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Section I: Application Type

Check one:

- Education, Prevention & Planning Early Detection & Response Established Infestation Control

Legislative District Numbers		To determine your legislative district, go to http://165.189.139.210/WAML/ Type in complete address, next screen shows information.
Senate	Assembly	
23	73	

Section II: Applicant Information

Applicant Golden Sands RC&D Council, Inc.			Type of Eligible Applicants		
Waterbody Name Perch Lake, Holcombe Flowage			<input type="checkbox"/> County	<input type="checkbox"/> Tribe	<input type="checkbox"/> Other Gov't Unit
Project County/Township/Section/Range St. Croix, Chippewa, Rusk			<input type="checkbox"/> City	<input type="checkbox"/> Sanitary Dist.	<input checked="" type="checkbox"/> Nonprofit Org.
			<input type="checkbox"/> Village	<input type="checkbox"/> Dist.	<input type="checkbox"/> College, School, etc.
			<input type="checkbox"/> Town	<input type="checkbox"/> Assoc.	<input type="checkbox"/> Federal
			<input type="checkbox"/> State		
			<input type="checkbox"/> Other		
Authorized Representative Named by Resolution Hugh O'Donnell			Project Contact Name Amy Thorstenson		
Authorized Representative Title President			Project Contact Title Regional AIS Coordinator		
Address 1100 Main Street, Suite 150			Address 1100 Main Street, Suite 150		
City Stevens Point	State WI	ZIP Code 54481	City Stevens Point	State WI	ZIP Code 54481
Daytime Phone (area code) (715) 343-6215	Evening Phone (area code)		Daytime Phone (area code) (715) 346-1264	Evening Phone (area code) (715) 573-1268	
E-mail Address			E-Mail Address Amy.Thorstenson@goldensandsrkd.org		

Mail Check to: (if different from applicant)

Name and Title Golden Sands RC&D Council, Inc.	Address 1100 Main Street, Suite 150		
Organization Golden Sands RC&D Council, Inc.	City Stevens Point	State WI	ZIP Code 54481

For DNR Use Only			
Application Type	Date Received 1/31/14	Date Reviewed (AIS/LC/RC) 1/31/14	AIS/Lake/River Coordinator Approval/Date
Waterbody ID#	Adequate Public Access <input type="checkbox"/> Yes <input type="checkbox"/> No	Environmental Grants Specialist Approval / Date	
Eligible Project <input type="checkbox"/> Yes <input type="checkbox"/> No	Eligible Applicant <input type="checkbox"/> Yes <input type="checkbox"/> No	Project Priority Rank	Research / Demo Project <input type="checkbox"/> Yes <input type="checkbox"/> No
Prior Grant Award(s) <input type="checkbox"/> Yes <input type="checkbox"/> No	Fiscal Year(s)	Amount Received To Date \$	Project Awarded <input type="checkbox"/> Yes <input type="checkbox"/> No

Aquatic Invasive Species (AIS) Control Grant Application

Form 8700-307 (12/11)

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Section III: Project Information

Project Title: Milfoil Biological Control, Perch Lake and Holcombe Flowage Proposed Ending Date: 06/30/17

Other Management Units	Letter of Support	Other Management Units	Letter of Support
1. Beaver Creek - Cit Sci Cntr, Wissota team	<input checked="" type="checkbox"/>	4.	<input type="checkbox"/>
2. St. Croix County Parks Dept	<input checked="" type="checkbox"/>	5.	<input type="checkbox"/>
3. Lake Holcombe Improvement Association	<input checked="" type="checkbox"/>	6.	<input type="checkbox"/>

Section IV: Public Access

Number of Public Vehicle Trailer Parking Spaces Available at Public Access Sites:

Number of Public Access Sites Including Boat Launches and Walk-ins:

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.

	Project Costs		
	Column 1 Cash Costs	Column 2 Donated Value	<i>DNR Use Only</i>
1. Salaries, wages and employee benefits	46,684.55	23,832.00	
2. Consulting services	22,950.00	0.00	
3. Purchased services--printing and mailing			
4. Other purchased services (specify):			
5. Plant material			
6. Supplies (specify)	10,233.00	0.00	
7. Depreciation on equipment			
8. Hourly equipment use charges	0.00	5,266.92	
9. State Lab of Hygiene (SLOH) Costs			
10. Non-SLOH Lab Costs			
11. Other (specify)	5,432.48	0.00	
12. Subtotals (sum each column)	85,300.03	29,098.92	
13. Total Project Cost Estimate (sum of column 1 plus sum of column 2)	114,398.95		
14. State Share Requested (up to 75% of total costs may be requested)	85,799.21		

Subject to the following maximum grant amounts:

- Education, Prevention and Planning Projects--up to \$150,000
- Early Detection and Response Projects--up to \$20,000
- Established Infestation Control Projects--up to \$200,000

Use of Federal funding as match: (check box below if applicable)

We are using or planning to apply for Federal funds to be used as match.

