Western Upper Peninsula Cooperative Weed and Pest Management Area
Spring Meeting 2008
June 4, 2008
Watersmeet Town Hall

Meeting Notes

Milfoil Weevil Slide Show
Presented by Courtney Marquette of EnviroScience Inc.
Contact Courtney at: 330-688-0111 or cmarquette@enviroscienceinc.com
Much of the information she presented is available on an EnviroScience DVD (available at the Ottawa National Forest office in Ironwood) and on their webpage at:
http://www.enviroscienceinc.com/

- EnviroScience is in its 10th year of using weevils as biocontrol for Eurasian watermilfoil (EWM)
- EWM was introduced in the 1930s or perhaps as early as the 1880s
- Aquaculture operations by US government during WWII may be the source of introduction
- Now only Maine and Wyoming of continental 48 states do not have EWM; Montana found first occurrence in river last year
- EWM grows in 1-4 m of water, Courtney has seen it to 30 to 40 ft depth
- EWM reproduces by autofragmentation

(Courtney also reviewed other general EWM info and effects of EWM that this group is aware of; no notes taken)

- Prevention cheaper than treatment
- Physical controls: mechanical harvest (dredge, rotavate, suction) and benthic barriers or shading
- Chemical: continued (e.g. annual) input needed, expensive, people often have health and environment concerns with the use of herbicides
- Biological: Sally Sheldon, Middlebury College, New Hampshire investigated a natural decline of EWM population in Brownington Pond, Vermont, to learn about the weevil, *E. lecontei.*
- Weevil life cycle: adults lay eggs on plant meristems (growing points); eggs hatch to larvae.
- Larvae cause most damage, burrowing and pupating in stem, then emerging as adults, size of sesame seed.
- Can keep in lab up to 50 days as adults. Egg to egg generation time is about 25-32 days.
- Larvae start at tip of plant, burrow through stem, disrupting tissue and vascular flow, leading to plant decay
- *E. lecontei* can get several generations per year; last one goes ashore to overwinter, otherwise an aquatic life cycle
- Weevils are specific to watermilfoils and apparently prefer EWM over native milfoils
- Controlled cage studies, then open release studies in MA, VT and WI
- In 1998, based on 10 years of research by Sheldon and others at Middlebury College, EnviroScience was selected to make MiddFoil commercially available. It is the process not the insect which is patented.
- They have conducted treatments in 120 lakes in 12 states since 1998. They added 2 Canadian provinces in 2005.

- "MiddFoil Process" which they provide includes survey/mapping of the stocking and monitoring sites to establish baseline conditions; stocking of the weevil adults; end of season follow-up surveys; and an annual report and future recommendations.

- Case Study: Paradise Lake, Cheybogan MI
1900 acres, 6 ft average depth
Placed 10,000 weevils in 1998 at 3 sites, 3000 the next year at 1 site
8 yrs later: 1999 to 2003, weevils overwintered and returned each year, increasing and spreading from stocking sites. By 2003, diverse native plant beds were seen. Stable and balanced milfoil and weevil populations 10 years later (5-10 ac EWM persisting)

- Lake St. Helen
2400 ac, 5.8 ft average depth
5 yr program, large stocking of weevils. Found in the first year that some EWM plant beds were nearly gone, too few to survey. Damage was severe and they found a dramatic decrease in EWM by 2002 end of season. In 2003, diverse native plant beds back. Moderately dense beds of EWM crop up occasionally but by the end of same season or early the next, the beds become damaged and fade away. 2007: down from 2000 acres to about 50 ac of milfoil. Property values coming back up. Weevils still there in 2007.

- Courtney usually finds native weevils in most lakes: the MiddFoil process artificially bumps up the stocking level to affect EWM more. She explained that having more weevils close together allows them to reproduce faster and increase population levels to attack EWM. Under non-stocked conditions, she described the weevils as being too far apart to find each other for reproduction and rapid population increase.

- Van Etten Lake, widened river, fast turnover, 1400 ac, 14 ft average depth. Stocked 65,000 weevils each yr for 3 yrs starting in 2000. EWM was on perimeter of lake with over 1000 stems per meter sq. 2000: large declines in EWM by end of summer, rapid weevil spread. Relatively little EWM left. 2001, did survey only: did not need to reintroduce weevils this year because worked so well in first year.

