WHITE WATER ASSOCIATES, INC.

LAKE JULIA STEWARDSHIP PROJECT
PHASE I REPORT - RIPARIAN WETLANDS

Submitted to:

WDNR Lakes Partnership
Attn: Jennifer Wudi
PO Box 818
Rhinelander, WI 54501

Lake Julia Lake Assoc.
Attn: Harry Helwig
5590 Lake End Road
Rhinelander, WI 54501

Nicolet Area Tech. College
Attention: Terry Rutlin
Box 518
Rhinelander, WI 54501

Prepared and Submitted by:

White Water Associates, Inc.
Contact: Dean Premo, Ph.D.
429 River Lane, P.O. Box 27
Amasa, Michigan 49903

December 31, 2002

Lake Julia
Stewardship Project

Phase 1 Report
Riparian Wetlands

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White Water Associates, Inc.
Contact: Dean Premo, Ph.D.
429 River Lane, PO Box 27
Amasa, Michigan 49903

Introduction

This document and contained products culminates the first phase of the Lake Julia Stewardship Project. The first phase of this watershed-ecosystem approach to conservation of Lake Julia focused on wetlands that exist in the immediate lake watershed. Among other functions, these wetlands soften the effects of non-point source pollution on the lake and serve as habitat for plants and animals enjoyed by residents and visitors of Lake Julia and students at Nicolet Area Technical College. This wetland focus, however, comprises only the initial phase of the Lake Julia Stewardship Project. It forms the foundation of a more comprehensive stewardship program whose future is planned to include species surveys by habitat, surveys for non-native weedy plant species, aquatic vegetation surveys in Lake Julia, wetland conservation plans, photographic documentation, oral history, management plans for the lake, and education.

An important goal of the effort described in this report was to identify and map the location of wetlands in the lake watershed and assess their quality as indicated by factors such as size, native vegetation, level of human-caused disturbance, and other variables. It was also possible to assess the amount of risk individual wetlands are subject to from human-related factors. A full report of this intensive fieldwork effort is provided in Section 2 of this report.

Another important goal of the Lake Julia Stewardship Project was education. Nicolet Area Technical College students and faculty were able to experience practical environmental science applied to a real natural resources need. Students were exposed to professional consulting scientists in both the classroom and the field. Educational outreach was also realized through TV coverage (WJFW-Channel 12 - Rhinelander), press releases to printed media, and presentations at meetings of the Lake Julia Lake Association. A summary and assessment of the educational component of this project was prepared by Mr. Terry Rutlin of Nicolet Area Technical College and is provided in Section 3 of this report.

An important tool that serves to integrate this first phase of the project and provide a framework for future phases is a geographical information system (GIS), a powerful geographic-based database capable of assembling, managing, and analyzing large amounts of data. Section 4 of this report includes a CD-ROM containing the GIS Project for Phase 1.

Lake Julia Watershed Description

Lake Julia and the associated Lake Julia Watershed is located in Oneida County immediately south of the City of Rhinelander, Wisconsin. Despite its close proximity to relatively dense human population, Lake Julia is a high quality lake, with good fish populations and natural shoreline on much of its perimeter. It has a moderate number of permanent residences and businesses on its shores. One of the largest riparian dwellers is Nicolet Area Technical College Lake Julia Campus. Lake Julia has an active lake association whose membership includes the college. The Lake Julia Lake Association has started a program of water quality monitoring.

Lake Julia has a surface area of about 250 acres. Its long axis is a little over a mile in length and is oriented north-south. It is somewhat over ½ mile wide in the middle. A 1938 Lake Survey Map (Appendix A) shows depth contours and some riparian features (wetlands, uplands, and some timber types). According to that map, Lake Julia is less than 20 feet deep.

The watershed that includes Lake Julia is bounded on the north and west by the Wisconsin River. Vegetative cover types in the northern part of the watershed include broad-leafed deciduous forest, mixed deciduous/coniferous forest, coniferous forest, grassland, low intensity urban development, general agriculture, wetlands (emergent/wet meadow, lowland shrub, and forested), open water (in the form of smaller lakes), and bare soil. Prior to the fieldwork component of the study, we reviewed Wisconsin Wetlands Inventory data. This review revealed that there are approximately 50 mapped wetlands (Wisconsin Wetlands Inventory data) within the north part of the watershed (this is a perimeter roughly 3/4 miles from the Lake Julia shoreline). Within 2000 feet of the shore there are approximately 35 mapped wetlands (WWI) and within 1000 feet of the shore there are 22 wetlands (WWI). The WWI wetlands represent those 2-3 acres in size and larger. The fieldwork report contained in Section 2 reports the results of field assessments of twenty riparian wetlands in the Lake Julia watershed.

Background, Need, and Partners

The Lake Julia Lake Association has expressed concerns regarding potential long-term impacts to Lake Julia that stem from non-point source pollution from human developments around the lake. The Lake Association has maintained an ongoing dialog with Nicolet College regarding expansion plans and run-off from buildings and parking areas into riparian wetlands. Nicolet College is dedicated to being a good environmental citizen on the shores of Lake Julia.

In fall of 2001, Dr. Dean Premo (White Water Associates, Inc.), Mr. Harry Helwig (Lake Julia Lake Association), and Mr. Terry Rutlin (Nicolet Area Technical College) made a field trip and observed evidence of stressed vegetation on some riparian wetlands as well as evidence of high quality wetlands. The focus of the field trip was the Nicolet College Lake Julia Campus, but Premo and Rutlin also made a driving tour around the lake's perimeter. Opportunities for student involvement in lake and watershed stewardship actions and education were also discussed. The reconnaissance trip also included a meeting with Nicolet College President, Adrian Lorbetske, who expressed support for the planned project.

