Lake Minnetonka Conservation District

2006 Video Launch Monitoring Summary

Environmental Sentry Protection, LLC

Background

In June of 2006, the Lake Minnetonka Conservation District (LMCD) approved a grant of a proposed demonstration project to explore new methods and strategies to prevent Zebra Mussels from being introduced to Lake Minnetonka. The main intent of this study was to determine how video inspection of boats prior to launch may affect boat and trailer clean off activities by boaters which would reduce the risk of further Aquatic Invasive Species being introduced. This project was conducted alternating a monitoring system between Grays Bay and Spring Park public boat launches.

Over 2500 video sequences were captured in the summer and fall of 2006. This report presents a summary of this project, analysis of these videos, personal observations of dynamics at boat launches, and recommendations for launch inspection methods for future years.

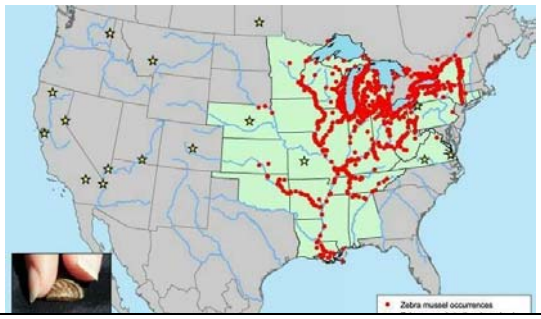
Initial Project Goals

The following high level goals were identified in the initial grant agreement between LMCD and ESP, LLC and achieved during the course of this study:

a) Educate launch visitors on clean-off procedures with this monitoring project
b) Capture and store information on pre-launch and post-launch clean-off activities
c) Achieve 24x7 operation of system including night-time monitoring
d) Analyze clean-off habits while interns are not present
e) Identify educational / monitoring steps to improve boater compliance
f) Develop summary report on effectiveness of unmanned monitoring

The Threat of Zebra Mussels

Our lake resources are under an unprecedented threat from Zebra Mussels that carry significant impact to lake ecology, property values, recreational enjoyment, and native species. They have no control technique that can be used to eradicate their presence once they infest a lake. Zebra Mussels siphon plankton at the base of the food chain impacting fisheries. They die off and litter shorelines with razor sharp edges and foul smell. As they move up the Mississippi River and around Lake Superior, they have been identified in Lake Ossawinnamakee, Zumbro Lake, and Lake Mille Lacs in Minnesota. In Wisconsin they have already spread to 100 bodies of water. In Michigan, 227 lakes. Therefore it's clear why identifying strategies that can be leveraged to get boaters to clean their boats is important to Lake Minnetonka and other lakes.



Zebra Mussel Spread across the US

Analysis Method

Key to this project was to determine whether boat launch users were ***compliant*** with the law by observing whether aquatic vegetation was present on the boat or trailer. As Zebra Mussels are most frequently transported through mature mussels attaching to aquatic plants, this provides a strong indicator of compliance. The Internet based video camera was generally configured to record from 15-30 seconds once motion was detected. Future configurations will utilize a different sensor so that not all motion (e.g. geese, people) will trigger video capture. We could distinguish wires and straps from weeds dangling from the trailer. Not advertising the role of the I-LIDS during the first part of the study gave us an opportunity to compare boat condition before and after signage was posted at the boat launch. Since the focus of the study was pre-launch clean-off, to prevent Zebra Mussels, the I-LIDS unit was mostly focused on pre-launch (vs. post pullout) conditions. In order to gain a sufficient sample to identify trends, the ILIDS was setup to perform video monitoring at Grays Bay and Spring Park from 8/10-9/5 without posted signage. On 9/6/06, two signs were posted at Grays Bay launch (and later Spring Park launch) to alert users that the area was under video surveillance and that they were required by law to clean their boats/trailers prior to launch. (See Appendix B)

While we had hoped to observe the role DNR intern interaction with boaters played on their clean-off behaviors, our videos did not see, or schedules did not coincide, to produce as many intern-boater interactions as desired.

