Notice: Use of this form is required by the DNR for any application filed pursuant to ch. NR 190 or 191, Wis. Adm. Code. Personal information (PI data) collected on this form, including such data as your name, address, phone number, etc., will be used for management and enforcement of DNR programs, and is not intended to be used for any other purpose. Information will be made accessible to requesters under Wisconsin’s Open Records laws (s. 19.32-19.39, Wis. Stats.) and requirements.

Section I: Application Type

☐ Lake Management Planning Grant

Check one:

☐ Large-scale planning grant
☐ Small-scale planning grant

☐ Lake Management Protection Grant

Check one:

☐ Wetland restoration
☐ Ordinance development
☐ Lake improvement
☐ Lake classification
☐ Land or easement acquisition

<table>
<thead>
<tr>
<th>Legislative District Numbers</th>
<th>To determine your legislative district, go to <a href="http://165.189.138.210/WAML//">http://165.189.138.210/WAML//</a></th>
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<tr>
<td>12</td>
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</table>

Section II: Applicant Information

Applicant
Little St. Germain Lake Protection & Rehabilitation District

Lake Name
Little St. Germain Lake

Size in Acres
980.00

Project County/Township/Section/Range
Vilas/T40N/R08E/S35

Authorized Representative Named by Resolution
Lou Mirek

Authorized Representative Title
Secretary

Address
1599 Shields Road

City
St. Germain

State
WI

ZIP Code
54558

Daytime Phone (area code)
(715) 477-2879

Evening Phone (area code)
(715) 477-2879

E-mail Address
ljmirek@verizon.net

Mail Check to: (if different from applicant)
Name and Title

Address

Organization

City

State

ZIP Code

For DNR Use Only

Application Type

Date Received

Date Reviewed (LC)

Lake Coordinator Approval / Date

Waterbody ID#

Adequate Public Access

Yes

No

Environmental Grants Specialist Approval / Date

Eligible Project

Yes

No

Eligible Applicant

Yes

No

Project Priority Rank

Prior Grant Award(s)

Yes

No

Fiscal Year(s)

Amount Received To Date

Project Awarded

Yes

No
## Section III: Project Information

<table>
<thead>
<tr>
<th>Other Management Units Around Lake</th>
<th>Letter of Support</th>
<th>Other Management Units Around Lake</th>
<th>Letter of Support</th>
</tr>
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<tbody>
<tr>
<td>2. Vilas County Land &amp; Water Conservation Dept.</td>
<td>✗</td>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>6.</td>
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</table>

### Section IV: Lake Access

- Number of Public Vehicle Trailer Parking Spaces Available at Public Access Sites: **30**
- Number of Public Access Sites on Lake Including Boat Launches and Walk-ins: **2**

### Section V: Cost Estimate and Grant Request

Section V must be completed or application will be returned. Details in support of Section V are welcome.

<table>
<thead>
<tr>
<th>Project Costs</th>
<th>Column 1 Cash Costs</th>
<th>Column 2 Donated Value</th>
<th>DNR Use Only</th>
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</thead>
<tbody>
<tr>
<td>1. Salaries, wages and employee benefits</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2. Consulting services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Purchased services—printing and mailing</td>
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<td></td>
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</tr>
<tr>
<td>4. Other purchased services (specify):</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5. Plant material</td>
<td></td>
<td></td>
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<tr>
<td>6. Supplies (specify) See attached</td>
<td>91,490.00</td>
<td>30,497.00</td>
<td></td>
</tr>
<tr>
<td>7. Depreciation on equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Hourly equipment use charges</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>9. State Lab of Hygiene (SLOH) Costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Non-SLOH Lab Costs</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>11. Land or easement acquisition value</td>
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<td></td>
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<tr>
<td>12. Associated acquisition costs</td>
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<td></td>
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<tr>
<td>13. Other (specify)</td>
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<td>14. Subtotals (sum each column)</td>
<td>91,490.00</td>
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<td>15. Total Project Cost Estimate (sum of column 1 plus sum of column 2)</td>
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<td></td>
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<tr>
<td>16. State Share Requested (up to 75% of total costs may be requested)</td>
<td>91,490.25</td>
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</table>

Subject to the following maximum grant amounts:
- Large-scale lake planning projects—up to $10,000
- Small-scale lake planning projects—up to $3,000
- Lake classification and regulation or ordinance development projects—up to $50,000
- Lake protection projects (other than lake classification and regulation or ordinance development projects)—up to $200,000
Section VI: Attachments (check all that are included)

A. For all applicants:

- Authorizing resolution
- Letters of support
- Map of project location and boundaries
- Lake map with public access sites identified (per Section IV of this application)
- Itemized breakdown of expenses
- For projects that entail sending samples to the State Laboratory of Hygiene (SLOH) only: a completed SLOH Projected Cost Form

- Project scope/description:
  - Description of project area
  - Description of problem to be addressed by project
  - Discussion of project goals and objectives
  - Description of methods and activities
  - Description of project products or deliverables
  - Description of data to be collected, if applicable
  - Description of existing and proposed partnerships
  - Discussion of role of project in planning and/or management of lake
  - Timetable for implementation of key activities
  - Plan for sharing project results
  - Other information in support of project not described above

B. For applicants that are Lake Management Organizations (LMOs) or Non-profit Conservation Organizations (NCOs):

- For first time applicant LMOs only: A completed Form 8700-226 (Lake Association Organizational Application)
- For first time applicant NCOs only: Copy of IRS 501(c)(3) determination letter and copies of your Articles of Incorporation and Bylaws
- List of national and/or statewide organizations with which you are affiliated
- List of board members' names, including municipality and county of residence. Designate officers
- Documentation of current financial status
- For land or easement acquisition projects: Detailed description of your organization's land management experience
- Brochures, newsletters, annual reports or other information about your organization