It is an accepted tenet of ecological restoration (including lake conservation) that it is more effective and economical to protect ecosystems from being degraded than to restore degraded ecosystems back to original functions. The Lake Julia riparian wetlands appear to be of good quality and therefore the time is right to institute a program that serves to characterize these wetlands and prioritize the conservation of these important components of a healthy Lake Julia.

The first phase of this project brought together a team of dedicated and able partners to apply their expertise and energies to Lake Julia watershed stewardship. These team members include: (1) Lake Julia Lake Association; (2) Nicolet Area Technical College faculty and staff; (3) Nicolet College students; (4) White Water Associates, Inc. (an independent ecological consulting firm; and (5) the Wisconsin Department of Natural Resources. Nicolet Area Technical College desires to institute a program in applied environmental sciences and this project provided a practical example – one that combined educators, students, and practicing resource professionals.

Methods

The project included laboratory effort, fieldwork, and reporting. Initial lab work included hardcopy and electronic map interpretation to identify watershed features including wetlands that became part of the field investigation. This project benefitted by Oneida County having recently updated Wisconsin Wetlands Inventory maps. This initial work included description of features such as WWI wetland classification, relative size, location, and ownership.

A system for evaluating and characterizing riparian wetlands was developed in checklist format. We drew from appropriate components of the WDNR Rapid Assessment Methodology for wetlands. This system included measures of wetland quality and value as well as risk and vulnerability to human-caused change. Factors such as presence of non-native weedy species will be included. Our goal was to have a simple system appropriate for Nicolet students to understand and use. More details on this part of the project are provided in Section 2.

Fieldwork for the project included visiting twenty wetlands (see Section 2). Nicolet students worked with White Water scientists Elizabeth Rogers and Dave Tiller for the fieldwork component of the project. The effort included use of a global positioning system (GPS) unit to spatially mark where the wetlands occur and demonstrate use of this technology to students.

A GIS project was developed using ArcView that was designed to accommodate information collected during this and future project phases. The GIS project for Phase I is included in Section 4 of this report and is housed at Nicolet Area Technical College and archived at White Water Associates. The GIS component of this project is possible because of the unique combination of project partners (specifically Nicolet College and White Water Associates).

Education and outreach efforts included a day-long classroom and field trip session with Nicolet students including hand-on experience with a variety of maps useful in assessing wetlands. Outreach presentations for stakeholders in the Oneida County community were made at Lake Julia Lake Association meetings by Mr. Terry Rutlin (Nicolet Area Technical College). Mr. Rutlin also prepared press releases and (along with Dr. Dean Premo of White Water Associates) was involved with an interview aired by the Rhinelander television station.

White Water Associates' Scientists

White Water Associates, Inc., an ecological consulting firm and analytical laboratory, was established in 1985 and is located in Michigan's western Upper Peninsula. Four of White Water's scientists were involved with the Lake Julia Stewardship Project: Dean Premo, Elizabeth Rogers, Kent Premo, and David Tiller. Their backgrounds are summarized below.

Dean Premo, Ph.D., is President and co-founder of White Water Associates, Inc. His academic training is in zoology and ecology. His undergraduate degree included certification for secondary science education. Dr. Premo has served as a consultant to the U.S. Environmental Protection Agency Science Advisory Board (Ecological Processes and Effects Committee, and Research Strategies Advisory Committee). He is a member of the National Research Council (research arm of the National Academy of Sciences) Committee on Inland Aquatic Ecosystems. He is on the Dean's Board of Advisors for the College of Natural Science at Michigan State University. Dr. Premo's work regarding biodiversity and ecosystem health with forest managers has received regional and national recognition and has been featured in *The New York Times*. He is a Certified Senior Ecologist (Ecological Society of America). For the Lake Julia Watershed Project, Dean Premo, was project manager and principal scientist.

Elizabeth Rogers, Ph.D. is a senior ecological scientist for White Water Associates. Her duties include ecological research, wetland delineation and mitigation monitoring, environmental education, and grant writing. Dr. Rogers doctorate degree is in zoology/ornithology and her masters degree is in environmental education. She is a seasoned field scientist with 25 years experience in environmental education and natural resource management and over 30 years work in bird field identification. Dr. Rogers is currently on an National Research Council Committee on Riparian Zone Functioning and Strategies for Management. Dr. Rogers has designed and delivered educational programs for a variety of audiences including foresters, zoning officials, lakefront real estate agents, and land managers. She has successfully designed programs and acquired funding for K-12 schools to implement innovative "project-based" learning experiences for children such as "Tracks at Your Doorstep" (funded by Toyota Tapestry) and "From A Brook Trout's Point of View" (funded by Trout Unlimited). For the Lake Julia Stewardship Project, Elizabeth Rogers was co-principal wetland scientist.

Kent Premo, M.S. is the systems support scientist, publications specialist, and technical editor for White Water Associates. His degrees bachelor's and master's degrees are in botany and plant

pathology. Mr. Premo is a project scientist for a White Water study of car-deer accidents in a Michigan county that includes Grand Rapids, Michigan's second largest city. This study involves an innovative geographical information system (GIS) approach to evaluating many layers of natural resources and other information. Mr. Premo assisted Oneida County, Wisconsin develop a GIS database for classification of its 1,200 lakes. In many water quality projects, Mr. Premo is responsible for deployment and maintenance of remote sensing devices for continuous monitoring of dissolved oxygen, temperature, and other water quality measures. This work includes data management and interpretation. For the Lake Julia Stewardship Project, Kent Premo was principal GIS project scientist.