If known, indicate source of funding:

Control

Section VI: Attachments (check all that are included)

A. For all applicants: (Refer to instructions for applicability.)

- 1. Authorizing resolution
- 2. Letters of support
- 3. Map of project location and boundaries
- 4. Lake map or river segment with public access sites identified (per Section IV of this application and page 20 of the guidelines)
- 5. Itemized breakdown of expenses
- N/A 6. For projects that entail sending samples to the State Laboratory of Hygiene (SLOH) only: a completed SLOH Projected Cost Form
- 7. Project scope/description:
 - a. Description of project area
 - b. Description of problem to be addressed by project
 - c. Discussion of project goals and objectives
 - d. Description of methods and activities
 - e. Description of project products or deliverables
 - f. Description of data to be collected, if applicable
 - g. Description of existing and proposed partnerships
 - h. Discussion of role of project in planning and/or management of lake
 - i. Timetable for implementation of key activities
 - j. Plan for sharing project results
 - k. Other information in support of project not described above

B. For applicants that are Lake Management Organizations (LMOs), River Management Organizations (RMOs) or Qualified Non-profit Organizations:

- N/A 1. For first time applicant LMOs/RMOs only: A completed Form 8700-226 (Lake Association Organizational Application) or 8700-287 (River Management Organization Application)
- N/A 2. For first time applicant Qualified Nonprofit Organizations only: Copy of IRS 501(c)(3) determination letter and copies of your Articles of Incorporation and Bylaws
- 3. List of national and/or statewide organizations with which you are affiliated
- 4. List of board members' names, including municipality and county of residence. Designate officers
- 5. Documentation of current financial status
- 6. Brochures, newsletters, annual reports or other information about your organization

C. Education, Prevention and Planning Projects: (No additional attachments required.)

D. Early Detection and Response Projects:

- N/A 1. APM Permit application

E. Established Infestation Control Projects:

- 1. Management Plan
- 2. APM Permit application

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 <i>Hugh O'Donnell</i>	Title of Authorized Representative
Signature of Authorized Representative <i>Hugh O'Donnell</i>	Date Signed <i>1-16-14</i>

Estimated costs
 Biological control education for lake groups
 (2 lake groups involved, 3 years)
 Collections, mass rearing, monitoring

	Cash Expenses			Volunteer labor/equip		
	hrs/qty	Rate	total \$	hrs/dys	Rate	\$ value
Mass rearing: training/setup (hrs)	9	\$ 26.93	\$ 242.39	58	12	\$ 696.00
Mass rearing: feedings (hrs)	--	--	--	70	12	\$ 840.00
Mass rearing: release (hrs)	9	\$ 26.93	\$ 242.39	35	12	\$ 420.00
Mass rearing: lab inspections (hrs)	24	\$ 26.93	\$ 646.36			\$ -
Mass rearing: shipping	2	\$ 200.00	\$ 400.00			\$ -
Lake 1			\$ 1,531.13	Lake 1		\$ 1,956.00
Lake 2			\$ 1,531.13	Lake 2		\$ 1,956.00
planning & prep (hrs)	16	\$ 26.93	\$ 430.91			
3 interim on-site visits reporting (hrs)	36	\$ 26.93	\$ 969.54			\$ -
	24	\$ 26.93	\$ 646.36			\$ -
Fish surveys: Bass, Perch (hrs) Chris	28	\$ 20.61	\$ 577.15	6	12	\$ 72.00
Fish surveys: Bass, Perch (hrs) Paul	28	\$ 26.06	\$ 729.59	6	12	\$ 72.00
Weevil collection (hrs) Amy	14	\$ 26.93	\$ 377.04	16	12	\$ 192.00
Weevil collection (hrs) Paul	20	\$ 26.06	\$ 521.13			
Weevil collection (hrs) Mike	20	\$ 16.80	\$ 336.00			
Weevil propogation (hrs) Amy	44	\$ 26.93	\$ 1,185.00	24	12	\$ 288.00
Weevil propogation (hrs) Paul	44	\$ 26.06	\$ 1,146.49			\$ -
Weevil propogation (hrs) Mike	32	\$ 17.30	\$ 553.73			\$ -
Weevil propogation (hrs) Student	32	\$ 11.99	\$ 383.66			\$ -
Weevil release (Wingra) (hrs)			\$ -	4	12	\$ 48.00
CLMN training (hrs)	14	\$ 26.93	\$ 377.04	20	12	\$ 240.00
CBCW time (hrs)			\$ -	20	12	\$ 240.00
tanks	5	\$ 22.00	\$ 110.00			
screen	5	\$ 25.00	\$ 125.00			
1x1 lumber	4	\$ 10.00	\$ 40.00			
Lighting equip			\$ 750.00	240	12	\$ 2,880.00
Fyke nets	2	\$ 850.00	\$ 1,700.00			
misc			\$ 200.00			
lodging (State rate)	5	\$ 70.00	\$ 350.00			
meals (breakfast \$8, lunch \$9, dinner \$17)	12	\$ 11.33	\$ 136.00			
mileage (fed rate)	3,205	\$ 0.565	\$ 1,810.83			
pontoons				12	78	\$ 936.00
boats/kayaks/canoes				13	19	\$ 247.00
GPS unit						\$ 300.00
kayak trailer				24	11.36	\$ 272.64
Consultant - Beaver Creek			\$ 7,650.00			
			Subtotal			\$ 24,167.74
			RC&D AR/AP/payroll time (195 hrs @ \$24.07)			\$ 4,265.61
			Grant dollars needed (year 1)		Match yr 1	\$ 9,699.64
			Grant dollars needed (year 2)		Match yr 2	\$ 9,699.64
			Grant dollars needed (year 3)		Match yr 3	\$ 9,699.64
			Total Grant Dollars Needed:		Total match avail	\$ 29,098.92