Project Implementation

Because Grays Bay is jointly operated by the LMCD, City of Minnetonka, and DNR, review of the project and approval had to be obtained from these entities. Final approval to utilize Grays Bay was completed on July 26. Hennepin County maintains the boat launch on Spring Park and provided approval on June 29. Grant objectives highlighted and italicized below…

1) Operational I-LIDS System

a) Define clean-off zone at Lake Minnetonka boat launch and signage
Completed with approvals of M.Pavelka, City of Minnetonka and J.Settles/T.Brough Hennepin County. Signs designed with input from DNR and Exotics committee.

b) Install I-LIDS footing(s) at clean-off zones (Grays Bay pre-launch /post launch options) In addition to 2 footings at Grays Bay, installed 3rd footing at Spring Park as approval was still pending from DNR for Grays Bay. Assistance from Hennepin County and City of Minnetonka supported footing installation.

c) Install I-LIDS on footing Single I-LIDS was rotated between footing locations as shown on website reports. Ability to store camera configuration aided time to re-install at each location.

d) Install Wireless Access Point (router /antenna) and broadband service at nearby location WAP installed at Grays Bay with external antenna and dedicated cable modem/router. WAP services at Spring Park provisioned from private company across street by adding a wireless router and antenna to their existing Ethernet connection.

e) Integrate system with network to capture/store clean-off activity video
Footage captured and delivered to server from early August through mid-October.

2) ***Post-operational Activities***

f) Install external light if power is available to I-LIDS
Request for power not approved for course of 2006 study. Provisions for external power exist in footing for future use.

g) Ensure transactions are web-reviewable by authorized project participants

Three web systems were developed and explored during the study: Stored video with date selection and summary report by date, online access to camera for live viewing, and Camera Station interface to playback stored video on server. (Appendix C.)

h) Review and identify potential violations during course of project

Over 2500 videos reviewed and violations were identified. Identities of violators not part of study.

Onsite activity at both launches totaled approximately 750 hours worth of effort in networking, camera configuration, and troubleshooting issues. A cookbook of recipes and procedures to implement remote monitoring with the network programs, camera, and interfaces was developed during this time that will facilitate future implementations.

The ILIDS housing is a hardened stainless steel casing that is bolted to a footing plate. Access to the inside of the ILIDS is gained thru the use of a special key to remove the dome at the top of the unit. The ILIDS sleeve consists of a network based video camera, 12V batteries, power conversion/sensing circuitry, and solar panels. The remote systems on the Internet hosted an FTP server for receiving video files, Apache Webserver, PHP developed website, a Java program for file conversion, and a MySQL database that stores video metadata.

Findings / Observations

The percentage of boats launching with weeds dropped dramatically after the posting of video monitoring signage. Launching boats with attached vegetation dropped from 7.4% to 1.78% when comparing pre-signage to post-signage periods at Grays Bay. At the start of the study I walked around Grays Bay and observed that on one Saturday in late July, a third of the boats had aquatics dangling from their trailer. While they had not left the launch indicating a violation, it indicated indifference to the issue. On September 6, a news crew did a report on Grays Bay just after the announcement of 11 new lakes with Eurasian Watermilfoil. A similar walkthrough of the parking lot revealed not one trailer with weeds on it.

The percentage of boaters inspecting their boats or slowing for camera inspection increased after posting of video monitoring signage. It was observed that boaters seemed to inspect more carefully or rely on slowing their boat/trailer while proceeding past the I-LIDS to confirm they had cleaned their craft. Before signage was posted it was observed that 3.17% of boaters performed inspection. After posting signage, 13.45% inspected or relied on camera for inspection.

Boaters tended to focus on cleaning off and inspecting boats after pullout vs. before launch. This is probably due to procedures the DNR and interns have been advising boaters to follow coupled with the hurry that people are in to get in the water once at the lake. The issue is that some boaters aren't cleaning off at other lakes and are just following others unknowingly launching attached aquatics as seen on video captures. Also the presence of a spray off facility presents an attraction for boaters to clean their boats at Grays Bay. A majority of boats on pullout used this facility.

The boating public accepted or endorsed video boat inspection. During the course of working on the ILIDS unit, there were over 100 people who would approach and ask **"What is that thing?"** referring to the ILIDS. I consistently replied that it was a demonstration project to

perform video monitoring of boats and trailers in an effort to understand if people are cleaning aquatics off of their boats prior to launch with a long term goal of keeping Zebra Mussels out of Lake Minnetonka. Most of the feedback was quite positive with "Great idea!", "Good to see something is being done", and "Wow, I hope you can keep them out." Other comments were less ecstatic: "Good luck with it.", "Cool idea". No one expressed a concern about their boat privacy, or personal privacy of being on video. The only objection experienced was from one local boater who thought that there was going to be Milfoil successfully removed from Lake Minnetonka. In fact the goal of the project is to in fact keep the lake in its current condition. This reaction seems to be in direct contrast to preliminary concerns projected on the public by the media and others.