David Tiller, B.S. is an associate consultant and field biologist on many of White Water's ecological research and assessment projects. His expertise includes identification of aquatic and terrestrial plants, aquatic sampling, wetland identification, classification, and evaluation; wildlife habitat inventory; and systematic surveys of birds and mammals. David Tiller's recent design and installation of a large (20 acre) mitigation wetland in Menominee County, Michigan included collection and interpretation of hydrological data, site inspections, excavation plans, and use of over 50 species of native plants in aquatic, wet meadow, and riparian habitats. Mr. Tiller's continued formal training has included an intensive field course in delineation of jurisdictional wetlands sponsored by Michigan State University with cooperation by the Michigan Department of Natural Resources and wetland delineation training by the Wisconsin Coastal Zone Management Program. For the Lake Julia Stewardship Project, Dave Tiller was co-principal wetland scientist.

WHITE WATER ASSOCIATES, INC.

FUNCTIONAL ASSESSMENTS OF LAKE JULIA WETLANDS
FIELD WORK 2002

Submitted to:

Lake Julia Association
Attention: Harry Helwig, President
PO Box 1313
Rhinelander, WI 54501

Ecologists
Elizabeth Rogers, Ph.D
David Tiller, B.S.

Nicolet Area Technical College
Science Students
Teresa Arnold, Melissa Hamilton
and Scott Hamilton

Report Prepared By:
Elizabeth Rogers, Ph.D. (erogers@up.net)
David Tiller, B.S. (dtiller@up.net)
White Water Associates, Inc.
429 River Lane, P.O. Box 27
Amasa, Michigan 49903 Phone: (906) 822-7889

I. INTRODUCTION

The Lake Julia Association and Nicolet Area Technical College have partnered on a study designed to preserve the overall health of Lake Julia with a grant from the Wisconsin Department of Natural Resources (WDNR). The first phase of the project focused on assessments of the current condition of wetlands in the immediate watershed of Lake Julia. On July 29 and 30, 2002, ecologists from White Water Associates, Inc., an ecological consulting firm in Michigan's upper peninsula, assisted by science students from Nicolet College, conducted functional assessments of twenty wetlands within the watershed. Field work was preceded by a classroom seminar on the origin and purpose of the project and the functions and values of wetlands and riparian areas.

This report is divided into seven sections: Section I, the Introduction (this section); Section II, Background; Section III, Description of Project Area; Section IV Survey Methods; Section V, Findings; Section VI, Recommendations, and Section VI, Summary.

II. BACKGROUND

Wetlands, as understood and defined by scientists, encompass far more than the obvious cattail marsh or white cedar swamp that everyone thinks of as a wetland. They include areas that, while appearing similar to uplands to the casual observer, possess a combination of hydrology, soil properties, and plant communities that scientifically identify them as wetlands. The NRC (National Research Council) has offered the following definition of wetlands: "*A wetland is an ecosystem that depends on constant or recurrent, shallow inundation or saturation at or near the surface of the substrate. The minimum essential characteristics of a wetland are recurrent, sustained inundation or saturation. Common diagnostic features of wetlands are hydric soils and hydrophytic vegetation. These features will be present except where specific physiochemical, biotic, or anthropogenic factors have removed them or prevented their development.*"

Wetlands provide numerous ecological functions that have significant societal values associated with them. These can be grouped as hydrologic functions, biochemical functions, and habitat and food web functions (NRC 1995). Hydrologic functions include long and short term water storage and maintenance of the water table. These translate to societal values of protection from floodwaters,

maintenance of fish habitat, and perpetuation of biodiversity. Biogeochemical functions include the retention and removal of dissolved substances and accumulation of inorganic sediments, both of which translate to the maintenance of good water quality. Finally, wetlands provide for the maintenance of characteristic plant communities that in turn provide habitat for a diversity of invertebrates and vertebrate animals. A landscape that is biologically diverse and well vegetated with native plant communities provides society with aesthetic and recreational values such as hunting, fishing, birdwatching, nature viewing and photography, and housing privacy

A functional assessment is designed to provide a snapshot impression of the condition of wetlands with respect to hydrology, soil, and plant and animal communities. It allows an observer to identify current potential threats to a wetland or past degradations. Using some landscape knowledge, an experienced observer can judge the uniqueness of a wetland. An assessment of the plant community can help ascertain presence or absence of artificial disturbances and impairments as well as indicate the potential of the area to harbor unique plant species or communities. A functional assessment allows a knowledgeable observer to render judgements on values provided by a wetland. Finally, an assessment can point out needs for more in-depth assessment and data collection.

SECTION III: DESCRIPTION OF PROJECT AREA

Lake Julia is a 238 acre lake lying immediately south of Rhinelander. Lake Julia is classified as a stratified seepage lake in the WDNR "self-help lake monitoring" program. With the presence of a small stream on the north end accounting for some outflow, it may be more accurate to classify it as a groundwater drainage lake (fed primarily by groundwater and precipitation with some contribution of runoff, and a stream accounting for most outflow). Another drainage area on the northwest end (Wetland 16) may also account for outflow from the lake, either connected through groundwater movement or a branch of the main outflow. The lake's watershed includes a substantial number of wetlands, many of which have been discretely mapped by the Wisconsin Wetland Inventory (WWI). The presence of other small wetlands is noted by a marshland symbol on the WWI map. Within the watershed, roads and buildings have been built on ridges and hills that lie between major wetlands. This has led to an increase in the amount of impervious surfaces, which can result in an increase in runoff following precipitation and a decrease in the rate of groundwater recharge. In contrast, the wetlands surrounding Lake Julia have limited opportunities for development. This lack of development is

particularly noticeable on the south end of the lake. Thus, wetlands protect the water quality of the lake indirectly through limiting development and directly through their functions of groundwater recharge and filtration.

