Archibald Lake Sensitive Area Designation

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February 1998

Introduction

Archibald Lake in Oconto County is a 430 acre hardwater seepage lake averaging 19 feet in depth with a maximum depth of 58 feet (WDNR 1995). Primary species of fish include muskellunge (*Esox masquinongy*), northern pike (*Esox lucius*), walleye (*Stizostedion vitreum*), largemouth bass (*Micropterus salmoides*), panfish (*Lepomis spp.*), yellow perch (*Perca flavescens*), and white sucker (*Catostomus commersoni*). The lake supports a variety of recreational opportunities that include fishing, boating, swimming, and wildlife viewing. Most importantly, Archibald Lake provides an important and unique ecological function to the region which merits protection efforts.

Chapter NR107.05 (3)(l)(1.) of Wisconsin's Administrative Code allows for the designation of sensitive areas within waterbodies if they fall under the following definition:

> "areas of aquatic vegetation identified by the Department as offering critical or unique fish and wildlife habitat, including seasonal or lifestage requirements, or offering water quality or erosion control benefits to the body of water."

These might include:

- Diverse stands of high quality native aquatic plants which help provide a buffer against the invasion of exotic species of plants. An example would be Eurasian water milfoil (*Myriophyllum spicatum*) which is a very aggressive non native aquatic plant increasingly becoming a nuisance in Wisconsin's lakes.

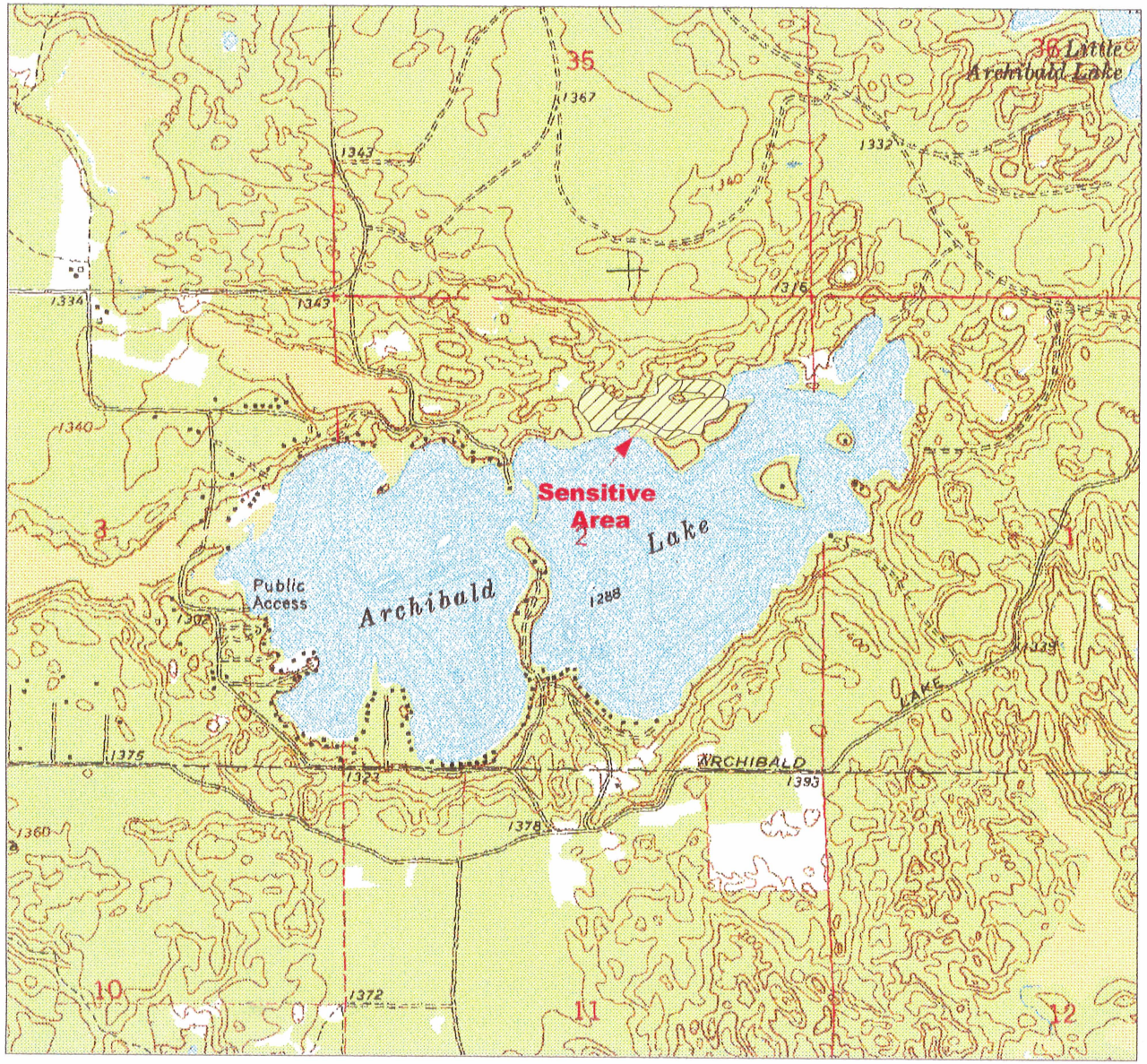
- Areas of vegetation which trap sediments and nutrients flowing into the lake thereby improving water clarity and reducing available nutrients for undesirable plant growth.