Total Project Costs: \$ 114,398.94
 State Share Requested (75% MAX): \$ 85,799.21
 Local Share (25%): \$ 28,599.74

Milfoil Biocontrol Perch Lake & Lake Holcombe

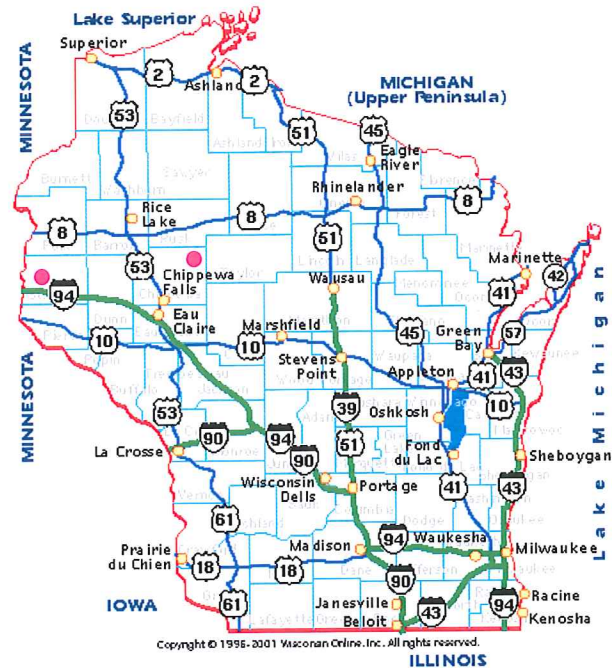
Project Area:

- 1) Beaver Creek Reserve Citizen Science Center, rearing for Perch Lake, St. Croix Co. (WBIC 2488300)
 - a. Perch Lake is an **Outstanding Resource Water** of 45 acres and a maximum depth of 63 feet. With only 5 private cottages on the lake, the majority of the lake is surrounded by Homestead County Park, which includes **walk-in access, public beach, picnic area, and fishing pier**. Perch Lake is designated electric-motor-only, which protects the excellent water quality that supports a two story fishery. St. Croix County Parks Dept rents no motor watercrafts from the park, but there is also a gravel Town boat launch available on the south end of the lake. EWM was recorded here in 2004.
- 2) Lake Holcombe, Chippewa/Rusk Co. (WBIC 2184900)
 - a. The Lake Holcombe is a 2,881 acre flowage of the Chippewa River and Jump River, an **Exceptional Resource Water**. Most of our weevil stocking activities are focused on Pine Lake, a no-wake section of the flowage with a great deal of natural shoreline and undisturbed islands owned by dam owner/operator Northern States Power. The flowage has a maximum depth of 62 feet, **2 public parks, 12 improved public boat landings, 1 unimproved public boat landings 1 public beach, 1 handicap-accessible public fishing pier, and 19 walk-in access points**. EWM was first recorded here in 2006.

Map at right indicates locations of the project lakes in magenta. Maps of individual lakes are attached, with best available public access data included. Part of the grant objectives will include improving these maps and records of parking spaces.