SECTION IV: SURVEY METHODS

A datasheet was designed based on a modified version of the Wisconsin Department of Natural Resources Wetland Functional Assessment protocol (Appendix A). Efforts focused on assessment questions that could be answered by a visual inspection (one time visit) at an observation point in the field. Wetlands were chosen based on proximity to Lake Julia (contiguous to Lake Julia or very near to the lake) and accessibility (by car or boat). All but two assessed wetlands lie within 2000 feet of the lakeshore. Seven of these wetlands are emergent/aquatic communities within the lake, lying along its edge. A map of the assessed wetlands is found in Appendix A.

Field functional assessments of 20 wetlands were conducted on July 29 and 30, 2002. Wetland ecologists, Elizabeth Rogers, Ph.D. and David Tiller, B.S., of White Water Associates worked on 10 assessments with Nicolet College students, Teresa Arnold, Melissa Hamilton, and Scott Hamilton on July 29. On July 30, the White Water scientists returned to assess 10 more wetlands.

Findings from the assessment were summarized using a relational database and are presented in report form in Appendix B. Scientific names of plants can be found on these report forms. Section V provides a narrative of the assessment findings.

SECTION V: FINDINGS

Most of the wetlands surrounding Lake Julia are acidic in nature, supporting moss (*Sphagnum* spp.) as a ground cover along with associated heath family species such as blueberry, leatherleaf and Labrador tea. Mosses in the genus *Sphagnum* have the capacity to actually enhance acidic conditions by releasing hydrogen ions in return for securing mineral ions such as calcium and sodium (Johnson 1985). The soils of most of the wetlands are largely peat or muck, and were flooded or saturated at the time of the July assessments.

The wettest of these bog wetlands are open sedge meadows with scattered tamarack and black spruce. In some cases, a floating bog mat is present. They are dominated by shrubs (alders, willows,

leatherleaf, and Labrador tea) and a mixture of sedges and grasses. These open wetlands exhibit some differences in species composition. Wild calla was found in several wetlands, while buckbean was only recorded in one. A more detailed botanical survey would likely reveal other differences. The riparian upland edges of some of the open bog wetlands harbor scattered and substantially-sized red and white pines, eastern hemlock, and paper birch. This intact riparian edge is pleasing aesthetically and enhances the habitat functions of the wetland. In general, an intact riparian edge provides a buffer to the wetland that helps to protect the wetland itself from perturbations from the adjacent uplands (Malamootil et. al 1996).

The slightly drier of these wetlands are forested with a mixture of conifers (e.g. tamarack, black spruce, and balsam fir) and deciduous trees (e.g. red maple, yellow birch, and paper birch). A fair diversity of shrub species (such as mountain holly, winterberry, Labrador tea, and blueberry) is present as a component of the understory of the forested wetlands. Where more sunlight reaches the open patches in the forested wetlands, or along the edges of the wetland, alder and willows predominate. The slight hummocks within these forested wetlands support ground flora species associated with northern latitudes such as bunchberry, bluebead lily, and starflower. In and of themselves, these acidic forested wetlands are not particularly diverse. They do, however, provide a patch of diversity on the larger landscape.

Most of the assessed wetlands appear to be connected with Lake Julia, at least through groundwater. In some cases the hydrological connection has been altered by roads with culverts but is still present. We found no place where hydrological connections had been completely obliterated by fill. In general, the roads and driveways that were examined appeared to have adequate culverts.

Overall, the wetlands around Lake Julia appear to be in good health and functioning well. Forest cover is intact on the forested wetlands. Few problems with alien plant species were noted. There is little encroachment by surrounding dwellings and few roads through the wetlands. There are currently minimal problems with alien plant species and forest cover is intact on the forested wetlands with no evidence of recent logging or clearing.

There has been and will continue to be altered hydrology that will likely affect the vegetation of particular wetlands. Such shifts in vegetation in response to hydrology alterations may take years to manifest and thus are not always obvious. We noted such hydrology alterations in Wetland 1 and Wetland 3. Wetland 1 appeared to have originally been dominated by white cedar. It appears that increased runoff from the development of Nicolet Area Technical College parking areas and roads, and

perhaps and impounding effect of a drive and parking area, have made this wetland wetter. As a result, the white cedars are dying and the wetland is shifting toward a shrub and emergent wetland. It will lose some of the wildlife habitat functions associated with a conifer component but will maintain functions of groundwater recharge, water quality preservation, and wildlife habitat for species associated with a more open wetland. Wetland 3 also appears to be gradually shifting away from a forested wetland and toward a shrub wetland due to wetter conditions likely resulting from increased runoff from paved roads and parking areas. As with Wetland 1 some habitat functions and aesthetics are lost but the wetland functions protecting Lake Julia water quality remain largely intact.

Wetlands may suffer impacts as a result of proximity to dwellings. Wetland 8 had some altered hydrology from the road. In addition, organic yard debris had been pushed into the wetland on one side. Some alien plant species were encroaching including reed canary grass, glossy buckthorn and narrow - leaved cattail. In terms of its vegetation, this was one of the more stressed wetlands that was assessed. Nevertheless, its filtering and recharge functions appear to remain intact.

The aquatic/emergent wetland communities in Lake Julia all appear to be healthy and diverse. In addition to robust beds of many species of submergent and emergent plants, the shoreline has abundant downed and dead material along shore and in the shallow waters. There was abundant and good cover for various species of fishes and their prey base. Wildcelery (*Valisneria americana*), an important duck food, is a common component of the aquatic community throughout the lake. The seeds and vegetative parts of pondweeds (*Potamogeton* spp.) are eaten by many species of waterfowl and shorebirds. Common loons are also part of the summertime fauna of Lake Julia, reflecting its fish population.