- Areas of vegetation which offer spawning, nesting, or feeding habitat for fish and/or wildlife.

- Areas of vegetation whose species composition or hydrologic functions make it an ecologically unique community.

Sensitive areas designations can be used to protect vital aquatic plant communities. Once a sensitive area is identified, the Wisconsin Department of Natural Resources (WDNR) may provide recommendations to lake groups that can be used in implementing further protection measures such as boating and zoning ordinances.

ARCHIBALD LAKE



Map Provided by WDNR Northeast Region Drinking Water and Groundwater Program, M.H. 12-18-1997.

Natural History

The natural features of this portion of Wisconsin are attributed to ancient volcanic activity and consist of some of oldest rocks in the area. The Northern Highland Geological Province, as it is called, was molded during the last glaciation about 15,000 years ago. During this period, the region was divided into six major glacial lobes including the Green Bay lobe which covered Oconto County. The ice within these lobes inched towards their boundaries, reshaping the landscape in the process (Kolev 1995). Most of the undulating landforms seen today are a result of this movement.

Precambrian igneous and metamorphic rocks along with granite constitute the principle bedrock in Oconto County. The insolubility of these geologic features result in relatively infertile waters, moderate alkalinity and somewhat low pH values. In Archibald Lake, alkalinities range around 110 mg/l (total carbonate hardness) and pH near 7.5 which is normal for Oconto County (Carlson, et al 1977).

Site Description

The wetland on the northeast end of Archibald Lake is approximately 21 acres in size. It is clear and shallow (1-7 feet), contains a variety of open water and wetland plant species, and has an undeveloped shoreline. The wetland is immediately bordered by 110 acres of land originally owned by descendants of W.A. Holt. In the mid 1990's, this property was sold to the Weherhauser family and then gifted to the Nature Conservancy (DeWitt-Davidson 1997). This tract is now managed by the US Forest Service. Surrounding this is an additional 2,229 acres of land that was acquired by the US Forest Service in 1990 and became part of the Nicolet National Forest. Much of the area remains in a pre-cultural state.

Concerns

For many years, locals have witnessed a decline in the wetland's natural features. It is theorized that cultural disturbances, primarily in the form of motorized craft, have contributed to this deterioration. Recent studies conducted by the WDNR Bureau of Research indicate "that boats may significantly impact shallow littoral areas, both by reducing water clarity through sediment resuspension and by directly damaging plant beds through sediment scouring and cutting of plant shoots" (Asplund, et al. 1997). The confined size of the Archibald Lake wetland in combination with its shallow depth and flocculent sediments makes it susceptible to these activities.