Problem to be Addressed:

This biocontrol project will utilize the research being done around the state to bring biological control of Eurasian watermilfoil (EWM) to lake groups at an affordable rate. Research being done by Susan Knight, UW-Madison, Paul Skawinski, UW-Stevens Point and Golden Sands RC&D Council, Inc., and Dan Miller, UW-Stevens Point, is better defining the lake factors that indicate whether a lake is or is not a good candidate for biological control. Recent research by Amy Thorstenson, Golden Sands RC&D Council, Inc., has developed a mass rearing method lake groups can use to grow the quantities of weevils they need in a controlled, predator-free environment. **That**



(Map from Wisconline.com.)

method required the purchase of starter stock from EnviroScience, Inc., which is no longer offering weevils for purchase.

Many lake groups are eagerly awaiting the ability to apply biological control in their lake. However, now that weevils are no longer available for purchase, **biological control of EWM comes to a standstill**, unless a method is developed for lake groups to generate their own starter stock.

This proposal would develop the rapid collections method need to fill that void, and also establish the long-term monitoring process required for properly utilizing biological control. It will also complete the final chapter in the comprehensive biocontrol manual being produced by Golden Sands RC&D as the final product of the mass rearing pilot study.

Goals and Objectives:

- 1) Public access
 - a. Update public access mapping and parking space records for project lakes
- 2) Monitoring
 - a. Continued professional monitoring of EWM and weevil populations on Perch Lake through contracting with Beaver Creek Reserve Citizen Science Center (3 more years).
 - b. Collaboration with the continued professional monitoring of EWM and weevil populations on Lake Holcombe being done by Jodi Lepsch, WDNR.
 - c. Train Perch Lake and Lake Holcombe Improvement Association (LHIA) volunteers in CLMN Milfoil Weevil Monitoring protocols, to establish process for **long-term monitoring** of weevil populations.
- 3) Collect and propagate starter stock for mass rearing project
 - a. Fine tune light attraction method
 - b. Compare labor-efficiency of light attraction method to daytime collection
 - c. Propagate starter stock numbers in UWSP greenhouse
 - d. Develop final chapter for biocontrol manual
- 4) Mass rearing:
 - a. Continue mass rearing supervision for BC Citizen Science Center and Perch/Holcombe volunteers
 - b. Collect subsamples to analyze production results
 - c. Refine biocontrol manual, as needed
- 5) Fish population surveys: Critical data in evaluating biological control success or failure
 - a. Fyke net surveys of Perch Lake, as part of our current studies (Holcombe was already sampled in 2013 by WDNR.)
 - b. Fyke net surveys of Bass Lake, a long-term study lake for WDNR and an **Outstanding Resource Water**.
- 6) Community focused outreach
 - a. CBCW volunteers at Lake Holcombe landings

Methods and Activities:

Macrophyte surveys – Point intercept surveys of the aquatic macrophyte community were conducted by BCCSC on Perch Lake in 2012 and 2013 to establish baseline (pre-stocking) data and continue to monitor annually. BCCSC will continue annual surveys throughout the duration of this project to monitor changes in the EWM population and other native aquatic macrophytes. A standard PI grid was acquired from WDNR, and standard WDNR PI sampling methods is being used to collect the data.

In Lake Holcombe, the aquatic macrophyte community is being tracked by Jodi Lepsch, WDNR. Our project is collaborating with WDNR to share and analyze data together, and ensure a comprehensive biological control program at Lake Holcombe.

Milfoil weevil population density surveys – Pre-stocking weevil surveys have been conducted on Perch Lake in August 2012, and post-stocking weevil surveys were conducted in August 2013. With funding from this grant proposal, this professional-level monitoring can continue. Surveys are conducted by selecting four representative EWM beds, and collecting two to three EWM stems at five equidistant sample points along three equidistant transects running across all depth zones through the sample beds. The top 50 cm of EWM stem are retained in ziplock bags, preserved with isopropyl alcohol and kept refrigerated. Stems are floated in a glass cake pan over a light table, and all *E. lecontei* of all life stages counted and retained as voucher samples. Magnification goggles (10x) are used for examining stems, and a 50x Magniscope™ is used for further assistance as needed. Beaver Creek Citizen Science Center was fully trained by Amy Thorstenson, Golden Sands RC&D, on weevil sampling and identification, and is qualified to independently perform weevil population surveys. Species ID confirmation will be available from Thorstenson, if needed.