-Some programs get weevils every year, others get it for 2-3 years and then don't need to get more.

Q: What about lakes where weevils can't sustain themselves over winter and you have to restock annually? Is fish predation an issue causing the need to restock?
A: Fish predation was not found to be significant, too small a food source. In one study, they collected 60 fish in a lake and checked, only 1 ate weevils. Another study of 225 Michigan fish, only 10 ate weevils. Every lake has fish but they area not eating the weevils. (SEE REFENCES IN APPENDIX FOR MORE ON THIS TOPIC)
Overwintering: people used to think the shoreline condition was key to overwintering success. Some lakes were all seawall: people were not sure if that would work for overwintering weevils, although the weevils could climb over the wall onto lawns. Weevils seem to survive at some level even with lawns. If fewer overwinter, then there are fewer the next year and it takes longer to get the population back up to EWM-damaging levels. On one lake, EnviroScience wondered

if they stocked too many weevils because it seemed like they all died. But a year later, it resolved to a stable population.

Q: Some lakes don't work?
A: Weevils do not seem to like to eat the hybrid milfoil plants. Courtney is collecting some purported hybrids from WI River this week to see if they can raise beetles on hybrids for several generations and then release those ones which may come to prefer hybrid milfoil. Otherwise, she has always seen the biocontrol work. But some years it takes longer than she would guess.

- 66 lakes in MI have been treated with MiddFoil. 2 were not successful but some were slower than others. And in some cases the lake association will use herbicide too, but then that affects the weevils. Combined use of biological and chemical control needs careful thought. If you take away EWM with herbicide so weevils can't find food, then their population goes down.

Q: What lakes work best? Flowing, contained, size?
A: She has used weevils in small ponds to Houghton Lake (25,000 ac). Has used in rivers as well. Depends on local situation.

Q: Hagerman Lake lost all vegetation by crayfish, fish cribs fixed that, lake is spring fed and no EWM yet. DNR told them northern crayfish cycles up, runs out of food and dies. Do weevils run up numbers, crash and die?
A: Weevils will not completely die off or move onto native plants (other than occasional bite).

- Van Etten Lake has a large oscillation yearly, with more EWM surging annually and being controlled. But they may get a few more beetles to control better.

<u>Eagle Lake, SW Michigan</u>
200 ac of EWM: $35,000 bid for weevils vs. $66,000 herbicide bid for 3 yrs. 3 yr stocking program, 15,000 weevils first year, 28,000 total. First season, EWM still dominated. Slow reaction. Second year, EWM was declining, natives were returning. 2001 showed more rapid spread of weevils and more EWM control. In 2005, they had a total resurgence of EWM back to pre-weevil treatment levels. But in 2007 control came back and it looked good again. First time they saw such resurgence.

MiddFoil Process
- Pros: long term control, selective to EWM, no non-target impacts. Flexible, can be integrated with other control methods to start. Affordable. Takes typically 3 yrs to get controls
- Cons: not a quick fix

- Rate of control is depending on number of weevils stocked. Commit to 2-3 years. May take more than 1 yr for weevils to increase to controlling level. Won't be a problem like ladybugs in house, etc.

- Strategies: stock more in fewer locations; 1 yr vs. multi yr stocking. Multi-year: minimizes seasonal variation, spread costs out, gauge progress before commit to next stocking.

Q: Is it better to front load introduction vs. spread over several years?
A: Better to spread out, adults fly and are carried on wind, could end up in windward end of lake. So may need to spread them around more to match up to EWM patches.

Q: Why in Asia, N. Africa and Europe is EWM not invasive?
A: Probably more competition there to control it.

Q: 600 ac lake (Duck) with 5-10 acres of EWM they have been treating chemically each year. Is this a candidate for MiddFoil?
A: Is EWM spread out? If so, would need to spread out weevils in the patches but should work. Weevils are not good swimmers or fliers (can raft on plants). So might not be ideal to use weevils on Duck unless you stocked each patch because might not get them to spread around.

Q: Do you need DEQ permit to use weevils?
A: No. She has APHIS permit to move beetles into MI.