Flora and Fauna

The Archibald Lake wetland exhibits characteristics associated with a transitional area between an inland lake and upland terrain. This particular situation allows for diverse ecological characteristics which are exhibited in both the flora and fauna of the area.

Plant Survey

On July 15, 1997, Scott Szymanski, Brad Johnson, and Charmaine Robaidek (WDNR Water Resources personnel) along with Matthew Marty (Archibald Lake Association) conducted a cursory survey of the wetland area at the northeast end of Archibald Lake. Flora and fauna as well as depth and bottom type were noted. At this time the following aquatic plants were identified:

Submergent

Common Name	Scientific Name
Bladderwort	*Utricularia vulgaris*
Mud plantain	*Heteranthera dubia*
Muskgrass	*Chara*
Naiad	*Najas sp.*
Native water milfoil	*Myriophyllum spp.*
Flatstem pondweed	*Potamogeton zosteriformis*
Variable pondweed	*Potamogeton gramineus*
Whitestem pondweed	*Potamogeton praelongus*
Stonewort	*Nitella*
Spike rush	*Eleocharis accularis*

Floating

Common Name	Scientific Name
Floating-leaf bur reed	*Sparganium fluctnans*
Floating-leaf pondweed	*Potamogeton natans*
Watershield	*Brasenia schreberi*
White water lily	*Nymphaea sp.*
Yellow water lily	*Nuphar sp.*

Emergent

Common Name	Scientific Name
Arrowhead	*Sagittaria sp.*
Bluejoint	*Calamagrostis canadensis*
Water bulrush	*Scirpus subterminalis*
Hardstem bulrush	*Scirpus acutus*
Cattail	*Typha latifolia*
Cinnamon fern	*Osmunda cinnamomea*
Horsetail	*Equisetum sp.*
Jewelweed	*Impatiens capensis*
Jointed spike rush	*Eleocharis equisetoides*
Marsh bluebell	*Campanula aparinoides*
Marsh cinquefoil	*Potentilla palustris*
Sedge	*Carex lasiocarpa*
Sedge	*Carex comosa*
Sedge	*Carex stricta var. strictior*
Sedge	*Carex stricta*
Smartweed	*Polygonum sp.*
Spike rush	*Eleocharis smallii*
Sundew	*Drosera rotundifolia*
Swamp milkweed	*Asclepias sp.*
Three-way sedge	*Dulichium arundinaceum*

Wildlife

The diverse ecological character of the Archibald Lake wetland is critical to a variety of insects, amphibians, mammals, and birds which are native to this area.

Waterfowl, wading birds, shore birds, and nongame migratory birds occupy the wetland at various times of the year. The shallow water habitat offers optimal fishing opportunities for the great-blue heron while the secluded vegetative hummocks are inviting to loons which find this area favorable for raising their young (Strecker 1997).

A variety of sediment types including sand, gravel, and marl provides suitable spawning substrate for fish including bluegills, perch, muskellunge, and northern pike (Heizer 1997). Emergent and submergent aquatic vegetation provides spawning habitat for muskellunge, northern pike, and perch. Additionally, the aquatic vegetation harbors a myriad of aquatic insects that provide feeding and rearing opportunities for different developmental stages of fish.

Both snapping (*Chelydra serpentina serpentina*) and painted (*Chrysemys picta*) turtles were noted on the July 15 visit. It is likely that more species are present and utilize this area for breeding and residing habitat.

A single green frog (*Rana clamitans melanota*) was heard on the July 15 visit. Most species of frogs vocalize earlier in the season so it was difficult to make a thorough assessment of the species present. However, it is known that frogs find this type of shallow water habitat to be imperative throughout their multiple life phases. The diversity of aquatic vegetation sustains egg masses, acts as nursery areas for tadpole development and metamorphosis, and provides feeding and cover territory for adults.

Perhaps most symbolic of the wetland's importance is the presence of an active eagle's nest which overlooks the site. Because eagles often depend on fish and other aquatic organisms for sustenance, this nesting site is very instrumental in meeting those needs.