CLMN Milfoil Weevil Monitoring – Professional level surveys are possible in the short-term, as part of the current studies, but long-term, the lake group volunteers will need to be trained and capable of performing annual surveys. The CLMN Milfoil Weevil Monitoring protocol offers a method of surveying that is attainable for volunteers. Amy Thorstenson is a WDNR-approved trainer for the program, and will train a crew at Perch Lake and at Lake Holcombe.

Collections and propagation – This element is a critical link to develop in order to make volunteer rearing of weevils possible. Field collections have been conducted by staff of Golden Sands for past projects. Two methods will be evaluated to determine efficiency: daytime collections, and nighttime collections using light attraction.

- Daytime collections – Lake Wingra appears to be a good candidate lake for collections, as it has weevil densities sampled at 0.56 N/stem, with 38% adults, 2012. Golden Sands staff and various volunteers will cruise slowly over the best milfoil beds in kayaks and pick adults off of the tops of milfoil plants. (Adults spend a high percentage of their time on the tips, as that is where they lay eggs.) Adults will be placed in bags of water with fragments of Wingra milfoil to feed them, and kept cool in a cooler for transport to the greenhouse. We will return 1.5X the number of weevils collected back to Lake Wingra.
- Nighttime collections – Weevils are highly attracted to light (cite light study and our study). We will solicit the retired carpenters within the Lake Holcombe volunteer crew to

construct a floating light buoy with a top that lifts like a hatch. We will place the buoy in the milfoil bed at Lake Wingra before sunset, then return prior to dawn to pick all adults off the milfoil tops. The hatch-like top to the buoy is important to reduce disturbance to the milfoil, as adult weevils scatter easily. Adults will be placed in bags of water with fragments of Wingra milfoil to feed them, and kept cool in a cooler for transport to the greenhouse. We will return 1.5X the number of weevils collected back to Lake Wingra.

- Propagations – Adult weevils will be transported to UWSP greenhouse, where 10-gal tanks will be set up for propagation, filled with filtered, chlorine-free water. Adults will be placed into tanks of Perch Lake milfoil, or Lake Wingra milfoil, depending on the intended recipient lake. Tanks will be stocked at a rate of 7 weevils and 30 stems per tank. Tanks will be designated by lake to prevent mixing of milfoil strains. Adults will be allowed to crawl off of the Wingra stems used for transport and onto the milfoil in the tank, then the transport stems removed. Adults will be allowed to lay eggs in the tanks for 6 days, then the egg/larvae-bearing milfoil stems removed from the tanks, inspected to count weevils, placed into bags of filtered tap water and packed into coolers with ice, and shipped for overnight delivery to BCCSC to stock to their mass rearing tubs. Adults will be retained to continue propagations, assuming we do not have enough during the first cycle.

Mass rearing – Amy Thorstenson, Regional AIS Coordinator with RC&D, has trained Lake Holcombe’s volunteer crew for 3 years, and BCCSC and Perch Lake volunteers for 2 years. Thorstenson will train the BCCSC/Perch Lake crew in rearing for their third and final year, with continued rearing by the groups an additional two years, with Thorstenson assisting as needed. On-site training is given at project start-up to help the group prepare for the weevils, three times during the project, and again at project wrap-up to help the group release the weevils. Team leader at the Perch Lake site will be Beaver Creek Reserve – Citizen Science Center, working with volunteers from the Perch Lake area.

Weevil rearing methods were modeled after Hanson, et al. 1995, with modifications based graduate work conducted by Amy Thorstenson at UW-Stevens Point. Hanson, et al. reported that an outdoor stock tank performed just as well their indoor, controlled 20-gal aquariums, with less management time invested. Thorstenson’s studies found similar results, and developed a simplified method for outdoor, mass rearing (Thorstenson 2011).

Each lake group will set-up and maintain 5 to 10, 370-L “Freeland poly-tuf” stock tanks (79cm W x 132cm L x 63cm H), stationed in an outdoor area where full sun and access to a clean water supply will be available. At the Perch Lake site, 1.2-m, transparent aquaculture tanks will be used for comparison to the 370-L stock tanks.

Potable, chlorine-free water will be provided; a carbon filter may be used to dechlorinate the water, if needed. Full sun is important to keep the milfoil stems (food stems) healthy, but water temperatures will be monitored to ensure they do not approach lethal temperatures (34 C). Water temperatures will be monitored with aquarium thermometers and recorded a minimum of every other day. Temperature records will be reported in to Thorstenson on a weekly basis to evaluate weevil life cycle rates. Fresh water will be added as needed to top off or cool the tanks. NoSeeUm (0.033 cm mesh) light duty fiberglass screening will be used to cover the tanks and pools. While the primary use of the screening is to exclude predator/competitor insects and birds, it also functions as light shade to reduce peak temperatures in the tanks during sunlight hours.