Q: Questioner lives on a lake with EWM and the riparian owners don't want to help, can he just stick some weevils in? Purchase bugs only without the survey part?
A: Courtney will come and stock bugs and then leave but she prefers to do the whole survey etc. so she has info to do the control most effectively and better respond to questions. Flexible in how she will work.

Q: Chicagon Lake: 1100 acres, spotty EWM in 3.5 ac. How many weevils would you need?
A: $1200 for units of 1000 bugs, that's how they sell. $1.20 a bug. Smaller bugs tend to be more expensive than larger species that are used in biocontrol (of other weeds than EWM). Chicagon might need $2400 worth. She has projects from $4000 to $50,000.

Iron Lake: Will be putting in 6-7000 weevils this summer. Sue Rice is contact. EnviroScience will be working in Menominee River so was able to give Iron Lake group a reduced rate.

Q: Bass Lake weevil project—when will that occur and can he observe? ISCCW is helping Bass Lake try this.
A: Courtney hopes to start next week or the following week. Yes, he can observe but not much to see. Techniques are improving. In 1998 they guessed at how many to put where. Found that if you put 5000 in one area they will increase faster than if you split them up. Bass Lake: 9000 bugs and will likely put as 5000 in one group and 4000 in another. She prefers to stock close together.

Q: Leap of faith from herbicide to weevil: is there a window of time to not use herbicide to avoid damage?
A: Depends on chemical. Some previously treated lakes will have weevils on EWM that is regrowing. Herbicide applicators tend to be negative toward MiddFoil because it is business competition and sometimes hasn't work with test lakes where they would do ½ and ½ of each control type.
If moving from herbicides to weevils, due to time lag for generations, the EWM may increase and look worse before it gets better.

Q: How about northern lakes and climate?
A: Shorter growing season so may get fewer generations. Weevils do OK up here. Sawyer Lake: weevil control of EWM is not working in one part; they are testing that for the milfoil hybrid.

Q: The Wisconsin Cooperative Fishery Research Unit published the report "Wisconsin Milfoil Weevil Project: 1996-1998 Results" in 1999. This study did not recommend weevils for rapidly growing populations of EWM. How does EnviroScience respond to that study?
A: In really big infested areas, Courtney may recommend they try herbicide to knock EWM back and then use weevils for longer term control. Contact herbicides: plant rebounds faster. She might place weevils in another part of the lake, where plants are rebounding as food sources. Then she'd look where bugs are and use herbicides where they are not.

Q: The lake that started this weevil investigation (Brownington Pond, Vermont) had a natural decline. How often does this happen?
A: She knows of 1 lake in IN and one in IL. WE Energies site: found lots of weevils and they have been finding some EWM beds gone, so maybe are getting some natural decline. She is surveying this year over 1000 ac of EWM looking for weevils. May need to augment the weevil population in some areas.

Q: Courtney said Cowboy Lake in Dickinson County contains the Eurasian watermilfoil/ northern watermilfoil hybrid. How do they know that? What lab is currently offering that service?
A: Courtney said WI DNR had samples genetically tested, at a lab in Ohio. Some state agency has to ask or the lab can't do test. Verified as hybrid. They are funding a grad student at MSU to study weevils and starting a PhD student in OH? To study EWM, such as differences in bugs and plants state wide.

Genetic testing note: Ted Ritter: WI DNR—was sending samples east to Michael Moody's lab in Connecticut. This lab is no longer available. Ted Ritter stated this past winter a lab was set up at Univ. Wisconsin-Stevens Point to do this test, but we have been unable to confirm this. [*Later in 2008 the CWPMA learned Dr. Ryan Thum of Grand Valley State University is doing these tests.*]

Q: Watersmeet Lake status: amount of EWM?
A: Ted: Very bad, and no management plan. Vilas County has other infested lakes too.

EnviroScience may open a satellite office in Iron Mountain. Courtney will be up in the UP 5 times this summer and may do more work up here.

Q: EWM propagates faster in dark vs. light?
A: EWM does not need much light so grows in either clear or stained lakes. Nutrient rich sediments promote growth over sand substrates.

Q: Is Courtney available to go to lake assoc meetings?

A: Yes, she will be at CCROA meeting on June 21 and can do others. At Lake Antoine tomorrow. Can set up some other meetings.

