

BEAR LAKE WATERSHED MANAGEMENT PLAN

SUMMARY

INTRODUCTION

Bear Lake is a 194 acre natural lake located in the towns of Little Wolf and Royalton, Waupaca County, Wisconsin. Bear lake and its watershed are part of a popular recreation/tourism region and are used extensively for fishing, swimming, boating, waterskiing, camping and other recreational activities. Land uses in the 2321 acre watershed are primarily agricultural or natural areas with some residential and commercial development.

Watershed residents have expressed concern about failing septic systems; nuisance growths of aquatic vegetation and degraded water quality in Bear Lake through their Bear Lake Association. In 1979, the Association contacted the Department of Natural Resources (DNR) for assistance in defining and solving Bear Lake's water quality problems. DNR staff cooperated with local staff of the Waupaca County Land Conservation Department, University of Wisconsin-Extension, U.S. Soil Conservation Service, U.S. Agriculture Stabilization and Conservation Service, Waupaca County Shoreland, Zoning and Sanitary Code Administration and the Bear Lake Association to collect information about the Bear Lake watershed and to prepare a lake protection plan.

SUMMARY

The plan concludes that Bear Lake is becoming over-enriched and has problems with locally abundant aquatic plant growth, periodic algae blooms and oxygen depletion in deeper water. Phosphorus inputs to the lake are excessive. Runoff of sediments and phosphorus from croplands, barnyards, pastures and developed areas needs to be reduced by 60-80% to avoid further deterioration in lake water quality. Without substantial phosphorus reductions, Bear Lake will likely become more enriched (eutrophic) with increased algae and submerged plant growth, expanded oxygen depletion and possible negative impacts on the existing warmwater fishery. Although septic systems contribute a smaller portion of the total phosphorus load to the lake, failing systems are causing nearshore water quality problems and could pose a health threat to swimmers.

The following summarizes the findings of the Bear Lake Study and suggests how residents can work together with assistance from various agencies and programs to improve and protect Bear Lake's water quality and warmwater fishery.

PUBLIC CONCERNS

Public use and perceptions of water quality were assessed from a questionnaire mailed to 161 watershed residents. Forty-five percent of the questionnaires were completed and returned. Ninety-four percent of the respondents used Bear Lake for some form of recreation, mostly fishing, swimming, aesthetics (enjoying natural beauty) and boating. The majority of respondents (68%) felt water quality problems do exist and that some action is needed to correct these problems. Excess algae and submerged vegetation were identified as the water quality problems most limiting recreational use of the lake. Eighty-three percent felt that a plan to protect Bear Lake from water quality degradation was desirable.

STATE OF THE LAKE

Aquatic Vegetation

Vegetation surveys indicate that aquatic plants approach nuisance levels in some parts of the lake. Rooted aquatic vegetation is most abundant near the inlet and outlet to Bear Lake and near homes, cottages and two livestock operations on the shoreline. These areas likely receive direct inputs of nutrient-rich runoff. Although excess algae was not observed during water quality surveys, the public questionnaire did identify algae as a problem. It is probable that nuisance blooms do occur periodically but were missed by sampling dates.

Fishery

Fish surveys conducted periodically by the DNR since the 1940's show that Bear Lake has maintained a good warmwater fishery. Primary species include largemouth bass and bluegills, with good populations of northern pike and yellow perch. Other species include pumpkinseed, rock bass, green sunfish, black and yellow bullheads, white sucker, carp and a variety of minnows. Carp do not appear to be overly abundant and pose no major management problems for the Bear Lake fishery. Trout stocking was discontinued in 1963 due to strong competition from warmwater species, light public fishing pressure for trout and unfavorable temperature/oxygen conditions. Future maintenance of the warmwater fishery will depend upon the improvement and protection of water quality in Bear Lake.

Water Quality

Water quality samples were taken from Bear Lake in 1975 and from summer 1980 through spring 1982. Results indicate that Bear Lake is approaching an over-enriched (eutrophic) state due to excess phosphorus loading. The way to control algae and other aquatic plant growth in Bear Lake is to limit the amount of phosphorus entering the lake from watershed runoff and other sources.

Average pH values were slightly alkaline. High total alkalinity indicates that Bear Lake should not be affected by acid rain.

During winter and summer seasons, dissolved oxygen levels were extremely low in the bottom water of Bear Lake. This is caused by the decay of excess vegetation and other organic matter in the lake. Low dissolved oxygen can place stress on fish populations and will prevent most fish from inhabiting the deeper water of the lake.