The upland riparian areas along the shoreline of Lake Julia are likewise in fairly good condition at the present time. Many of the buildings along the shore have left a good coverage of large trees. The wetland riparian area are well forested. Even the islands have a good, diverse forest cover. During the survey, the ecologists recorded an adult merlin feeding a fledged juvenile on the largest island in the northwest end of the lake indicating that nesting had taken place on the lake.

SECTION VI: RECOMMENDATIONS

Wetlands of the Lake Julia watershed and the riparian areas are vital to the long-term health of Lake Julia. Seepage lakes and groundwater drainage lakes (such as Lake Julia) are dependent on the filtering and recharge functions on their watersheds. Given the predominance of wetlands in the Lake

Julia watershed, it is logical to assume that wetlands perform most of these functions that perpetuate water quality and quantity. Given the particular importance of wetlands to the health of the lake, impacts on wetlands should be carefully considered. If new roads and driveways cross wetlands, efforts should be made to install adequately sized and an adequate number of culverts and sizes of culverts to maintain the current hydrology.

Wetlands can and do function as filters of sediments and pollutants from the surrounding uplands. Nevertheless, if the quantity of runoff is anticipated to greatly increase, as with, for example, a substantial increase in impervious surfaces in a new development such as apartment complex, it would be good to create a detention basin within the affected property to allow water to filter and recharge the groundwater without directly impacting adjacent wetlands. Although wetlands do act as filters, they should not be expected to suddenly receive excess sediment and water without experiencing deleterious impacts.

The lack of recent logging and clearing in the Lake Julia wetlands has resulted in diverse and well-functioning natural vegetative communities. In general, clearing of wetlands in the Lake Julia watershed should be avoided. Logging and clearing operations inevitably introduce seeds of weedy alien species and creates disturbances of soil and hydrology that foster their growth. Most logging operations compact or create ruts in the sensitive wetland soils leading to altered hydrology and impaired tree and shrub regeneration. The forested wetlands around Lake Julia experience forest regeneration through the small scale disturbance typical of saturated soils. Tip-ups of trees are fairly common, creating elevated microsites that allow young trees to start growth. Such tip ups also create canopy gags that allow more sunlight to reach the forest floor and foster regeneration. Such a gradual, natural regeneration allows the unique microclimates of the wetland forest floor to persist, thus perpetuating the unique complement of plant species forming the forested wetland plant community. The forested wetlands we examined had a good variety of tree ages, including the invaluable dead trees (standing snags and downed logs) that provide crucial habitat for so many animals throughout their period of decay. The lake association may wish to consider promotion of conservation easements for wetlands as a means of protecting the entire wetland ecosystem (soils, hydrology, plants) in perpetuity. Conservation easements are also attractive as means to ease tax burdens on property owners and thus reward them for good stewardship practices. The vegetative communities of the Lake Julia wetlands are currently healthy and are best protected with a "hands-off" approach.

The emergent and aquatic (submergent) plant communities are a showpiece for Lake Julia. Lakeowners should be educated to the aesthetic, water quality, and habitat values of these plant beds as well as the submerged logs and branches that enhance the fish habitat of the shallow water and shoreline. They should be encouraged to preserve these features along their frontage. For a fairly developed lake, Lake Julia possesses exceptionally good shallow water and shoreline habitat.

Alien species, such as purple loosestrife, are not yet a problem in the watershed. The lake association may want to consider a citizen watch group that examines lakeshore and wetlands for incipient presence of this or other noxious species in order to eradicate them before they become well established. An annual monitoring survey for alien species could be a worthwhile investment of time for the future health of the watershed.

Education of landowners and lake users should be ongoing. New homeowners within the watershed could be provided with materials to educate them about ways to protect the water quality and ecological health of Lake Julia. The importance of wetlands to this lake ecosystem and perpetuation of their ecological functions and aesthetic values should be included in all educational endeavors.

SECTION VII: SUMMARY

In summary, Lake Julia and its watershed currently appear to be in good ecological health. The prevalence of wetlands has limited development within the watershed. This has protected the recharge and filtering functions of the watershed which, in turn, have protected lake water quality. The aesthetics and ecological integrity of the wetlands in the watershed is high. Disturbances to these wetlands in terms of hydrological impairments, clearing, and filling, should be assessed and minimized in all future development. Preserving the ecological health and natural aesthetics of the watershed's wetlands will go a long way to perpetuating a healthy lake ecosystem.

REFERENCES

Bormann, S., R. Korth, J. Temte.1997. Through the Looking Glass. A Field Guide to Aquatic Plants. University of Wisconsin-Extension. Stevens Point, WI.

Brown, L. 1979. *Grasses: An Identification Guide.* Houghton Mifflin Company, Boston

Cobb, B. 1963. A Field Guide to the Ferns. Peterson Field Guide Series. Houghton Mifflin Company, Boston.

Cody, W.J. and D. M. Britton. 1989. *Ferns and Fern Allies of Canada.* Research Branch Agriculture Canada. Publication 1829/E. Canadian Government Publishing Centre, Ottawa, Canada.

Edsall, M. S. 1985. *Roadside Plants and Flowers. A Traveler's Guide to the Midwest and Great Lakes Area.* University of Wisconsin Press, Madison, WI.

Eggers, S. and D. Reed. 1997. *Wetland Plants and Plant Communities of Minnesota and Wisconsin.* U.S. Army Corps of Engineers, St. Paul District, Minnesota

Johnson, C.W. 1985. *Bogs of the Northeast.* University Press of New England., Hanover, NH.

Hallowell, A.C. and B. G. Hallowell. 1981. *Fern Finder.* Nature Study Guide. Berkeley, CA.

Hitchcock, A.S. Manual of the Grasses of the United States. Second edition revised by Agnes Chase. Volumes 1 and @, Dover Publications, Inc., New York.