For more information, visit the EnviroScience web site: http://www.enviroscienceinc.com/

Grant Application Results

WUPCWMA did not receive the PTI grant we applied for. We asked for $40,350. No particular reasons were given by the granting foundation for why the grant application was not approved.

ISCCW received a PTI grant, as they have for several years now. ISCCW is a separate corporation from Township, still waiting on final paperwork. Membership drive, 186 members. Still getting more. Raised over $20,000 in private donations. Made them more aggressive in PTI application. Last 3 yrs asked for $10,000. This year asked for more money because paperwork effort was similar. PTI wants 50% match. Applied for and got $40,000. Entered into contract with Township for education etc. Township also gave matching funds. Applied to LVD Tribe for 2% funding (state agreement for casino revenues). Did not get these funds. Also applied to Boat U.S. Foundation grant. Up to $4000 available for CBCW program. Boat US liked the proposal and eventually as able to give the $4000. No match required but can offset match on PTI. So ISCCW has $86,000 to work with this year for Township lakes.

Planned projects: education. Delores Sewell hired for 32 hrs/wk. They also hired 3 other part time educators to work 16 hrs per wk. Several of them went through CB/CW training and can train others. Want to expand volunteer base. On each lake with lake association or public landing, they want to get a team of volunteers. About $10,000 for boat landing education. Also got some kits and materials for volunteers to use.

Purchasing a boat washer. Checked out the portable one that Notre Dame demonstrated a year or so ago. Nice unit but price went way up, to over $50,000. Looked into making their own with off the shelf components. But Joe LoMastro found a manufacturer in MN that makes a model they like. Will use in the summer parades as well as for boat washing. Boat US grant will pay for signs that go with unit. 4000 psi pressure washer (gas powered) and a heating unit. Recommend 104 degrees to kill EWM. This unit raises it to 240 degrees (or lower settings), with diesel burner. Also has a 250 gal water tank. Will ask permission of boat owners before washing but are also looking into liability insurance for washer. At infested lakes, they will mostly try to clean boats that are leaving. Other lakes, try to clean before they enter the lake.

They have set up a website, http://www.lakeguards.org. http://www.isccw.org is the alternate name. Produced restaurant placemats. Got 22,000 at first, used most of them up so far. Will print more with the Boat US grant.

Treatment: ISCCW will help lake associations with treatment. For Bass Lake, helping with weevil treatment. 50% match for them, in advance so they can do this. For other lakes, match up to 50% of their cost after treatment. First year, matched 30% but able to match more now.

Surveying and monitoring: ISCCW has contract with Barb Gajewski to survey or monitor 17 lakes. Also contracted with Barb (and with help from Ted) to train volunteers in survey and monitoring.

Education Committee
Jim Floriano, chair
ISCCW meets 3rd Tuesday of the month at 9 am Central at Watersmeet Ranger District conference room.

Lake Treatment Plans for 2008

MDEQ Permits, 2008

Lake	County	Responsible party	Permit No.	Target	Herbicide
Brule Lake	Iron	Kenneth P. Coles	08-98-0011-0	Bulrush	
Chicagon	Iron	Chicagon Lake Homeowners Association	08-98-0003-0	Eurasian watermilfoil	2,4-D
Duck	Gogebic	Duck Lake Nuisance Aquatics	08-98-0005-0	Eurasian watermilfoil	2,4-D
Runkle Lake	Iron	Runkle Lake Association	08-98-0056-0	Eurasian watermilfoil	2,4-D
Langford	Gogebic	Langford Lake EWM Association	08-98-0775-0	Eurasian watermilfoil	2,4-D
Lindsley	Gogebic	Cisco Chain Riparian Owners Association	08-98-1036-0	Curleyleaf pondweed	Aqathol K (endothall)
Fishhawk	Gogebic	Cisco Chain Riparian Owners Association	08-98-1037-0	Curleyleaf pondweed	Aqathol K (endothall)
Clearwater	Gogebic	Cisco Chain Riparian Owners Association	08-98-1105-0	Eurasian watermilfoil	2,4-D

Bass Lake weevils

Buck Lake Just started a lake association last Saturday. 150 ac lake with 50 or more ac of EWM. 37 lake owners. Interested in weevils. Some lake association members very much against herbicide, draining the water level for EWM control, even against having the association. Hope to get up to half of property owners as members.