There is a significant gap in launch coverage when boaters are not being reviewed for clean-off compliance. Heavy usage of the Gray's Bay boat launch occurs on weekends starting at 4:15 in the morning and continues to after midnight. The existing monitoring program had about 1996 hours of documented coverage across 5 launches mostly scheduled before Labor Day. The total demand for launch monitoring for 13 Lake Minnetonka boat ramps at 6 months of usage is 44,460 hours. This assumes boater usage between 5am and midnight. While this doesn't take into account the obvious heavier usages during weekends, only 5% of these potential usage hours were staffed at launches in 2006 which presents a significant opportunity for boaters to introduce aquatics into the lake.

DNR Intern protocols at the boat launch can go further to stop aquatics from being transported into and out of the lake. A uniformed person educating people to clean their boats clearly has an affect on boater behaviors. However, from what was observed visually and on camera, there is an opportunity to have a greater affect on boater behaviors by orienting procedures to talk to ***more*** boaters and incorporate boat and trailer inspection into the procedures. Based on gaps in the schedule and the August 10 start to the study, there were only 3 intern shifts where the camera was capturing boats at the stop sign while interns were present. Out of these 12 hours, interns were observed on four video sequences. This infrequent contact with boaters may have been due to trailers with AIS clean off stickers not being stopped or contact possibly occurring off camera. The procedures shared by an intern include not stopping boats if they have a sticker on the trailer indicating that they have been spoken with. There is a presumption that once 'educated' they're going to clean. In one case, I observed this was not the case. (See images in Appendix A). The procedures also do not encompass a direct inspection of the boat and trailer. It is in fact difficult to be everywhere at a launch. There were times when an intern and I would too late see boats leaving Spring Park with weeds dangling from the trailer.

Grays Bay

Grays Bay launch is perhaps one of the most heavily used launches in Minnesota with hundreds of boats using it daily and up to 500 on a weekend. While there are repeat users, there was limited commercial services using the launch and it seems that usage is evenly divided between fishing and recreational boating. More DNR intern time was spent at this launch, justifiably. When we initially started monitoring here you could see that there was Eurasian Water Milfoil on every third trailer in the parking lot. On September 6, you couldn't find a trailer with weeds in the lot. Many of the boats drove right past the stop sign proceeding to launch their boats. This might seem alarming except that most individuals have been instructed to adopt a 'clean after use' approach. Because of the presence of a clean-off hose post pullout, most boaters would stop and spray off their trailers and boats. In speaking with some of the trailer re-launchers of milfoil their perception was that it was ok because "I pulled it out of the lake a few hours ago". The only challenges with

the Grays Bay launch were in trying to initially network through the screened window. The City of Minnetonka was outstanding in their support for helping implement an external antenna, footings, signs, etc. to make any issues short-term in nature.

Spring Park

Users tended to move more rapidly with respect to usage of the launch. Commercial boat services with larger boats, local fisherman, and weekend recreational traffic was prevalent. This launch is unique in its heavy concentrations of milfoil which clogged its southern exposure. Resulting pullouts tended to universally have milfoil hanging to some degree off of the trailer or boat. More than 25% of the boats were seen leaving the launch area at the beginning of the study with weeds on the trailer. This was difficult to demonstrate with footage captured due to the two exits and distance between camera and exit. In fact, most of the trailers parked had hanging milfoil. In one case a milfoil laden trailer had a DNR educated boater sticker. On one occasion an older volunteer joined an intern in engaging boaters and conducting actual inspections which appeared to be impactful to boaters.

On two occasions when noticing weeds on boats that were about to launch, and no interns were present, I approached the boaters and notified them that the launch was being video monitored and that launching weeds into the lake was a violation of state law and a finable offense. The subsequent compliance that this generated was clearly noticeable and no evidence of aquatics were visible after these boaters cleaned their trailers. One of the infractors was a local commercial services company focused on boater pullouts and launches. While they were meticulous in how they prepped boats, they frequently had weeds when pulling out of the parking area. I approached them to educate them on zebra mussels and stopping spread of milfoil, to which they rationalized a local jurisdiction which in their mind exempted them from compliance. When I informed them that video monitoring was taking place that would potentially result in citations, I witnessed trailer inspection and clean-off as a new procedure they started following. One boater at Spring Park was thoughtful enough to be equipped with a tool enabling them to grab and remove milfoil from the trailer without getting out on the wet ground to remove it. ***The logical conclusion here is that every launch should be enabled with a permanent weed removal tool that could be used by the public to facilitate compliance with the law.***