Lellinger, D.B. 1985. *A Field Manual of the Ferns & Fern Allies of the United States and Canada.* Smithsonian Institution Press, Washington, D.C.

Lyon, J.G. 1993. *Practical Handbook for Wetland Identification and Delineation.* Lewis Publishers. Ann Arbor, MI.

Mulamoottil, G., B.G. Warner, E.A. McBean. 1996. *Wetlands: Environmental Gradients, Boundaries, and Buffers.* Lewis Publishers, New York.

Newcomb, L. 1977. *Newcomb's Wildflower Guide.* Little, Brown and Co., Boston.

Peterson, R. T. and M. McKenny. 1968. *Wildflowers: Northeastern/Northcentral North America.* Peterson Field Guide Series, Houghton Mifflin Company, Boston.

Pohl, R.W. 1978. *How To Know The Grasses.* Wm. C. Brown Company Publishers, The Pictured Key Nature Series. Dubuque, IA.Newmaster, S.G., A .G .Harris, and L. J. Kershaw.1997. *Wetland Plants of Ontario.* Lone Pine Publishing, Edmonton, Alberta.

NRC (National Research Council). 1995. Wetlands: Characteristics and Boundaries. National Academy Press, Washington, D.C.

Smith, H.V. 1966. *Michigan Wildflowers.* Cranbrook Institute of Science, Bulletin 42, Bloomfield Hills, MI.

Soper, J.H. and M.L. Heimburger. 1982. *Shrubs of Ontario.* Royal Ontario Museum, Toronto, Ontario, Canada.

United States Army Corps of Engineers. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Waterways Experiment Station, Vicksburg, MI

United States Department of Agriculture. 1993. *Soil Survey of Oneida County, WI.* USDA Soil Conservation Service.

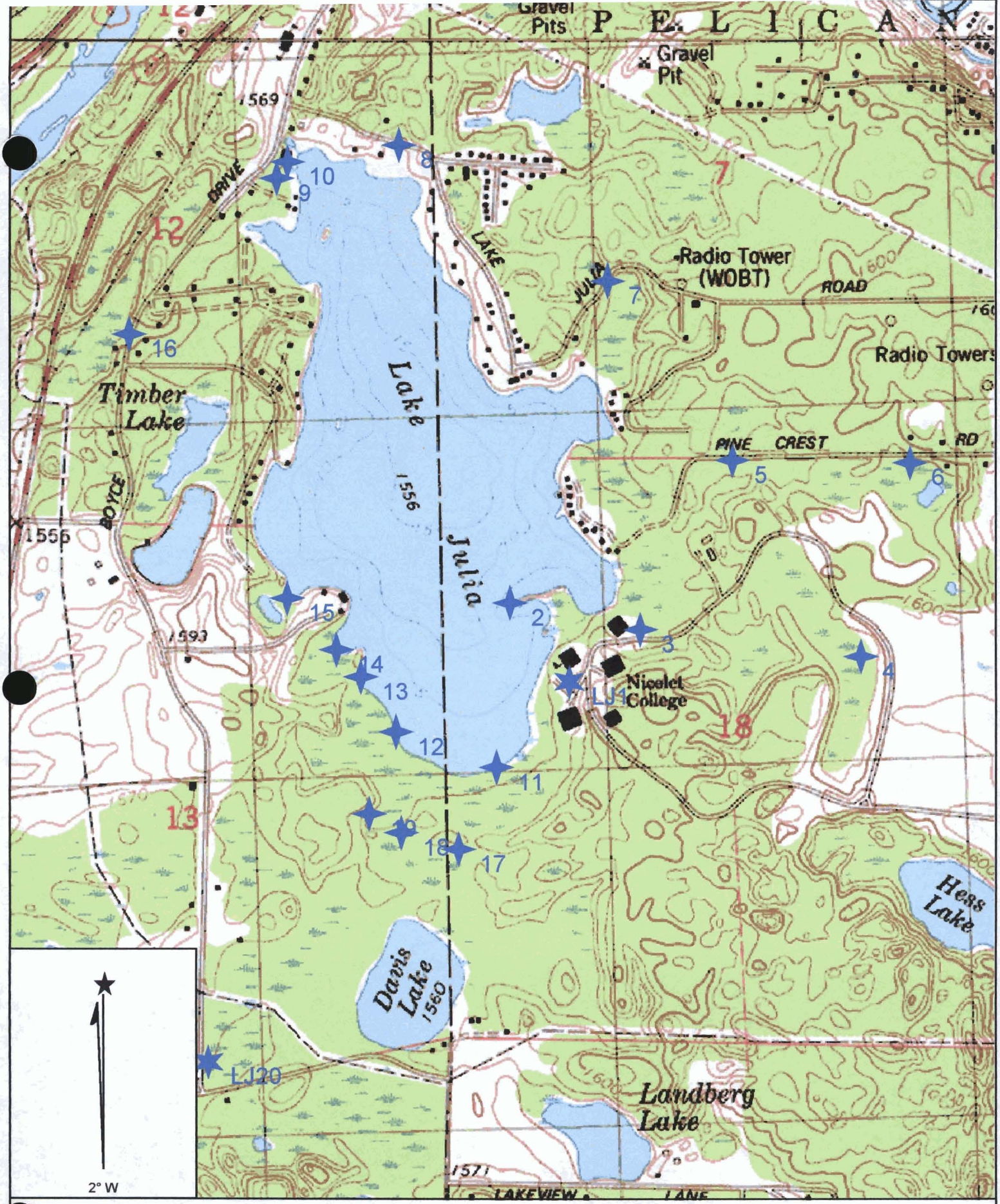
United States Department of Interior, Fish and Wildlife Service. 1988. *National List of Plant Species That Occur in Wetlands: Michigan.* Washington, D.C.