Chicagon Lake Got DEQ treatment permit. Waiting for WI Lakes and Ponds to treat 3.5 acres with 2,4-D later in June.

Clearwater Intend to treat EWM again. They report about 5-6 ac spread out around lake. Working pretty well with annual herbicide spot treatments. May consider weevils and use herbicide annual $ amount for that instead. This year, planning for 2,4-D with Bob Langjahr, Aquatic Biologists, Inc.

Crooked Barb is contracted to monitor here (ISCCW). No lake association but they have an account and a little money for some additional work in the north bay. FS help requested for whole-lake work, but unlikely to be able to help.

Duck Received DEQ permit to treat up to 5 ac. Barb contracted to do surveys. Dave Anderson/Flintsteel would treat in next few weeks.

Fishhawk Received DEQ permit for curlyleaf pondweed (CLP). John Skogerboe (Army Corps) got involved because DEQ was making unnecessary restrictions on herbicide use and he wanted to be sure herbicide (aquatholl) was used right. But he did not find any plants of CLP in early spring survey. It could be there at very small numbers. John will keep monitoring to see if increasing. CLP may not become a problem in this lower nutrient type lake. Recommends a survey of entire Cisco Chain. If CLP is widespread at low numbers, don't treat. If it is only in a few spots, might be good to treat. Full chain survey has not been discussed yet by CCROA. Three lakes are on state border, so harder to monitor, each state expects the other to do it. Aquatholl is broad spectrum, better not to use later in spring or summer when native plants are up. Also CLP less susceptible later, so John does not recommend a treatment in July if they find more.

Ice—no representative at meeting.

Iron—6000 weevils to go in this month.

Lake Emily Dara Olson found CLP. Sue Wodjula got samples from a resident. It was not CLP, was *Potamogeton* probably *robinsonii*. Also some *Chara*. But no CLP. So they need to look more.

Lindsley Found CLP in there, was treated by ABI, 2 acres with Aquathol K.

Paint Pond EWM We Energies. May be weevil treatment there again, there was last year.

Pomeroy No treatment planned. Over 20 ac of EWM. More signs to go up to alert lake users to clean equipment.

Prickett UPPCO. One acre may be treated. Drawdown and herbicide in 2009. Also plan to map infestation thoroughly in August.

Runkle Got DEQ permit. Summer snowmobiling outlawed by city ordinance (Crystal Falls), to help slow spread of EWM.

Langford John Skogerboe: lake was treated with 2,4-D for EWM on May 19 . He did a point intercept survey first. Percent occurrence of EWM was down from last year but still some thick patches, mostly in band of 9-11 feet depth, compressed into that more. Aggressive treatment this spring—did whole contour at 9-11 feet. Evaluating. Hoping to decrease patches that would have to be controlled on annual basis. Last year: treated very early. EWM went into hyper growth phase during that time (hot summer) and perhaps did not take up herbicide as much because of that. This year, got it while plants were smaller and not in rapid growth. 5 year study. Will treat again next year. Fish monitoring during experiment. Also dissolved oxygen and water samples. One week after treatment last year, the 2,4-D concentration was undetectable

by one lab. Also taking Secchi disk measurements (light penetration). John is also looking at selectivity. 2,4-D is selective to dicots not just EWM. Did not see any ill effects last year from treatment.

Pete Djupe Q: Some lakes are "sour" and were treated with lime. Any effect on EWM?
John: Has a colleague looking at small lab experiments. Does have an effect on plants. EWM likes it more alkaline.

Lake Monitoring Plans

All lakes in Watersmeet Township with a boat launch or near an infested lake will get surveyed. Over 300 lakes in township. 17 with contract. 4 with infestations to get more detail survey.

Ottawa NF will do some monitoring, based on susceptibility and which lakes no one else is doing.

Iron County: Is anyone going to be surveying? No plans. Some riparian property owners can do some surveys.

How about going to boat dealers and asking them to educate their clients? *E.g.* Eagle River. Some dealers are delivering boats and jet skis with weeds on them.