C. Wetland Restoration Projects:

- Deed, easement, or land control agreement
- Preliminary engineering plans
- Water regulatory permits
- Map of project location and boundaries

D. Ordinance Development Projects:

- Inventory of applicable existing ordinances
- Description of resources each jurisdiction allocates to enforcement
- Preliminary surveys

E. Lake Improvement Projects:

- Engineering and design plans
- Water regulatory permits
- Map of project location and boundaries
Section VI: Attachments, continued

F. Land or easement acquisition projects:

☐ 1. DNR Form 1800-1 (Environmental Hazards Assessment Form)
☐ 2. Legal description of the property
☐ 3. Project location boundary map
☐ 4. Property or easement appraisal (if not previously submitted to the Department)
☐ 5. If escrow closing, the title insurance commitment
☐ 6. Evidence of compliance with Uniform Relocation Act requirements, if applicable
☐ 7. Agricultural Impact Statement, if applicable
☐ 8. Status of acquisition negotiations, including expected time frame for closing
☐ 9. A land management plan
   ☐ a. Full description of property and conditions
   ☐ b. Description of current and proposed uses of property and adjoining properties
   ☐ c. Management requirements for property
   ☐ d. If roads, piers or grading are proposed, a topographic survey with feature locations, and design cross sections

Section VII: Certification

I certify that information in this application and all its attachments are true and correct and in conformity with applicable Wis. Statutes.

Print/Type Name of Authorized Representative
Lou Mirek

Title of Authorized Representative
Secretary

Signature of Authorized Representative

Date Signed
04/29/09
LAKE PROTECTION GRANT RESOLUTION

WHEREAS Little St. Germain Lake is an important resource used by the public for recreation and enjoyment of natural beauty; and

WHEREAS a study and examination of the lake will lead to better understanding and will promote the public health, comfort, convenience, necessity and public welfare; and

WHEREAS we recognize the need for responsible and holistic long-range planning to better manage the lake, its watershed, and its use; and

WHEREAS we are qualified to carry out the responsibilities of lake protection projects,

IT IS, THEREFORE, RESOLVED THAT: The Little St. Germain Lake Protection & Rehabilitation District Board of Commissioners requests the funds and assistance available from the Wisconsin Department of Natural Resources under the "Lake Protection Grant Program": and

HEREBY AUTHORIZES Lou Mirek to act on behalf of the Little St. Germain Lake Protection & Rehabilitation District Board of Commissioners to: submit an application to the State of Wisconsin for financial aid for lake protection grant purposes; sign documents; and take necessary action to undertake, direct, and complete an approved grant.

BE IT FURTHER RESOLVED THAT the Little St. Germain Lake Protection & Rehabilitation District Board of Commissioners will meet the obligations of the protection project including timely publication of the results and meet the financial obligations under this grant including the prompt payment of our 25% commitment to protection project costs.

We understand the importance of a continuing management program for Little St. Germain Lake and intend to proceed on that course.

Adopted this 9th day of April, 2009

By a vote of: 1 in favor 0 against 0 abstain

By___________________________, Secretary, Board of Commissioners

Lou Mirek
Please see the Little St. Germain Lake District website at http://www.littlesaint.org/ for the following additional information:

- History of and authority for the Little Saint Germain Lake P&R District
- Valuation and tax levy history
- Grant history
- E-mail broadcast system
- Buoy marking program
- Water quality monitoring
- Invasive species management
- Winter aeration systems
- Lake studies
- Meeting minutes
- Financial reports
- Newsletters
- Miscellaneous documents

<table>
<thead>
<tr>
<th>Commissioner</th>
<th>Position</th>
<th>Town of residence</th>
<th>County of residence</th>
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<tbody>
<tr>
<td>Ted Ritter</td>
<td>Chairman</td>
<td>St. Germain</td>
<td>Vilas</td>
</tr>
<tr>
<td>Erv Stiemke</td>
<td>Treasurer</td>
<td>St. Germain</td>
<td>Vilas</td>
</tr>
<tr>
<td>Lou Mirek</td>
<td>Secretary</td>
<td>St. Germain</td>
<td>Vilas</td>
</tr>
<tr>
<td>Todd Wiese</td>
<td>Town appointee</td>
<td>St. Germain</td>
<td>Vilas</td>
</tr>
<tr>
<td>Mary Platner</td>
<td>County appointee</td>
<td>St. Germain</td>
<td>Vilas</td>
</tr>
</tbody>
</table>
Project Title: Restoring Shoreline Habitat on Little St. Germain Lake, Vilas County, to Develop Best Management Practices and to Evaluate the Ecological and Water Quality Benefits of Riparian Buffer Restorations.