RECOMMENDATIONS

Overall Goal

Improve and protect Bear Lake's water quality and warmwater fishery by significantly reducing phosphorus and sediment loadings to the lake.

Management Objectives

1. Reduce soil erosion, sedimentation and animal waste runoff from "priority management areas" by 75% through the use of best land management practices.
2. Correct failing septic systems.
3. Maintain the existing warmwater fishery.
4. Protect and maintain wetlands and buffer strips of natural vegetation adjacent to the lake and streams.
5. Encourage the use of erosion control practices on future development in the watershed.

Priority Management Areas

Land areas with the greatest potential for soil erosion, livestock waste runoff or septic system problems were identified as "priority management areas" (see attached map). They were determined from soil information and land use inventories. Management that is focused in priority areas should result in the greatest water quality improvement. Therefore, these areas should receive attention first.

Best management practices for each land use are discussed in the plan along with information on benefits, costs and technical or financial assistance. Good land management should result in benefits to both landowners and lake users.

WHAT YOU CAN DO TO IMPROVE AND PROTECT BEAR LAKE

The best management practices recommended to reduce sediment and phosphorus loading to Bear Lake are voluntary. Lake improvement will depend upon your actions. Here's what you can do.

Residential Areas

First, make sure your own house is in order.

*Check your septic system to make sure it is functioning properly. Your local plumber or the zoning office can assist you in determining the cause of problems or failure. If you and your neighbor both have problems, you may want to consider a joint (cluster) system which may be less expensive.

*Be sure your septic tank is pumped every 2-3 years to remove excess solids and prevent system overloading.

*Keep heavy objects like cars and boats off of the septic system absorption field to prevent soil compaction. Maintain a level grass cover.

*Be conscious of water conservation in your home. Install water saving devices on the toilet tank and shower to reduce wastewater flow to the septic tank.

*Avoid unnecessary disposal of household chemicals which can cause upsets in your septic system.

*Avoid excess fertilization of your lawn. Keep leaves, lawn clippings, household chemicals and debris in areas where they won't be washed into the lake.

*Preserve natural shoreline vegetation to help filter sediment and nutrients out of land runoff and to reduce shoreline erosion. Avoid clipping your lawn right up to the shoreline.

*Plan ahead before you build near waterways. Keep grading and soil disturbance to a minimum. Use mulch, hay bales or diversions to keep runoff from eroding bare soil. Reseed or sod as soon as possible.

Agricultural Lands

If you have a farm, check with the Waupaca County Land Conservation Department (LCD) on how you can develop a farm plan to reduce nutrient-rich runoff to Bear Lake, protect your soil and improve crop productivity. Many management practices cost little or nothing to install. Other practices may be eligible for cost-sharing funds and tax deductions. The LCD and the Agriculture Stabilization and Conservation Service (ASCS) can assist you in applying for funding.

*Use a longer hay rotation and/or conservation tillage on erodible soils and use contour stripcropping on croplands with greater than 4% slopes.

*Maintain buffer zones (25-50 feet) of natural vegetation between surface waters and your cropland, barnyard and pasture. Use grassed waterways where necessary.

*Fence livestock away from Bear Lake and feeder streams. Controlled access areas can be provided for livestock watering.

*Control runoff from barnyards and manure storage areas. Avoid overgrazing on steep slopes or woodlands and near streams.

*Carefully manage the use and disposal of fertilizers, pesticides and herbicides.

Work Together to Protect Bear Lake

As a landowner in the Bear Lake watershed, it is up to you and your neighbors to protect your lake. Collectively, there are additional actions you can take which may not be possible as individuals.

*Work with your Lake Association to form action committees which can address some of the specific objectives mentioned in the plan, i.e.

- Conduct a sanitary survey
- Control shoreline erosion

*Consider forming a lake district with sanitary district powers. Special purpose districts have authority to apply for funding from local, state and federal sources or to raise funds through taxes, loans or special assessments. Funds may be used to assist landowners in replacing failing septic systems or installing agricultural land management practices.

*Involve your town and county representatives in Lake Association meetings.