Eurasian watermilfoil stems to be used for food will be collected from the same lake that would be the recipient of the weevils reared. Stems will be collected from the deepest milfoil beds, farthest from shore, where naturally occurring weevils are less likely to be present, in order to avoid the inadvertent introduction of unaccounted for weevils. To minimize the introduction of predator or competitor insects, the collected food stems will then be laid thinly over mesh screen and sprayed with a hose and nozzle at a pressure sufficient to clean the milfoil but not damage it. Cleaned stems will then be floated in a wading pool of clean water, sorted and untangled. Because weevils lay their eggs on apical meristems, only stems with apical meristems will be retained for use; stems that had gone to flower or have broken tips will be discarded. Stems will be trimmed to a length sufficient to reach from the base of the rearing chamber to the surface of the chamber's water (62 cm). Stems will then be bundled together in groups of fifteen stems, and attached at the base to a rock with a rubber-band to weight the stems down and achieve vertical orientation in the rearing chamber. All chambers will receive an initial stocking of milfoil food bundles, with stockings to be repeated every 21 days to keep the weevils supplied with actively growing milfoil (Table 1). [For tanks that are running average temperatures near optimum for weevil production (29C), this schedule will shortened to 17 days.]

Table 1
Weevil feeding schedule.

	<u># of EWM stems to feed per tank</u>
Day 0	105
Day 21	165
Day 42	225

The "starter batch" of weevils will be provided via the collections and propagations work (methods above). We will provide weevil stock from Wisconsin, in order to ensure weevils with winter-hardy genetics. Each tank will be initially stocked with 70 weevils. The weevils will arrive to BCCSC as eggs and early instar larvae attached to bundles of milfoil stems in sealed plastic bags. The estimated number of weevils in each bag will be written on the outside of each bag, however the number of weevils inside will be assumed to be unevenly distributed amongst the milfoil stems. The stems will be randomized by placing them into a large tub of water and counted to derive an estimated average of weevils per stem. Stems will then be selected randomly to accumulate the number of weevils needed to stock each rearing chamber. Thus, the number of weevils initially stocked to each rearing chamber is an estimated average.

Chambers will be maintained for approximately 52 days, allowing enough time to produce two generations. Prior to releasing the weevils to their recipient lake, subsamples will be extracted by Thorstenson to estimate total production. A 10% subsample of the weevil-containing food stems will be extracted from five of the ten tanks (selected at random), preserved in 80% isopropyl alcohol, and refrigerated for later laboratory examinations. The preserved subsample stems will be examined by Thorstenson by floating stems in water in a glass pan over a light table, with 3x magnification goggles. Each stem will be carefully examined for weevil larvae, adults, and eggs and the total number of weevils recorded. The assistance of a higher power (30x) Carson Magniscope™ will be used for identification of specimens when needed. Specimen vouchers will be preserved in sample vials in 80% isopropyl alcohol.

Contributing to
State research
priorities

Fish population surveys – Stunted pan populations of >25-30 per 24 hr trapnet effort can be a limiting factor in establishing weevil population densities sufficient to control EWM (Ward and Newman 2006). In order to properly evaluate the success or failure of our biological control projects in Perch and Holcombe. Fish surveys are also needed to evaluate the successful biocontrol at Bass Lake, which is due to naturally-occurring weevil populations. Bass Lake is a long term study lake that has had milfoil weevil surveys dating back to 1997. One mini fyke net will be deployed per lake, on Perch Lake and Bass Lake. These nets will be deployed in the late morning or early afternoon, and will be checked the following day. The deep end of the net will be placed where less than one meter of water exists over the top of the net. Each fish caught in the nets will be identified to species and will be measured for length. All fish will be released to the same lake they came from after measuring. Length data will be used to generate a length histogram for each species.

A 25-foot x 4-foot seine net will be used to survey at least 100 feet of shallow water on each lake during daylight hours. Each fish caught in the seine will be identified to species-level and will be measured for length. All fish will be released to the same lake they came from after measuring. Length data will be used to generate a length histogram for each species.

Community focused outreach -

- CBCW volunteers at Lake Holcombe landings

Products and Deliverables:

Report will be provided summarizing all activities, including total production and return rate estimates. We will also generate the **final chapter** needed for the Mass Rearing Manual – how to generate your own starter stock.

Data to be Collected:

A rearing spreadsheet will be completed for each participant lake, documenting for each chamber:

- # EWM stems in (each feeding)
- # weevils in
- # weevils out (estimated, based on sub-sample counts)
- Return rate (# weevils out/# weevils in)

For the each lake project, average return rate and total estimated production will be estimated based on the 10% subsamples. Total estimated release (total production – subsamples) will also be calculated.