Voss, Edward G. 1972. *Michigan Flora. Part I. Gymnosperms and Monocots.* Bull. 55. Cranbrook Inst. Sci. and University of Michigan Herbarium. 488 pp.

Voss, Edward G. 1985. *Michigan Flora. Part II. Dicots (Saururaceae to Cornaceae).* Bull. 59. Cranbrook Inst. Sci. and University of Michigan Herbarium. 724 pp.

Voss, Edward G. 1996. *Michigan Flora Part III. Dicots (Pyrolaceae--Compositae).* Bull 61. Cranbrook Inst. Sci. and University Michigan Herbarium. 622 p

APPENDIX A



Name: LAKE JULIA
Date: 9/18/2002
Scale: 1 inch equals 1142 feet

Location: 045.6109720° N 089.4274169° W
Caption: Lake Julia Wetlands Functional Assessments, 2002

Educational Value of Lake Julia Stewardship Project

Phase 1 - Riparian Wetlands

The summer 2002 Physical Geology class was able to participate in the Lake Julia watershed assessment project this year. Scientists from White Water Associates spoke to the class about the scientific method, jobs in geology and environmental science and field techniques. They also led the class on a walking tour of Nicolet College's wetlands, describing to the students the characteristics of these areas on the college's property. In addition, three students chose to work with the scientists as they assessed the condition of the Lake Julia watershed in direct field observations and analysis.

It would be difficult to over estimate the value of this experience for all the students. So often students see no real connection between the classroom and the "real world" of employment. The students were able to witness scientists apply their craft. The love of learning, work and nature was apparent in the energy and attitude the scientists possessed.

Another valuable lesson learned by the students was that things are not always what they seem. At first glance, a particular wetland might be designated as one type but as the investigation ensued, different plants and soil conditions indicated that a different designation was more appropriate. There are many gray areas in the real world and sometimes more than one right answer.

The competencies and core abilities that Physical Geology addresses - demonstration of program competence, global awareness and sensibility, critical thinking, improved self-awareness and effective communication - were addressed and incorporated into the students' thinking and their place in the world. I look forward to similar partnerships in the future.

Submitted by Paul O. Ehlers, instructor, Nicolet Area Technical College

Community Outreach and Education of the Lake Julia Stewardship Project

Phase 1 - Riparian Wetlands

The first phase Riparian Wetlands study of the Lake Julia Stewardship Project received a significant amount of coverage by the local media and through communications issued by Nicolet College and the Lake Julia Lake Association.

This includes:

- a full length press release describing the project issued by Nicolet College. This press release was sent to and used by numerous print and broadcast media outlets in the Northwoods, including WJFW TV 12, The Rhinelander Daily News, Our Town (Rhinelander), Vilas County News Review, and WXPR Public Radio. A second press release will be issued by the college in January that describes the results of the study.

- a feature photo and short description of the project in the Nicolet News, a community newsletter issued by the college that is sent to approximately 50,000 households in the six-county Nicolet district.

- presentations and updates at several meetings of the Lake Julia Lake Association Board of Directors and to the association's general membership at the group's annual Christmas party and Annual Meeting.

For immediate release
Media contacts: Harry Helwig (715) 369-2549
Terry Rutlin (715) 365-4681

Lake Julia Lake Association receives $7,125 DNR grant, partners with Nicolet College to keep Lake Julia healthy

The Lake Julia Lake Association and Nicolet College have partnered to preserve the overall health of Lake Julia with the help of a $7,125 grant the lake association recently received from the Department of Natural Resources.

The money will fund the first phase of the Lake Julia Stewardship Project, a long-term effort that will study numerous ecological components in and around the lake. The initial work will consist of mapping and assessing the important wetlands in the Lake Julia watershed with a goal of maintaining and hopefully even improving the already good ecosystem health of the 238-acre lake just south of Rhinelander, says Harry Helwig, president of the Lake Julia Lake Association.

"Virtually every lake in the Northwoods, including Lake Julia, is coming under increasing pressure from a variety of different sources," says Harry Helwig, president of the Lake Julia Lake Association. "Lake Julia today is in good shape and this project is part of a long-term approach that will help keep the lake healthy for generations to come."

The first phase will consist of mapping the significant wetlands surrounding Lake Julia, assessing the current environmental health of these wetlands, identifying potential threats to these areas, and providing recommendations on ways to improve degraded wetlands and better protect those that are deemed as threatened.

The lake association will use the DNR grant money to hire environmental consultant Dr. Dean Premo and his firm White Water Associates to participate in many technical and educational aspects of the project. This firm, located in Michigan's U.P. has a nearly twenty year track record working with the northwoods environment.

According to Premo, healthy wetlands:

- collect and filter water that seeps down to recharge groundwater aquifers. This clean groundwater then enters the lake through springs in the lake bed.

- significantly reduce the amount of sediment entering a lake through surface water run-off. If too much sediment enters a lake, the gritty deposit can quickly blanket prime fish spawning areas on a lake bed, leading to significant reductions in fish populations. Lake sedimentation can also cover other lakeshore habitats used by insects, amphibians and other wildlife, which play an important role in a lake's food chain and add to the overall biotic diversity of a lake ecosystem;

- trap excess nutrients such as phosphorus and nitrogen - the main culprits that cause algae blooms. Along with being unsightly, algae blooms can consume large amounts of dissolved oxygen in the water column - a condition that causes respiratory stress to fish and in the worst cases can cause significant die-offs.

Premo and staff from White Water Associates will be working closely with science students and staff at Nicolet College's Rhinelander campus, which sits along the eastern shore of Lake Julia. Together, they'll visit wetlands in the Lake Julia watershed to map and assess the health and threats to each of these areas.