Project Summary: A large shoreline restoration project is proposed for Little St. Germain Lake, Vilas County. Little St. Germain is a multi-basin lake (upper East Bay, East Bay, No Fish Bay, West Bay, and South Bay) with a total of 977 surface water acres. Maximum depth ranges from 10-16 feet in East, No Fish, and South Bay to 53 feet in West Bay. Over seventy years of resort operation and housing development has resulted in moderate to severe erosion along its shoreline, which is also heavily impacted by run-off and pedestrian traffic. Impervious surface run-off has enhanced the impacts. Much of the impacted stretch of shoreline has little native vegetation and is at risk of losing mature white and red pine, and contributes large quantities of sediment to the lake during heavy rain events. In addition, much of the coarse woody material has been removed and few downed trees are found along the developed shoreline, resulting in degraded habitat for fish and their spawn. We propose to correct erosion problems through development of rain gardens to prevent run-off as well as use of biodegradable erosion control products to reduce bank erosion. We will also replace rip-rap, asphalt private boat ramps, and retaining walls with biodegradable materials such as bio-logs and delta-lock bags. Tree drops and establishment of aquatic macrophyte beds will be implemented to improve fish habitat. We will then plant the shoreline into native vegetation, including native trees, shrubs, and ground cover that are appropriate for the Little St. Germain Lake ecosystem. Aquatic invasive species such as curly pondweed and Eurasian Water Milfoil occur throughout the littoral zone of Little St. Germain Lake, and hand-pulling will occur whenever encountered in this research project. Terrestrial invasive species will be inventoried and eradicated as well. This project will be conducted in coordination with an ongoing Wisconsin DNR Science Services research project which is evaluating the ecological benefits of shoreline habitat restoration on 6 lakes in Vilas County. Little St. Germain Lake has historically provided habitat for Species of Greatest Conservation Need (Wisconsin Wildlife Action Plan http://dnr.wi.gov/org/land/er/wwap/plan) including the mink frog and black tern, as well as ospreys, a state threatened species – this project will provide habitat improvements that will benefit these species. Consultation and plant material will be provided by local landscapers with over 10 years experience conducting riparian restoration projects. All project partners have a documented history of successful completion of successful projects. We will also partner with WDNR Watershed Management and U.S. Geological Survey to evaluate the potential for a nutrient run-off experiment to test the effectiveness of riparian buffer restorations in reducing nutrient loadings to lakes. Finally, experiments will be conducted to develop Shoreland Restoration Best Management Practices for lakes in Vilas County.
Background

Little St. Germain Lake, Vilas County, is one of 21 impoundments operated by Wisconsin Valley Improvement Company (WVIC) to provide storage for power and recreational use. The level of the lake, which was dammed in 1882, has been maintained about 5 feet above its natural level since 1929, and is annually drawn down about 1.5 feet from December – March. Little St. Germain is a multi-basin lake (upper East Bay, East Bay, No Fish Bay, West Bay, and South Bay) with a total of 977 surface water acres. Maximum depth ranges from 10-16 feet in East, No Fish, and South Bay to 53 feet in West Bay. Water quality has recently declined across all basins (Robertson and Rose 2000). The West Bay consistently had the best water quality, the South Bay intermediate, and East Bay the worst water quality. While water quality was relatively stable 1991-2000, it has since worsened. The West Bay has changed from oligotrophic to mesotrophic, the South Bay from mesotrophic to eutrophic, and the East Bay from eutrophic to hypereutrophic (Robertson et al. 2005).

Seasonal trends in water quality show that degradation occurs during the summer when phosphorus contributions from inflows are lower but internal phosphorus loading is elevated. The degraded water quality has negative impacts on aesthetics, fish populations, and macrophytes leading to lower enjoyment of the lake by residents and others who use the lake for these purposes. As defined by NR 1.91(4d), Little St. Germain Lake exceeds minimum public boating access by having more than one access site with a total of more than 28 car-trailer parking spaces (1 per 35 open water acres). The system contains 18 resorts, of which 6 contain their own private boat landing.

Much of the Little St. Germain Lake shoreline has been developed for housing and the lake has been used for seasonal recreation for over 70 years. The soils in the watershed consist of mainly well-drained sand and sandy loams. These soils are thought to be naturally high in phosphorus content.

The water quality of Little St. Germain Lake, as indexed by secchi disk depth, has notably worsened over the past 5 years (Figure 1 & 2). Lake District residents are interested in implementing management strategies to improve water quality and reduce shoreland nutrient run-off. Recent studies conducted by WDNR Science Services and UW Trout Lake Research Station have documented dramatic alteration of riparian habitat (terrestrial and littoral zone) on many lakes in northern Wisconsin. The alteration is primarily due to shoreland housing development and has resulted in negative changes in native plant communities, simplification of habitat structure, and changes in fish, amphibian, and bird populations. Many of the WDNR findings have been published in peer-reviewed scientific journals (Elias & Meyer 2003, Lindsay et al. 2002, Woodford & Meyer 2002) and UW findings are in review (Sass 2004). The Little St. Germain Protection and Restoration Lake District will implement shoreland habitat restorations at private properties with a minimum of 500 meters of contiguous shoreland and will quantify the ecological benefits of the restoration via biotic surveys.

In this project, we proposed to 1) evaluate the ecological benefits of lake buffer restoration for wildlife and fish populations 2) assess the feasibility of using the Little St. Germain restoration project to conduct experiments to quantify the benefits of re-establishment of riparian buffers to reduce nutrient run-off, and 3) conduct experiments to develop Best Management Practices for shoreland restoration in the Upper Wisconsin River Watershed and Northern Highlands Ecological Landscape.
Figure 2. Little St. Germain, Vilas County, West Bay, Secchi Disk Depth has declined (average July and August).

Figure 3. Shoreline Development, Little St. Germain Lake, Vilas County
JUSTIFICATION/CONCEPT: Aquatic ecosystem health is a function of water quality and intact riparian and aquatic food webs. Human alteration of riparian and aquatic habitat has led to changes in lake water quality, decreases in plant and animal species diversity, increase in exotic invasive species, and changes in the population performance of individual fish and wildlife species. Management actions that limit riparian and littoral zone alteration or promote shoreland restoration should result in measurable improvements in aquatic ecosystem health. Documentation of this improvement will enhance public support of these management activities.