Challenges in Obtaining Sample Videos from Spring Park

There were two specific challenges with obtaining larger numbers of video transactions from Spring Park earlier in the study. One was that the footing was established in ground that was mostly clay. It was also set at a level that turned out to be too far below surface level. When it rained the irrigation cover shaped rectangle would fill with water as it did not drain and would seep into the lower part of the ILIDS. While no risk was presented to users, we were challenged to keep the batteries and camera equipment as dry as we would have liked. Future changes to address this could consist of a drainage tube to the lower sidewalk, a full complement of bolts, and an improved gasket design. All of which are doable. The other challenge was the network connection. Initially the Hennepin County Sheriffs Patrol building was considered as a location for the Wireless Access Point. However, based on the fact that we couldn't shoot thru the trees and didn't have an outside antenna, we didn't get a signal at the I-LIDS. A business across the street was engaged to allow us to plug a wireless router into their network and aim an antenna at the I-LIDS. However we did not have control over the PORT settings on the shared firewall at this point and had to work with the existing configuration. Between dynamic port selection and an internal antenna, we had some latency issues initially in getting video files transferred. The Grays

Bay site by comparison was ideal in that we had control over the port settings, dedicated bandwidth, and an external antenna to obtain predictable performance in video transfer.

Spring Park also has an unfortunate traffic pattern allowing people to leave at the Sheriffs Patrol entrance as well as to the east. Due to a more chaotic traffic flow, it was difficult to determine whether clean-off took place after pullout.

Enforcement

In 2005 the Minnesota DNR reports that there were 5 citations issued to boaters violating AIS laws. Information from the DNR as to how many AIS violation citations were issued in 2006 was requested by Lieutenant Jess Storms from Captain Conrad from the DNR, but was not available at the time of this report.

It is clear from the behavior in the videos that AIS clean off needs to be elevated as a priority for all boaters. Boaters who were stopped carrying weeds claimed ignorance of the need to clean off their boats. There were also those that said it didn't matter.

Ken Soring, AIS Enforcement Conservation Officer for the DNR perhaps captured it best when at a recent meeting he shared

"There are three steps in soliciting compliance with the law.

1) Laws must be understood and supported,
2) There must be an expectation of an enforcement,
3) Then there must be a consequence for a violation"

Summary Statistics for Grays Bay Launch Monitoring

Grays Bay													
Presignage													
Date	**Day**	**View**	**Video Configuration**	**Boats**	**Stops**	**Inspects**	**Trailers**	**Weeds**	**Weed Video File #**	**Scheduled Interns**	**Intern Contacts on video**	**% Violations**	**% Inspects**
8/10/2006	Thursday	A	AVI-1st Camera	27	11	1	18	2	125, 176	None	0	7.41%	
8/16/2006	Wednesday	A	AVI-1st Camera	17	10	2	18	3	222, 228, 1453	None	0	17.65%	
8/26/2006	Saturday	A	AVI and MPEG videos-Camera out of focus	41	16	3	41	4	260, 262, 269, 283, 337, 347	Blank on schedule	0	9.76%	
8/27/2006	Sunday	A	MPEG-not focused	68	22		31	3	433, 490, 502	9am-5pm	0	4.41%	
8/28/2006	Monday	A	IR sensor used	6	2	0	0			None	0	0.00%	
8/29/2006	Tuesday	A	IR sensor used	26	4	0	23	2	596, 640	None	0	7.69%	
8/30/2006	Wednesday	A	Moved to Spring Park in pm	4	2		0	0		None	0	0.00%	
TOTAL				**189**	**67**	**6**	**131**	**14**				**7.41%**	**3.17%**
Postsignage													
9/6/2006	Wednesday	C	MPEG - IR delay	1		1	1			none	0	0.00%	
9/12/2006	Tuesday	A	MPEG - High Quality	21	1	4	16	0		none	0	0.00%	
9/13/2006	Wednesday	A	MPEG	56	20	12	37	1	866	none	0	1.79%	
9/14/2006	Thursday	A	MPEG	22	13	4	21	0	955		0	0.00%	
9/16/2006	Saturday	A	MPEG	8	4	4	5	0		1-5pm	2	0	
9/17/2006	Sunday	A	MPEG condensation	23	8	2	15	2	1212, 1227	1-5pm	2	8.70%	
9/28/2006	Thursday	B	MPEG	0	0	0	7	0		none	0		
9/29/2006	Friday	B	MPEG	26	0	2	16	0		none	0	0.00%	
9/30/2006	Saturday	B	MPEG-Excellent	77	8	12	20	0		none	0	0.00%	
10/2/2006	Monday	B	MPEG	16	12	1	34	1	1908	none	0	6.25%	
10/3/2006	Tuesday	B	MPEG	15	1	2	18	1	2041	none	0	6.67%	
10/6/2006	Friday	A	MPEG	11	1	0	12	0		none	0	0.00%	
10/7/2006	Saturday	A	MPEG-Good visibility	71	33	7	54	2	2232, 2242	none	0	2.82%	
10/8/2006	Sunday	A	MPEG-Good visibility	47	27	2	30	0		none	0	0.00%	
TOTAL				**394**	**128**	**53**	**286**	**7**				**1.78%**	**13.45%**