Temperature data will be compiled into a spreadsheet and graphed for each rearing site. Min, max, mean, and 90% confidence interval will be calculated for comparison to optimal temperatures for weevil production.

Milfoil weevil population density surveys will calculate the average number of weevils per stem (all life stages) as a lake-wide average. Average number per stem will also be calculated for individual milfoil beds to elucidate variation between different areas of the lake.

Macrophyte PI data will be entered into the WDNR Aquatic Plant Survey Spreadsheet to calculate statistics pertinent to determining an increase or decrease in EWM and other native plants, such as relative frequency and average rake fullness. Data will be compared to previous year's data using chi square tests to test for significant increases or decreases in EWM and native plants.

Existing or Proposed Partnerships:

Golden Sands has demonstrated decades of commitment to protecting lakes on many levels. Our Regional AIS Program, dating back to 2003, has become a model of efficiency and efficacy in the state, annually harnessing over 1100 hours in volunteer activity towards AIS prevention, monitoring, and control. We have been active in milfoil weevil study and research since 2004, with two of our staff now holding graduate degrees on the subject.

Golden Sands RC&D:
A premier partner in
biocontrol research and
the fight against AIS
since 2003.

Relationships exist and will be strengthened between RC&D/Thorstenson and the respective DNR lake managers, Beaver Creek Reserve – Citizen Science Center, Lake Holcombe Improvement Association, as well as between Thorstenson and EnviroScience, Inc.

Additionally, an exciting new partnership is being struck with Tom Hamilton, retired fish biologist in Michigan. He will be doing light attraction and propagation experiments in parallel with our studies, sharing and comparing his results ours to speed progress.

Role of Project in Management of the Lake:

Due to budget limitations, some lake groups inquire about putting in "just a few" weevils, which is not effective. The candidate lake groups have chosen biological control as part of their EWM management plan; it is just a matter of making it a more affordable option to them. Our original pilot study trained them in the mass rearing methods, and we were just about ready to release the manual to lake groups statewide, but starter stock is no longer available from EnviroScience, Inc. This project will complete Perch and Holcombe partners' training in weevil monitoring and final rearing results, AND develop the starter stock collection and propagation methods needed for the **final chapter of the biocontrol manual**. Once approved by WDNR, this manual is intended to become the **comprehensive guide to implementing EWM biocontrol**, using milfoil weevils, from "Is biocontrol right for my lake?" to "Where can I get milfoil weevils?" to "How do I know my weevils are working?".

Writing the book
on biological
control

Our project partners are committed to improving lake health on a holistic level:

Lake Holcombe Improvement Association has recently made, and continues to make, many habitat improvements, including "fish sticks" and island erosion stabilization, as part of their new lake management plan. Upon discovering EWM in their lake, the LHIA employed the use of chemicals for two years, with no success, whereby they turned to biocontrol for solutions. They committed fully to the endeavor, fundraising

Protecting lakes
on a
landscape level

for the needed cash by creative means, such as “weevil parades”, and even generating over 300 hours in volunteered time in the first year of participation with the weevil mass rearing research grant. This project would **further assist in implementing** their biocontrol program by developing the needed collection and propagation methods, and training them on monitoring methods.

St. Croix County, as manager of Homestead Park which surrounds Perch Lake, has a Master Plan for the park that includes habitat and shoreland restoration projects, such as their native plant restoration around the catch basin in 2008 (pictured below), and planting 100 native dogwoods in the crib wall to enhance the crib as fish habitat. Their plan also includes addressing invasives, both in the lake and on the land, including the removal buckthorn and knapweed surrounding the beach area in 2013 and annually raking/handpulling the EWM in the swimming area to avoid the controversial use of chemicals. Biological control of EWM is just part of the larger picture of lake management and improvement at Perch Lake, but it is a very important part to restore the valuable, two-story fishery in this Outstanding Resource Water (ORW). This project would **continue the groundwork laid** with the volunteers at Perch Lake during the milfoil weevil mass rearing research study by refining their mass rearing program and training them on monitoring methods.

Building on our past success for successful long-term implementation of biological control



Before (left) and after (right) photos of the native plant restoration in the storm water catch basin by the boat rental area. This planting complements the prairie restorations on the hilltops surrounding Perch Lake.