Round Robin of Attendees and news from their organizations

Iron County Coalition of Lake Associations
Elected VP, but Pres left. Working on bylaws, not incorporated yet. One member won a radio spot and they are preparing an invasive species public service announcement for boaters.

Chicagon
Waiting for lake to be treated. Meeting Monday. Encourage attendance at Ted Ritter's free training on CB/CW. Town of St. Germaine, contract with Trees for Tomorrow. Booth and a brief version of CB/CW training at Farmer's Market. Did in the past with Lakeland Discovery Center but that person moved on.

CCROA
They are monitoring in June or early July with lake representatives. Weed ID, send in reports. Not planning to change anything this year but looking to add more fisherman contacts, talk to lodges etc. Trying to keep it non-confrontational and educational. Put out a newsletter regularly on NNIP etc. 456 members. Business meeting, annual picnic, and a fundraiser on Father's Day.

Golden Lake
They are doing periodic surveys.

Lake Mary

Paul Dalpra checks it. Lake Association and fees to have a small kitty for emergencies. Worried that it will get infested with EWM because near infested lakes.

Buck Lake
No report.

Long Lake
They do their own monitoring. They are doing some barberry spraying this year.

Lake Gogebic
Want to put up wooden signs from Nicolet Sign CO. about $300 each. Signs will show how to clean boats and give ID info. Will put at Ontonagon County and Gogebic County access, state park, and Bergland Township park. Have spiny water flea in the lake.

Langford
Riparians are monitoring and doing visitor contacts on holidays. Annual meeting. Asking for $100 per owner for treatments.

Hagerman
177 members, 850 ac. Annual lake meeting 2nd week in August. Put out a property owners association book with milfoil and other info and this is a directory. Realtors want it now so they have to make more copies. Boat Parade July 4. Pete Djupe found a Northern Lake Living magazine with info on invasives, a free publication. Their large sign is up now on Ottawa NF landing. Has not been vandalized.

Duck
Barb will be there 2 times, starting this weekend to check milfoil areas from 2007 survey. Will use underwater camera to check. Later in summer she will do a full lake survey. Have their 17 sectors and property owners monitor. Will SCUBA for EWM found after treatment. Somewhat successful in removing plants. Plan an on-water session for 20 people on how to look for EWM (aqua scopes, use of sample grabber etc). Plan to put photos and info on their website as well. Duck Lake looked into self-application of chemical, but it was cumbersome to get certified and there are liability issues so they are no longer considering that.

Dinner Lake
110 ac. DEQ sent letters to several lake owners saying that DNR would be expanding boat launch. 25 owners. Public landing is in good shape and seems fine. Owners worried. Proposal to make landing twice as deep and wide as it is now, including dredging. No invasives now, worried they will get them from this. They wrote and opposed it. As did biologists for loon effects and the proposal has stopped for now. At least DNR would hold a hearing before expanding the landing.

Duck
Also had the DNR landing expanded a couple years ago. Cost $200,000. Wish the $ were spent on invasives instead.

County Line Lake
62 acres. DNR put in a new landing. Boat landing on a 3 acre part with a channel through there. Homeowner association inactive, only formed for getting electricity in to lake. Only a few owners. Barb looked at it about 3 yrs ago.

DEQ permit fees proposed to be raised. Some CWMA folks called in. Want to raise fees to cover their costs in declining state budgets.

Iron County
Susan Wodjula went to the stakeholders meeting in Lansing. Eric Bacon was helpful, wants to come up in August to UP. He is more or less in charge of the Aquatic Plant Program and very busy with other duties as well.

Notre Dame Study: Lindsey Chatterton (?) found that the test boat wash was not used that much, might be better to park it at a campground than at a lake.

Susan Wodjula needs to step down as CWPMA chair, as she is resigning from Conservation District. She will train in the next person but they won't have many hours to spend on invasive issues. 30 hrs per wk in summer. That could change. Conservation District is a 501-C3 corporation with 5 member board. Susan wants WUPCWMA to include Iron County but is not sure the next person will want to be chair or put much time into it. Suggests we use materials prepared by ISCCW wider into CWPMA. She will be here through the summer. So we will need a new chairperson starting this fall.