GOAL: Demonstrate the ecological benefits of shoreland habitat conservation and restoration via plant, wildlife, and fish surveys before, during, and after conservation and restoration activities on Little St. Germain Lake in Vilas County. Evaluate the feasibility of conducting experiments to test the effectiveness of shoreland buffer restorations to reduce nutrient run-off to lakes. Establish Best Management Practices for Wisconsin Shoreland Restoration projects. Methods will follow those established during 2007-2008 Wisconsin Shoreland Restoration projects at Found Lake, Vilas County. These goals are met by following the methods describing in each of the following 3 projects.

Wisconsin Shoreland Restoration Projects
2007-2008
Project 1. Measuring the Value for Riparian Buffer Restorations for Fish and Wildlife Populations on Little St. Germain Lake

Background: We will develop site-specific management recommendations for Little Saint Germain lakeshore property owners who participate in the restoration program and will initiate restoration projects at the properties. Restoration activities will include conservation (no-cut, no disturbance) and restoration of native vegetation (terrestrial buffer zone and near-shore littoral zone), removal of exotic and invasive species, placement of physical structure such as downed trees and coarse woody debris for fish habitat, removal and replacement of retaining walls and impervious surface within the 35’ buffer, and other proven management techniques designed to enhance fish and wildlife diversity and abundance and reduce surface water run-off. Methods will follow that as described in Haskell (2009).

Biotic surveys will include baseline surveys before restoration commences, including measures of relative abundance and diversity of native vegetation, frogs and toads, prey and game fish, pollinating invertebrates, breeding birds, small mammals, and furbearers. Surveys will be repeated annually as restoration projects proceed – methods will follow those in Haskell (2009). Little St. Germain lake is known to provide habitat for ospreys, a state threatened species, and mink frogs, bald eagles, black terns, listed as Species of Greatest Conservation Need under with Wisconsin Wildlife Action Plan http://dnr.wi.gov/org/land/er/wwap/plan.

The project will focus restoration efforts on 500 meters of Little St. Germain lakeshore where habitat impacts are significant and private landowners on a significant portion of the shoreline agree to participate in the restoration efforts. Incentives will be offered to recruit participation. The study design will also include a control shoreline on Little St.Germain Lake, 500 meters of shoreline with significant habitat alteration that do not receive restoration efforts. Biotic survey results will be compared between the control and restoration shore sites.

Results of this restoration will be compiled with that of ongoing projects at Moon, Found, and Lost Lakes, Vilas County. Additional restoration projects are anticipated at 2 additional developed lakes in the county.

OBJECTIVES:

1. Solicit private landowner project participation via personal contacts and contractual agreements; >75% landowner participation is required at restoration and control sites to provide access for surveys and to allow for measurable benefits from restoration projects.
2. Develop site specific shoreland restoration management plans for each property owner enrolled in the project. Landowners will provide the initial restoration plans for their property and project scientists will then work with landowners to produce a plan that provides the maximum ecological value while integrating property owner land-use preferences.

3. Restore and conserve native vegetation within the shoreland riparian buffer and littoral zone of all properties participating in the project. Remove all invasive plant species encountered. Directly involve members of lake associations, landowners, and citizen groups in the restoration projects.

4. Repair shoreland bank erosion and shoreline toe erosion using biologically degradable materials such as bio-logs, brush bundles, delta-lock bags, straw blankets, sediment logs, as well as development of impervious surface run-off management plans via rain gardens and retention ponds when appropriate.

5. Remove/replace impervious surface (asphalt, concrete), retaining walls and rip-rap within the 35’ buffer when feasible, replacing with bio-degradable materials and improved run-off engineering.

6. Quantify the benefits of restoration activities by measuring water quality parameters, and by conducting annual habitat and plant and animal species surveys at reference, control, and treatment lake shorelands before restoration occurs and in subsequent years.

METHODS:

1. Recruit Little St. Germain property owners interested in participating in the Wisconsin Shoreland Restoration Project by conducting educational workshops and mailing educational materials/flyers. GIS products (24k lake hydrolayer, soil maps, county building layers) and shoreland surveys will be used to identify shorelands most impacted by development. Desktop publishing and Adobe Photoshop software will be used to create newsletters and educational pamphlets on this project’s objectives and detailed information on lake ecology, fish and wildlife species and habitat, and terrestrial and aquatic plant communities. This information will be distributed to all lake property owners via the Little St. Germain Lake District along with a description of the project’s goals and objectives.

2. Project biologists will arrange to meet with all property owners by phone, letter, or direct visits. During these visits the biologists will explain the project objectives as well as describe the type of landowner participation sought. Questions will be answered and a signed participation and care agreement shall be established with each participating landowner defining restoration benefits/goals, approved areas, site requirements. These agreements will follow the protocol developed by the Shoreland Habitat Restoration Interim BMP.

3. Restoration protocol shall follow WDNR and County Shoreland Habitat Restoration Best Management Practices and will include:
   - Site Evaluation: Establish baseline condition by determine current land-use patterns, boundaries, layout of plants and structures, inventory existing terrestrial and aquatic plants, determine slope, land contour, exposure, collect soil samples,
take landward and lakeward photographs, determine current pesticide, fertilizer, and mowing and practices currently employed.

- Site Planning: We will adopt lakeshore restoration planning methods developed by Wisconsin county land conservation departments, the Lower Chippewa Priority Watershed, and UW Extension. We will work with property owners to develop restoration plans that maximize ecological benefits while preserving property owners' expectations for use of their properties. During the planning process we will assemble a team of WDNR program and research experts (lake, watershed, fish, wildlife, vegetation/horticulture, etc.) for consultation and restoration plan reviews.