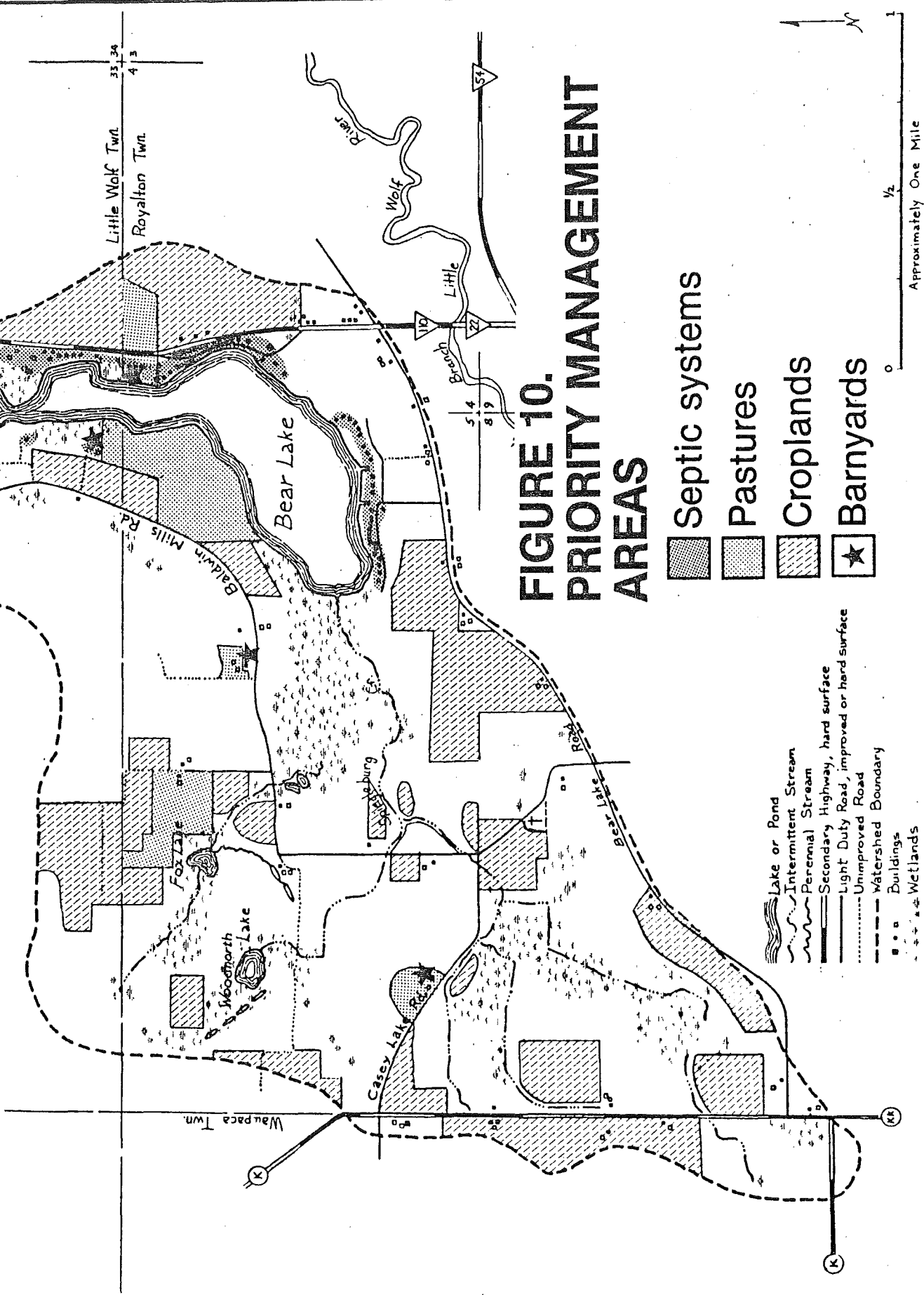
The following local, state and federal agencies can assist you in developing the most cost-effective management practices for the Bear Lake watershed and in seeking funds for implementation.

- Waupaca County Land Conservation Department, Waupaca, Wisconsin
- U.S. Agriculture Stabilization and Conservation Service,
Manawa, Wisconsin
- U.S. Soil Conservation Service, Waupaca, Wisconsin
- University of Wisconsin-Extension, Waupaca, Wisconsin
- Waupaca County Shoreland, Zoning, and Sanitary Code Administration,
Waupaca, Wisconsin
- Wisconsin Department of Natural Resources, Green Bay, Wisconsin

So, where do you go from here? It's up to you!

Bear Lake Watershed

Waupaca Co.



**FIGURE 10.
PRIORITY MANAGEMENT
AREAS**