Water Quality Benefits

One of the important functions of a shallow aquatic environment can be defined as its ability to purify water entering the lake from the surrounding watershed. Groundwater and surface water runoff weaves through a maze of sedge mats, grasses, bulrush stands, and submergent aquatic plants before entering Archibald Lake. On its methodical journey through the wetland, the water is cleansed by the filtration of suspended matter and absorption of nutrients. This site protects the northeast portion of the lake from potential run-off sources in the surrounding watershed. The wetland also acts to stabilize sediments and prevent shoreline erosion by buffering wind and wave activity.

Other Notable Efforts

The distinctive ecological features of the surrounding area have been recognized previously by other individuals and groups. In 1992, Gary Fewless of the University of Wisconsin - Green Bay conducted a vegetation survey of the tract near Cathedral of the Pines. In his writings, the maturity of the area was described

as "impressive in aspect" (1992). Additionally, this vicinity has been the subject of periodic breeding bird surveys conducted by the US Forest Service.

Over the last decade, the US Forest Service has worked in cooperation with the Nature Conservancy and private entities to identify and purchase property around the northeast end of Archibald Lake. The US Forest Service has designated over 950 acres in the vicinity of the proposed Sensitive Area through its own Land Management Planning process. The Special Area designation protects unique areas of biological significance (Zimmer 1998). It follows, then, that the aquatic community is deserving of similar protection.

Summary

The preservation of the northeastern wetland lobe of Archibald Lake is imperative for ecological reasons. The complex interactions found to exist in the wetland lobe are critical to supporting an array of aquatic and terrestrial species, and maintaining and improving water quality. Furthermore, one can not underestimate the aesthetic importance of this natural area in an era where such tracts are quickly vanishing. Due to the overall significance of this region, the entire wetland at the northeast end of Archibald Lake shall be considered a sensitive area.

Recommendations

For the sensitive area described above, the following recommendations should be adhered to:

- ➡ Chemical treatment of aquatic plants will be limited to the control of exotic species only. These chemical applications should be as selective as possible to reduce impacts on the native aquatic plant community. Hand cutting is recommended as an alternative; however, the removal of any native aquatic plants is strongly discouraged.

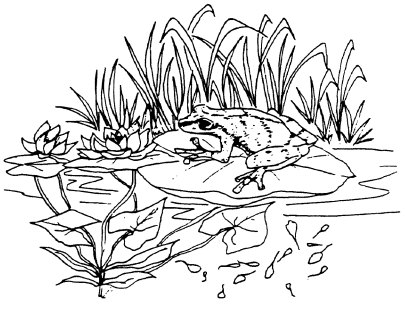
- ➡ Dredging is apt to be inconsistent with public interest in this waterway. Permits for dredging are not likely to be approved in the sensitive area.

- ➡ Wisconsin state law prohibits filling of lake bed. Proposed rip-rap projects in the sensitive area will be evaluated on a case by case basis.

- ➡ Proposed boathouses, piers, and swim rafts in the sensitive area will require permits because these structures warrant a public interest review.

In addition, the Archibald Lake Association should consider...

- ✓ focusing on educational efforts that inform people of the ecological benefits that this area provides,
- ✓ working with the Town of Townsend to adopt a local ordinance declaring the wetland as a "no-motor" zone to avoid disruption of native flora and fauna and to prevent re-suspension of flocculent bottom sediments in this shallow area,
- ✓ and acting as a "watchdog" to ensure that all enacted regulations pertaining to the sensitive area are adhered to.



Acknowledgments
Integral information for this report was obtained from reports and verbal communication provided by Gary Zimmer and Larry Strecker of the US Forest Service, Steve Richter of the Wisconsin Chapter of the Nature Conservancy, Russell Heizer and Robert Rosenberger of the WDNR Peshtigo Service Center, and Laurie DeWitt-Davidson and Matthew Marty of the Archibald Lake Association. I would like to extend my gratitude to WDNR staff Bradley Johnson and Charmaine Robaidek for their laborious taxonomic work and critical input, to Mary Gansberg for her review and comments, and to Mike Hronek for his GIS mapping skills.

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