- Site Preparation/Installation: Wisconsin Shoreland Habitat Restoration BMP methods will be used during the site restorations. Erosion control measures will be used when needed during restorations. Native plant species appropriate for conditions must be used and species shall be selected to minimize the need for fertilizer, pesticides, watering and maintenance. We will provide a service contract with private sector lake restoration specialists to guide our efforts as well in-kind cooperation with county LCD biologists who have been active in restoration projects across Wisconsin. When appropriate, aquatic plant communities will be restored and a service contract will be established to provide expert consultation with Dr. Susan Knight, UW Trout Lake, to guide restoration plans. Fish habitat will be improved on all lakes with coarse woody habitat augmentation (downed trees from properties as well as placement of trees when necessary). Habitat improvements will follow protocols established by Drs. Steve Carpenter and Greg Sass at the University of Wisconsin and we will seek to establish service contracts with this team to provide expert consultation. WDNR fish manager Steve Gilbert will be consulted prior to restoration activities.

5. Pre- and Post Restoration habitat and species monitoring methods shall include surveys that quantify and describe the following

- Composition of aquatic and terrestrial plant communities
- Avian and amphibian abundance and species composition
- Invertebrate pollinators surveys
- Small mammal and furbearer presence
- Fish species composition and relative abundance
- Coarse woody habitat structure and abundance

We will develop service contracts with experts to develop protocols for the plant, aquatic invertebrate, fish, and CWH surveys. WDNR researchers and managers will also be consulted during protocol development. Endpoints developed by the University of Wisconsin Lake Biocomplexity research project will also be evaluated for incorporation into monitoring plans. Videographic documentation of shoreline habitat will also be made before, during, and after restoration activities.

6. Implement Pollinator Response Surveys – pollinating insect abundance and species diversity surveys/before and after restoration. Pollinating insects, such as bees, are declining across the region. Anecdotal observation has demonstrated that these insects are responding positively to our restoration projects. We will conduct pollinator surveys at Little St. Germain
Lake to quantify the number of pollinating insects present before and after the restoration project is installed. This data will be used to quantify the ecological benefits of shoreland restoration projects.

Results of biological surveys at this restoration will be compiled with that of ongoing projects at Moon, Found, and Lost Lakes, Vilas County. Additional restoration projects are anticipated at 2 additional developed lakes in the county. Wildlife and fisheries surveys will be conducted for 10 years at each restoration project. Before-After-Control-Impact-Paired (BACIP) design (Morrison 2003) will be used to test the fish, vegetation, and wildlife response to the restorations as part of the larger Wisconsin Shoreland Restoration Project as outlined in Haskell (2009).

INTERGRATION OF THE LITTLE ST. GERMAIN SHORELINE HABITAT RESTORATION PROJECT WITH WDNR SCIENCE SERVICES WISCONSIN LAKESHORE RESTORATION RESEARCH PROJECT

Wisconsin DNR Research Scientist Dr. Mike Meyer, Science Services, Rhinelander, will provide consultation during development and implementation of this restoration project so that the Little St. Germain Lake Shoreland Restoration project can become a survey site for the Wisconsin Shoreland Restoration Project that Dr. Meyer is supervising. The study plan for Dr. Meyer’s project is described below. Dr. Meyer and his research team will continue to monitor the wildlife and fish response to the Moon Lake Shoreland Restoration Project as part of their evaluation of the ecological benefits of shoreland restoration projects in Vilas County. This project will continue through 2018.

RESEARCH PROJECT PROPOSAL
PROJECT SUMMARY

Study Title: Measuring the Value of Fish and Wildlife Habitat Restoration on Northern Wisconsin Lakes: The Wisconsin Lakeshore Restoration Project.

Study Number:
Grant: Federal Aid in Restoration, WI W-160-R

Objectives: Identify, map, and survey eight reference lakes, four control lakes, and four treatment lakes within Vilas County, Wisconsin. Educate & invest property owners in the project by conducting lake ecology workshops and creating and distributing educational information (pamphlets, hand-outs, video DVDs) of the native plant and animal communities found on northern Wisconsin lakes as well as the important ecological features. Solicit private landowner project participation via personal contacts and contractual agreements; substantial landowner participation is required at restoration and control sites to provide access for surveys and to allow for measurable benefits from restoration projects. Develop site specific management plans for each property owner. Landowner will provide the initial restoration plan for their property and project scientists will then work with landowners to produce a plan that provides the maximum ecological value while integrating property owner land-use preferences. Restore and conserve native vegetation within the shoreland riparian buffer and littoral zone of all properties participating in the project. Directly involve members of lake associations, landowners, and citizen groups in the restoration projects. Quantify the benefits of restoration activities by measuring water quality parameters, and by conducting annual habitat and plant and animal species surveys at reference, control, and treatment lakes before restoration occurs and in subsequent years.
Benefits: Aquatic ecosystem health is a function of water quality and intact riparian and aquatic food webs. Human alteration of riparian and aquatic habitat has led to changes in lake water quality, decreases in plant and animal species diversity, increase in exotic invasive species, and changes in the population performance of individual fish and wildlife species. Management actions that limit riparian and littoral zone alteration or promote shoreland restoration should result in measurable improvements in aquatic ecosystem health. Documentation of this improvement will enhance public support of these management activities.

