District in formulating a long range lake management plan and implementing any reasonable recommendations from the 1981 study.
- WRM should assist the Big Round Lake District in a Lakes Planning Grant application to pursue a long range lake management plan and help them to implement the recommendations of the 1980 study.
- WRM should assist the Apple River Flowage District in completing their current Lakes Planning Grants project and pursuing any recommendations for implementation practices from this or the 1979 study.
- WRM should assist the Amery Lakes District in completing their current Lakes Planning Grants project. Assistance should also be provided to pursue funding to implement any recommendations from the current study as well as the 1982 study.
- District WRM should consider the Upper Apple River Watershed a medium priority for possible selection as a priority watershed under the Wisconsin Nonpoint Source Water Pollution Abatement Program (Type B).
- Fish tissue monitoring should be conducted on the four lakes listed as high priority for this activity.
- Horseshoe, Pike, Pipe, Apple River Flowage, Big Blake, Big Round, Bone (7-35- 16W), Staples, North Twin, South Twin, White Ash, and North White Ash lakes should be considered a high priority for possible selection as priority watershed projects through the Wisconsin Nonpoint Source Pollution Abatement Program (Type B).

Contributors

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Wisconsin DNR’s mission involves preserving, protecting, and restoring natural resources. Watershed Planning provides a strategic review of water condition to enhance awareness, partnership outreach, and the quality of natural resource management.

Upper Apple River Watershed