Bob Hillabrandt with Waterfront Products won the radio PSA. 100 spots on Fridays and Sundays starting around July 4. Broad County Radio. Sue W. suggests we get more spots on other channels.

Sue W. has signs to put up at landings if townships will provide the post and dig a hole.
She would like to get program going in community schools. Worked well in Dickinson County. Would like to get a usage sticker required in Iron County. Issues with enforcement if only one township does it, but if county-wide, might be possible.

Vilas County, WI Ted Ritter
Expanding from aquatics to terrestrial invasives as well. Needs to create a CWMA within Vilas County, formally in place in a year. That will probably focus first on terrestrials. He hopes it will later include aquatics. About 19-10 EWM infestations in county. All but 2 being treated. One of these is small, the other is Boot Lake, a very large infestation. Big Sand having a large treatment this month. $75,000 or so. All of the major infestations on Eagle River Chain are being treated (all with chemicals). State paying some of this. Treatments mostly done already this spring. $400,000 grant total: a chunk is for monitoring chemical residual in water and in sediments on Eagle River chain. Concern about chemical use so they are checking this. Took water and sediments pre-treatment and student will take more samples post treatment at intervals and compare. WI State Lab of Hygiene doing tests. Should have results by late summer and they will post results on website. (http://www.vilaslandandwater.org/)

Miscellaneous topics
Buck Lake needs sign for EWM
Lake Emily needs sign: CLP and Perch parasite
Iron Lake needs sign for EWM

ONF plant to print a 2009 version of the Clean Boats brochure. Any edits? Dickinson County requested we change their boater photo on front. Send any edits or cover photos to Ian.

Meeting in Lansing Will Buergey report
Mostly state was explaining why they couldn't do anything about NNIP. Group suggested lots of ways to raise funds—surcharges on fishing license fees, boat registration fees etc. State mostly wasn't interested in trying these. Said last time they raised fees, they sold fewer and got more illegal fishing. No MI legislators there. Overall it was disappointing. Did make some contacts. Some good presentations. Long driving time so would have been good to have a longer session to make it more worth the drive.

Section 206 Army Corps Letter
Any group can request assistance from Army Corps through this process. Watersmeet Chamber got original help on invasives through Chamber of Commerce. They are in line to get some help again. Having a congressman involved helps.

Donation boxes at lake by NNIS sign?

Notre Dame study results not out yet.

Purdue University has a camp at Fortune Lake. They have a boat and maybe can do some monitoring. Pete Djupe will talk to them.

GLIFWC: mostly not monitoring lakes in WUP this year.

APPENDIX: SOME REFERENCES FROM THE INTERNET ABOUT FISH PREDATION ON EWM WEEVIL, THAT PROVIDE A DIFFERENT VIEW THAN COURTNEY'S . Lake associations considering the use of weevils may want to carefully look at additional references to supplement the information EnviroScience provided.

Is predation by sunfish (*Lepomis* spp.) an important source of mortality for the Eurasian watermilfoil biocontrol agent *Euhrychiopsis lecontei?*
Sutter, TJ, Newman, RM. Journal of freshwater ecology. La Crosse, WI [J. FRESHWAT. ECOL.]. Vol. 12, no. 2, pp. 225-234. Jun 1997.

The aquatic weevil *Euhrychiopsis lecontei* is a potential control agent for Eurasian watermilfoil (*Myriophyllum spicatum*). Predation by fishes may influence populations of this beneficial insect. To determine if fish predation is an important source of mortality for *E. lecontei*, fish stomachs from two Minnesota lakes, Lake Auburn and Cedar Lake, were sampled monthly during the summer of 1994. None of the black crappie (*Pomoxis nigromaculatus*) or yellow