The lake association plans on applying for additional DNR grants in the future to look at other environmental factors that are important to keeping the lake habitat healthy. The grants are made available through DNR's Lake Management Planning Grant Program, which is funded entirely from a portion of the state excise tax on motorboat gasoline. For more information about grant program, including how to apply for a grant, contact Jennifer Wudi, DNR lake management coordinator, at (715) 365-8900.

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Functional Assessments of Lake Julia Wetlands
Synopsis of Field Work and Findings 2002

Taken from draft White Water Report to Lake Julia Lake Association (September 30, 2002)

Introduction

The Lake Julia Stewardship Project is a watershed approach to conservation of Lake Julia. The focus of Phase I of the project are the wetlands in the Lake Julia watershed. The goals of the project include: (1) identify/map wetlands in the lake watershed, (2) assess wetland quality, (3) judge the risk individual wetlands, and (4) educate participants in environmental science. This synopsis draws from work already completed for the first phase of the project.

Efforts to Date

- Classroom seminar on the project and wetland and riparian ecology.
- Functional assessments of twenty wetlands within the Lake Julia watershed.
- Preparation of draft report by the consultants.
- Preparation of student projects.

Functional Wetland Assessment

A functional assessment is designed to provide a snapshot impression of the condition of wetlands with respect to hydrology, soil, and plant and animal communities. It allows an observer to identify current potential threats to a wetland or past degradations. The uniqueness of the wetland can also be judged. An assessment of the plant community can ascertain presence or absence of artificial disturbances and impairments as well as indicate the potential of the area to harbor unique plant species or communities. A functional assessment allows a knowledgeable observer to render judgements on values provided by a wetland. Finally, an assessment can point out needs for more assessment and data collection.

The Wetlands of the Lake Julia Watershed

- Wetlands surrounding Lake Julia have limited opportunities for development. Thus, wetlands protect the water quality of the lake indirectly through limiting development and directly through their functions of groundwater recharge and filtration.

- Most assessed wetlands appear to be connected with Lake Julia, at least through groundwater. In some, the hydrological connection has been altered by roads and culverts. We found no place where hydrological connections had been completely obliterated by fill. Roads and driveways examined appear to have adequate culverts.

- Overall, the wetlands around Lake Julia appear to be in good health and functioning well. Forest cover is intact on the forested wetlands. Few problems with alien plant species were noted. There is little encroachment by surrounding dwellings and few roads through the wetlands.

- There has been and will continue to be altered hydrology that will likely affect the vegetation of particular wetlands. Such shifts in vegetation in response to hydrology alterations may take years to manifest.

- The aquatic/emergent wetland communities in Lake Julia itself seem healthy and diverse. In addition to robust beds of many species of submergent and emergent plants, the shoreline has abundant downed and dead material (primarily logs) along the shore and in the shallow waters. There was abundant and good cover for various species of fishes and their prey base. Wild celery, an important duck food, is a common component of the aquatic community throughout the lake. Common loons are also part of the summertime fauna of Lake Julia, reflecting its fish population.

- The upland riparian areas along the shoreline of Lake Julia are likewise in fairly good condition at present. Many of the building along the shore have left good coverage of large trees. The wetland riparian areas are well forested. Even the islands have a good, diverse forest cover. During the survey, White Water ecologists noted an adult merlin (a rare raptor in the falcon family) feeding a fledged juvenile on an island in the northwest end of the lake indicating that nesting had taken place on the lake.

Recommendations

Seepage lakes and groundwater drainage lakes (such as Lake Julia) are dependent on the filtering and recharge functions of wetlands on their watersheds. Given the importance of wetlands to lake health, impacts on wetlands should be avoided wherever possible. The following are some specific recommendations for the Lake Julia watershed:

- If new roads and driveways cross wetlands, efforts should be made to install adequately sized and numbers of culverts to maintain current hydrology.

- Wetlands function as filters of sediments and pollutants from surrounding uplands, but their capacity can be overwhelmed if runoff is greatly increased through more impervious surfaces that accompany development. Addition of more impervious

surfaces should be minimized, but when unavoidable, water retention basins where appropriate to mediate this impact.

- The current wetlands have diverse and well-functioning natural vegetative communities. In general, clearing of wetlands in the Lake Julia watershed should be avoided for many ecological reasons. Strategic use of devises such as conservation easements may be used as a means of protecting wetland ecosystems in perpetuity.

- The emergent and aquatic (submergent) plant communities are a showpiece for Lake Julia. Lakeowners should be educated to the aesthetic, water quality, and habitat values of these plant beds as well as the submerged logs and branches that enhance fish and other aquatic animal habitat. For a fairly developed lake, Lake Julia possesses exceptionally good shallow water and shoreline habitat.

- Alien species, such as purple loosestrife, are not yet a problem in the watershed. The lake association may want to consider a citizen watch group that examines lakeshore and wetlands for incipient presence of this or other noxious species in order to eradicate them before they become well established.

- Education of landowners and lake users should be ongoing. New homeowners within the watershed could be provided with materials to educate them about ways to protect the water quality and ecological health of Lake Julia.

Next Steps

Some additional effort remains for the current project in the form of developing a geographical information system (GIS) project to manage the field data collected during the functional assessments of Lake Julia wetlands and to serve as the data manager and analytical tool for future phases of Lake Julia. Phase 1 is the foundation for a more comprehensive stewardship program – one that will likely include native species surveys, documenting non-native weeds, aquatic vegetation surveys, wetland conservation plans, oral history, management plans, and education. We believe an important next phase would include two components: (1) establishing a citizen watch group for monitoring alien species, and (2) surveying and mapping aquatic plants of Lake Julia.