Project 2. Feasibility Assessment – Testing the Effectiveness of Vegetated Buffers to Reduce Overland Runoff and Nutrient Loads from Developed Nearshore Lawns to Lakes in Northern Wisconsin

Background: Shoreland standards set by the Wisconsin Department of Natural Resources (WDNR) in Wisconsin Administrative Code NR115 (Wisconsin Department of Natural Resources, 2000) were designed in 1968 to protect water resource values including water quality, recreational uses, navigation, fish and wildlife habitat, and natural scenic beauty. Among numerous shoreland provisions in NR 115 is language to create a 35-foot-wide buffer zone landward of the ordinary high water mark in which trees and shrubs may not be clear-cut. At the time of codification, shoreland development was already quite high at many lakes and rivers, and the 35-foot riparian zone had already been cut and planted to grass. Shoreline standards are aimed to mitigate this issue on new and existing lots by requiring conditional permits for specific lot improvements with provisions such that a 35-foot riparian buffer be maintained or constructed as part of the permit agreement.

The USGS, in cooperation with the WDNR, previously conducted a study which evaluated differences in overland runoff and nutrient yields between grassed lawns and naturally-occurring woodland buffers at nearshore locations in northern Wisconsin (Graczyk and others, 2003). Data showed that while concentrations of nutrients were generally higher in woodland areas, loads and yields of nutrients delivered to lakes were actually higher from lawns because overland runoff from the lawns was higher than the woods. Lake groups at Moon and Found Lakes in northern Wisconsin are currently receiving funding to implement lakeshore improvements, which includes installation of vegetative buffers.

WDNR and USGS are proposing a new study which will build on some of the components of the previous study and determine how effective newly constructed shoreland vegetation buffers are at reducing overland runoff and nutrient loads to nearby water resources. We will test the feasibility of implementing this project at the Little St. Germain restoration project 2010-2015.

OBJECTIVE: Evaluate the feasibility of conducting a nutrient run-off experiment at the Little St. Germain shoreline restoration project. If deemed feasible, and if funding is secured, this experiment will:

1. Estimate the quantity of surface-water runoff from developed nearshore lawns before and after implementation of constructed shoreland buffers.
2. Determine concentrations, loads, and yields of nutrients and sediment in surface-water runoff from developed nearshore lawns before and after implementation of a constructed shoreland buffer.
3. Estimate rainfall/runoff coefficients for developed nearshore lawns with and without constructed shoreland buffers.
4. Evaluate differences in the quantity of surface-water runoff between developed nearshore lawns and those with a constructed shoreland buffer.
5. Evaluate differences in the quality of surface-water runoff between developed nearshore lawns and those with a constructed shoreland buffer.
6. Estimate spatial and temporal flow patterns of in nearshore soils beneath developed nearshore lawns before and after implementation of constructed shoreland buffers.

Proposed Approach:
WDNR and USGS lake scientists and hydrologists will travel to the Little St. Germain restoration site to conduct site assessments and establish pilot study collection sites. Ideally, the study will be conducted at 6 paired locations on lawns surrounding Little St. Germain Lake in Vilas County, Wisconsin (see map above). Five of the lawn pairs will be used for surface-water runoff and water-quality evaluations, while another lawn pair will be used to evaluate surface-water runoff and shallow subsurface-flow only. The study period is expected to last 5 years. Two years of pre-implementation data collection will be necessary to identify relations between lawn pairs so that proper statistical analyses can be conducted after the implementation phase. After 2 monitoring years, the implementation phase will begin, with half of the studied lawns having shoreland buffers constructed to specifications detailed in NR 115. Following buffer construction, 3 additional years of data collection will be necessary to properly evaluate differences in the hydrology and water quality that may be caused by the vegetated buffer. This project will provide the funds necessary for USGS and WDNR scientists to evaluate the feasibility of the St. Germain restoration sites for these measures.
Relevance and Benefits: As development activities near scenic areas have increased nationwide, determining the effects of this activity (sources of detrimental constituents, the processes affecting them, and pathways of movement) on environmentally sensitive areas has become of interest, both on the state and national scale. Lakes are one example of a system potentially sensitive to nearby development. Presently, lake modelers estimate the inputs to lakes, but the estimates are approximate and are generally not based on field studies. There is a need to quantify both surface water and groundwater inputs, and the loads they carry, to lakes from small parcels. In this proposed project, the USGS will provide a key role in collection of the field data because of its expertise in surface water and groundwater quantity and quality monitoring. These data will be used to elucidate movement of surface water and groundwater from small parcels to lakes and help us obtain a better understanding of the effects of changes in land use. Consequently, this information can be used to develop effective management practices to reduce any adverse effects of development.


We will test and quantify the ecological and cost benefits of several shoreland restoration management techniques. These techniques have been recommended as methods which are likely to increase the success of restoration efforts. Experiments 1 & 2 are a continuation of those implemented on Found Lake, Vilas County 2007-2008, by Haskell (2009) and Experiments 3 & 4 will be a continuation of new studies to be implemented on Moon Lake, Vilas County in 2009. Results of these experiments will guide development of Best Management Practices for Shoreland Restoration in Vilas County.

1. Down Woody Material Augmentation

Down Woody Material (DWM) is vital to the function and structure of healthy terrestrial and aquatic systems. Soil temperature and moisture can affect plant growth and survival. Haskell (2009) investigated the benefits of the addition of DWM at Found Lake restoration sites by establishing 30 - 10m x 10m experimental plots using three treatments of DWM (0, 25, 50% coverage). Daily soil temperature and moisture were measured at a depth of 10 cm, and plots were planted with 2 native shrubs and native understory herbaceous species; change in plant canopy volume was compared between treatments. The mean maximum soil moisture, temperature variation, and change in soil moisture were significantly lower in the 25% and 50% DWM plots. Plant volume growth was for snowberry (Symphoricarpus albus) and barren strawberry (Waldenstenia fragaroides) was significantly greater in the 25% and 50% DWM plots. We will replicate these experiments on Little St. Germain, using other “work-horse” plant restoration species in 2010 and 2011.