perch (*Perca flavescens*) stomachs from either lake contained *E. lecontei*. The frequency of occurrence of *E. lecontei* larvae and adults in sunfish (bluegill (*Lepomis macrochirus*) and pumpkinseed (*Lepomis gibbosus*) stomachs from Lake Auburn ranged from 10.3% in September to 28.6% in August. The mean number of *E. lecontei* adults per sunfish stomach from Lake Auburn ranged from 0.18 plus or minus 0.13 (plus or minus 2 S.E.) in May and July to 2.14 plus or minus 2.90 in August. Larvae of *E. lecontei* were found only in stomachs collected in August (mean = 0.21 plus or minus 0.31) and September (mean = 0.33 plus or minus 0.41). *Euhrychiopsis lecontei* pupae were not found in fish stomachs from either lake. *Euhrychiopsis lecontei* was rarely represented in the diet of sunfish from Cedar Lake. Larvae and adults were found in sunfish stomachs from Cedar Lake only during September (3.7% of stomachs; mean = 0.037 plus or minus 0.052 per stomach). Densities of *E. lecontei* were much higher in Lake Auburn than Cedar Lake, however, within lakes there was no correlation between *E. lecontei* density and either mean number or percent occurrence in sunfish stomachs. These data suggest that sunfish predation may be important and that with low *E. lecontei* population densities and high sunfish densities, *E. lecontei* populations could be limited by sunfish predation.

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Overwinter Habitat and the Relationship of Overwinter to In-lake Densities of the Milfoil Weevil, *Euhrychiopsis lecontei*, a Eurasian Watermilfoil Biological Control Agent
Newman, RM, Ragsdale, DW, Milles, A. and Oien, C. *J. Aquat. Plant Manage.* 39: 63-67

ABSTRACT
The native weevil *Euhrychiopsis lecontei* has been associated with declines of Eurasian watermilfoil (*Myriophyllum spicatum*). The weevil spends all summer on submersed plants, producing 3 to 6 generations. In September to November adult weevils move to shore where they overwinter in leaf litter at drier sites near the shoreline. Mean November shoreline densities from 1992-1998 at Lake Auburn (mean = 43 N/m2) and Smith's Bay of Lake Minnetonka, (mean = 125 N/m2) have ranged from zero to over 200 N/m2. Overwinter mortality is not severe (survival was typically >60%). Adults collected from terrestrial habitat have developed flight muscles and limited flight has been observed in the spring but submersed adults in summer do not have developed flight muscles. Adults return to the water in spring and females begin to develop and lay eggs after the water temperature reaches 10-15C. Spring (May-June) and Fall (September) inlake densities in these two lakes have ranged from zero to 40 N/m2 and Lake Auburn typically had higher in-lake weevil densities (mean of 15 N/m2 compared to 4 N/m2 at Smith's Bay). There was no relationship between in-lake and shoreline densities at Lake Auburn, but Smith's Bay spring in-lake densities were correlated with spring shoreline densities. Inlake densities were not correlated between the two lakes but shoreline densities were correlated over time, suggesting that regional climatic factors may influence shoreline densities. Weevils disappeared from Lake Auburn in-lake samples in July 1998; no weevils were found there in shoreline or in-

lake samples in 1999. In-lake factors such as fish predation may be more limiting than overwinter conditions.

See full article at: http://www.apms.org/japm/vol39/v39p63.pdf

Fish predation on Eurasian watermilfoil (*Myriophyllum spicatum*) herbivores and indirect effects on macrophytes Ward, DM and Newman, RM. Canadian Journal of Fisheries and Aquatic Sciences, Volume 63, Number 5, 1 May 2006 , pp. 1049-1057(9)

Abstract:
We assessed the effect of fish predation on native and naturalized insect herbivores of the invasive aquatic plant Eurasian watermilfoil (*Myriophyllum spicatum*) using manipulative field experiments within lakes and a field survey across lakes. For the field experiments, we manipulated sunfish (*Lepomis* spp.) density in cages in the littoral plant beds of two contrasting lakes: one with many sunfish, few watermilfoil herbivores, and abundant Eurasian watermilfoil; and one with few sunfish, many herbivores, and little Eurasian watermilfoil. Watermilfoil herbivores, including the milfoil weevil (*Euhrychiopsis lecontei*) and aquatic caterpillars, were suppressed by fish in both experiments. Herbivore density was also negatively related to sunfish abundance in the multiple-lake survey. We conclude that abundant sunfish can strongly suppress watermilfoil herbivores. Furthermore, in one of our experiments there was a marginally significant effect of fish exclosure on watermilfoil, suggesting that fish suppression of watermilfoil herbivores can have a positive, indirect effect on plant growth. Fish predation on macrophyte herbivores may be an important trophic interaction in freshwater lakes.

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