In addition to what our partners are doing, Golden Sands RC&D is active in protecting lakes by reducing non-point source pollution reduction from agricultural fields, the largest remaining source of pollution in the state, through our Managed Grazing Program. We have had a grazing specialist working with farmers throughout Central Wisconsin to convert fields from conventional corn production (which produces 3-6 T/ac/year of sediment) to permanent pasture for grazing (which produces 0.5 T/ac/yr). Our grazing specialist program is currently targeting the Mill Creek Watershed, a river on the 303(d) list and a tributary to the Wisconsin River flowages, which annually suffers from nuisance plant growth and toxic algae blooms. We also work in partnership with Waupaca and Waushara Counties to take groundwater lessons into schools, teaching area students about where their drinking water comes from and the important interconnectedness between groundwater and surface water.

Timetable:

- Apr 2014 - Project kick-off. Confirm green house space at UWSP, confirm timeline with project partners.
- May 2014 - Greenhouse set-up.
- Jun 2014 - 1st wk of June = partners mail food stems for propagation; weevil collections; start propagation tanks at greenhouse.
2nd wk of June = mass rearing tank setup (Perch, Holcombe), deliver weevil starter stock to mass rearing partners
- Jun-Aug 2014 – Groups maintain tanks, feed weevils on Day 21 and Day 42.
Thorstenson makes three on-site visits to check on tanks, check-in with teams, review temperature records, etc....
CLMN-weevil Monitoring training, Perch and Holcombe volunteers.
Fish surveys on Perch and Bass lakes.
- Jul/Aug 2014 – Pre-stocking macrophyte and weevil density surveys.
Day 55 = on-site visit to collect subsamples, weevils are released.
- Fall 2014 - Laboratory work (Thorstenson) to estimate total production and return rates.
- Winter 2014-2015 - Report to DNR and project partners.

(Repeat in 2015, 2016)

Plan for Sharing Results:

Final report and final chapter to biocontrol manual will be provided to DNR and all partner organizations. Upon approval by DNR, the biocontrol manual will be distributed through the DNR Lake Team and AIS Coordinators networks.

References:

- Hanson, T., C. Eliopoulos, and A. Walker. 1995. Field Collection, Laboratory Rearing and In-lake Introductions of the Herbivorous Aquatic Weevil, *Euhrychiopsis lecontei*, in Vermont. Vermont Department of Environmental Conservation, Waterbury, VT.
- Thorstenson, A.L. 2011. Biological control of eurasian watermilfoil (*Myriophyllum spicatum*) using the native milfoil weevil (*Euhrychiopsis lecontei*). M.S. Thesis. University of Wisconsin-Stevens Point, Stevens Point, WI.
- Ward, D.M. and R.M. Newman. 2006. Fish predation on Eurasian watermilfoil (*Myriophyllum spicatum*) herbivores and indirect effects on macrophytes. Can. J. of Fisheries and Aquat. Sci. 63:1049-1057.



GOLDEN SANDS

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Resolution: EWM Biological Control

COUNTY OF: **Statewide**

WHEREAS, our lakes are valuable to our local economy and are an important resource used by the public for recreation and enjoyment of natural beauty; and

WHEREAS, the Golden Sands RC&D Council, Inc. has established itself as a valuable cooperator in the research, demonstration, promotion, and application of biological control methods, and

WHEREAS, the Golden Sands RC&D Council, Inc. recognizes a need for making biological control of Eurasian water milfoil a more practical, attainable option to lake groups, and

WHEREAS, the Golden Sands RC&D Council, Inc. recognizes that without proper education and monitoring, biological control of EWM cannot be successful, and

WHEREAS, we are qualified to carry out the responsibilities of the EWM biological control project described in the state grant application; and

THEREFORE BE IT RESOLVED THAT:

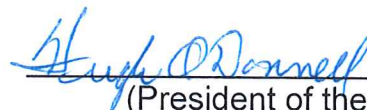
Golden Sands RC&D Council, Inc. requests the funds and assistance available from the Wisconsin Department of Natural Resources under the Aquatic Invasive Species Grant Program, and

HEREBY AUTHORIZES **Hugh O Donnell** to act on behalf of Golden Sands RC&D to submit an application to the State of Wisconsin for financial aid for the purposes of continuing the milfoil weevil mass rearing pilot study; sign documents and take necessary action to undertake, direct and complete an approved aquatic invasive species grant project.

BE IT FURTHER RESOLVED THAT Golden Sands RC&D Council, Inc. will meet the obligations of the aquatic invasive species grant project, including timely reporting of the results, and meet the financial obligations under this grant, including the prompt payment of our local share commitment to project costs.

Adopted this day 16 of JANUARY, 2014

BY:



(President of the Board)

Golden Sands RC&D Council, Inc.