2. Gravel Culture vs. Ball Shrub Plantings

Haskell (2009) tested six native shrub species of survival and growth rates that were transplanted in the summer from bare root stock and compared them to shrubs planted from nursery containers in 2007 at Found Lake restoration sites. Bare root shrubs were established in a culture of 2.5 cm diameter gravel at a local nursery (Hansen’s Garden Village, Rhinelander). Bare root shrubs can be cost efficient for restoration projects as their use can reduce the restoration costs of shrubs planted in nursery containers by 50-75%. Haskell found no difference in growth rates and survival of four species of matched shrubs (Sambucus
canadensis, Aronia canadensis, Cornus racmosa, Cornus stolonifera), but an increase in growth rates of bare-root snowberry (Symphoricarpus albus) and a decrease in growth rates of bare root common ninebark (Physocarpus opulifolius). Six additional species were added to the experiment in 2008 and will be evaluated in 2009. We will continue the bare-root vs. nursery container shrub growth and survival experiments using "work-horse" species on Little St. Germain Lake 2010-2011.

3. Effectiveness of Deer repellents vs. Deer Fencing

We will test liquid deer repellents vs. fencing to prevent herbivory of restoration plants. Inspection of several restoration projects implemented by Vilas County LWCD prior to the WDNR Shoreland Restoration Project showed moderate to severe damage due to deer and snowshoe hare herbivory. Four repellent formulations vs. fencing vs. control will be tested in plots containing nine shrub species. Results of this experiment and a cost-benefit analysis will dictate how fencing and/or repellents are incorporated into recommended shoreland restoration best management practices (BMP). The consultant will also finalize the erosion engineering as well as design and implantation of the planting plans and Rain Garden//Vegetation Enhancement Test Plot (see below).

4. Vegetation survival enhancement test plot (25m x 25m rain-garden)

Run-off from a large asphalt parking lot or other impervious surfaces can funnel water from upland areas directly into the restoration project. To manage run-off from this type of scenario, we will create a large rain-garden, containing 200 shrubs. These shrubs will provide the water-absorbing system for the rain garden. We will also use this site to test for the benefits of 2 nutrient formulations (Nutri-pak) and ectomycorrhizal supplements to enhance the survival and fitness of the planted shrubs. This experiment will be conducted in consultation with statisticians at Michigan State University, and designed so that practitioners of shoreland restoration can evaluate these tools as restoration plant supplements. The cost/benefits analysis of these supplements will dictate whether they are included in Shoreland Restoration BMP recommendations.

TIMELINE:

FY 2010
Prepare survey protocols and datasheets
Prepare education packets,
Site planning & design forms, and landowner agreement forms
Identify potential participating landowners – conduct workshops
Conduct site analyses & develop restoration plans/designs
Collect pretreatment data
Order plants, cuttings, & seeds

FY2011
Finalize plans w/owners and establish no-mow & conservation areas
Remove/replace impervious surface and retaining walls within the 35' buffer
Augment aquatic and terrestrial coarse woody habitat, place biologs
Conduct baseline water chemistry habitat, and species surveys
Conduct habitat and species surveys
Order plants, cuttings, & seeds
Implement vegetation & habitat restorations
FY2012

Follow-up evaluation surveys at restoration sites
Complete run-off engineering improvements
Complete vegetation & habitat restorations
Complete data analyses
Write Final Report

EXPECTED BENEFITS:

1. High profile demonstration projects on well-known northern Wisconsin lakes.
2. Restoration of fish and wildlife habitat
3. Investment of local stakeholders in restoration (property owners, businesses, civic and lake groups)
4. Public education
5. Quantification of hydrological and ecological benefits
6. Provide a restoration template for DNR Watershed managers, county LCD specialists, and private sector environmental consulting firms.

COOPERATORS:

WDNR Science Service, Fisheries, and Watershed Management programs
US Geological Survey
UW Extension
Vilas County Lake Association
Vilas County Land and Water Conservation Department
WDATCP
Michigan Technical University Faculty and Graduate Program
Private consulting firms
Local businesses

LITERATURE CITED:


Wisconsin Department of Natural Resources, 2000, Wisconsin Administrative Code, Environmental Protection, Chapter NR115, no. 532.

Project 1. Measuring the Value for Riparian Buffer Restorations for Fish and Wildlife Populations on Little St. Germain Lake

Erosion Control Supplies and Materials for 500 meter restoration project  -  $4,740

FABRICS AND PINS
3 rolls C125 incl pins @ 180.00 ea. = 540.00  
4 rolls DS150 dbl net straw blkt incl pins @ 88.00 ea. = 352.00

NATURAL LOG BANK EROSION CONTROL
To be supplied on site
est. 6 duckbill anchors w/ short cables @ 15.00

ENVIROLOCK WALLS
400 Envirolock bags w/ties and spikes @ 7.75 = 3,100.00  
Gravel/sand for base bags, 4 CY @ 25.00 delivered = 100.00  
Compost/sand for plantable bags 16 CY @ 25.00 deliv. = 400.00  
Should not need geogrid
Sub-soil fill for behind walls, 12 CY @ 20.00 deliv. = 240.00

Deer Fencing for 500m restoration project  $8,700
3,150 LF 8' std. plastic UV-prot. deer fence - incl. post assembly's,  
  cable, companion pins, clamps, zip-ties @ 2.60 per LF (delivered)

Irrigation Supplies  $3,500
3 pumps, hose, fittings, sprinkler heads

Mulch, Shredded Bark, Cedar  $2,800
100 CY, bulk delivery

Compost  $1,000
400 1 cu. ft. bags (Oneida County Compost) @ 2.50 per bag delivered

Plant material for 500m restoration project  $47,400
  Incl 90 trees  
  Incl. Rain Garden plants  
  Incl. Delivery

Contractual  $7,200
  DESIGN/CONSULT, Hansen Garden Village  
  180 hours, Brent Hansen @ 40.00 per hr.
  TREE DROPS FOR FISH HABITAT  $1,000

Implement Pollinator Response Surveys  $1,000
  materials & supplies = $1000
Sub Total Project 1. $77,340

Project 2. Nutrient Run-off Feasibility Assessment Budget

USGS and WDNR Travel and Per Diem $3,000
Supplies and Equipment for pilot studies $5,800

Sub Total Project 2. $8,800

Project 3.

Vegetation Survival Enhancement Test Plot $5,350

- plants (n=200 double density) = $3000
- fencing = $1000
- irrigation = $600
- fill dirt = $750

Labor (25% Match) $30,497
3 Field Technicians Michigan Technical University x 6 months x 2 years

TOTAL PROJECT COST $121,987

MINUS 25% MATCH $30,497

TOTAL GRANT REQUEST $91,490
May 15, 2009

Dear Kevin:

Please regard this letter as my support for the WDNR Lake Protection Grant which was applied for by the Little Saint Germain Lake Protection & Rehabilitation District in the May, 2009 grant cycle. The project intends to restore shoreline habitat on Little Saint German Lake, to develop best management practices for the restored properties and to evaluate the ecological and water quality benefits of riparian buffer restorations.

The proposed project compliments the objectives of the Vilas County Land & Water Conservation Department’s long range plans to reverse shoreline degradation and increase natural habitat through well designed and properly implemented restoration efforts. Because it parallels the County plan, this department will work with the project sponsor to provide cost sharing and technical support to help assure project success.

I am pleased to learn that this proposal is also being supported by Dr. Michael Meyer as a continuation of his research initiated in 2006. With Dr. Meyer’s involvement, I am confident this project will not only satisfy its restoration objectives, but will also produce results of long term benefits in planning future shoreline restoration projects.

We look forward to working with the Little St. Germain Lake District and Dr. Meyer on this project and encourage you to approve funding for it. Please contact me at (715) 479-3747 if you have any questions about our assistance or the support role we intend to provide.

Sincerely,

Carolyn L. Scholl, Vilas County Conservationist
May 1, 2009

Subject: Little St. Germain Lake Shoreland Restoration Lake Protection Application

Dear Kevin

I am writing to provide strong support for the Little St. Germain Lake Shoreland Restoration Lake Protection Application. The project at Little St. Germain Lake, described in the grant application submitted by the Little St. Germain Lake Protection and Rehabilitation District, is an excellent site to include in the Bureau of Science Services 2007-2017 research project investigating the ecological benefits of shoreland buffer restoration on northern Wisconsin lakes (Federal Pittman Robertson Project W-160-P; see attached). Because of the value of this project, I have agreed to provide staff and federal funds (PR) to assist the District meet their 25% match requirement. Specifically, my project will assist in the design and implementation of the restoration projects via staff, supplies, and materials. We will also conduct before and after wildlife, fish, and vegetation surveys at the site, to be repeated for 10 years post-restoration, to document changes in endpoint.

If you have any additional questions specific to Science Services commitment to this project please let me know. This project is a definite win/win for the WDNR Science Service research project as well as the Little St. Germain Lake Protection and Rehabilitation District.

Sincerely,

Mike Meyer

Michael W. Meyer Ph.D.
Research Scientist
Wildlife and Forestry Research
Bureau of Integrated Science Services
Wisconsin Department of Natural Resources
107 Sutliff Avenue
Rhineland, WI 54501
(☎) phone: (715) 365-8858
(☎) fax: (715) 365-8932
(✉) e-mail: Michael.Meyer@wisconsin.gov
May 10, 2009

Dr. Michael W. Meyer
Bureau Of Integrated Services
Wisconsin Department Of Natural Resources
107 Sutliff Avenue
Rhinelander, Wisconsin 54501

Dear Mike,

As you are aware, Todd Wiese, Vice Chairman for the Town Of Saint Germain, sits on the Board Of Commissioners for the Little Saint Germain Lake Protection and Rehabilitation District. Todd keeps the Town Board aware of the Districts activities that are of interest to the Town Of Saint Germain.

Recently, it has come to our Boards attention that the District will be applying for a grant to obtain funding necessary to restore approximately 1000 feet of shoreline on Little Saint Germain Lake. Given the deteriorating water quality and declining fish and wildlife habitat of the lake, it would be beneficial for the District to obtain the necessary funding to enable them to accomplish this project. This being one of our premier lake basins providing for the largest tourist based economy in our Town and the District’s desire to do what it takes to improve and maintain that water quality, we, the Town Board of The Town Of Saint Germain unanimously support the Districts efforts. Given the ongoing work and past history of the Little Saint Germain Lake Protection and Rehabilitation District, we are confident this would greatly enhance their past efforts. We would encourage you to seriously consider their grant application to assist in funding this project.

Thank you for your past attention to their efforts and be assured of our cooperation in all Matters of mutual concern.

Sincerely for the Town Board,

Peggy Nimz
Town Chair

cc: Little Saint Germain Lake Protection And Rehabilitation District