Weeds – All on boats that launched into Lake Minnetonka without being removed and were construed as a violation of existing AIS laws

FileID - # 1212 Intern is seen walking past boat at Grays Bay that has vegetation attached to trailer and will be launching

8/26/06 and 9/14/06- Discounted weed count from file-id 260, 269, and 955 as it was difficult to determine if it was aquatic plant

%Violations=Weed count / Boat launches

Stops – Stops boat/trailer and gets out of vehicle to walk around boat before launch

Inspects – Looks under boat or obvious slow Postsignage to permit camera review of boat

View – A:Grays Bay entrance facing ramp B: Grays Bay entrance facing traffic C: Grays Bay exit D: Spring Park facing ramp

Summary Statistics for Spring Park Launch Monitoring

Spring Park Boat Launch											
Date	**Day**	**View**	**Video Configuration**	**Boats**	**Stops**	**Inspects**	**Trailers**	**Weeds**	**Weed Video File #**	**Scheduled Interns**	**Intern Contacts on video**
Presignage											
8/30/2006	Wednesday	D	MPEG - nighttime	9	3	0	4	0		none	
8/31/2006	Thursday	D	MPEG	7	1	0	3	0		none	1
9/1/2006	Friday	D	MPEG-rain, batteries ran low	5	2	0	1	0		none	0
TOTAL				**21**	**6**		**8**				
Postsignage											
9/21/2006	Thursday	D		4	0	0	4	0		none	0
9/22/2006	Friday	D		3	1	0	7	0		none	0
9/23/2006	Saturday	D		2	3	0	13	0	2737	none	0
9/24/2006	Sunday	D		5	9	3	13	0	1399, 1400	none	0
TOTAL				**14**	**13**	**3**	**37**	**0**			

Weeds not counted as violation as they were on trailer on exit and may have been cleaned out of camera range

Recommendations

In order to achieve LMCD goals of reducing risk of Zebra Mussel introduction, I would offer the following recommendations:

1) **Coordinate and reach agreement on policies and procedures at the boat launches to ensure that boaters consistently receive messages to inspect, clean, and drain not just leaving but entering as well.**
2) **Explore what tools could be made available onsite to facilitate clean off compliance by boaters.**
3) **Convey message to people that violations of AIS clean off laws will be enforced through conversations, warnings, citations, and posting of citations in publications. Have peace officers/conservation officer presence to enforce violations.**
4) **Continue and expand usage of I-LIDS automated monitoring and posted signage to close gaps in monitoring coverage.**
5) **Evolve intern protocols to incorporate inspections and citizen volunteers.**

Obstacles – Solutions

There are a number of obstacles to addressing boater behaviors that can be addressed next season. Some ideas are listed here.

Obstacle	Potential Solutions
User recognition of video monitoring.	Larger font and more frequent signage/alerts. Utilize prerecorded audio alert and flashing light.
Despite post-signage increases in user behavior, more users need to stop to inspect, clean, drain their boats prior to launch at monitored locations.	Coordinate policy with DNR on prelaunch inspections being necessary. Install gate so user must physically press button to start a countdown prior to proceeding to ramp.
Users looking under boats for aquatics.	Trailer Mirror with signage “Got Weeds?” along with onsite tool for easy removal.
Users draining bilges, live wells.	New policy of showing drain plug to camera for compliance.
Identifying if they’ve been in a ‘red’ lake.	Intern engagement. Stickers, RFIDs detection.
Procedures if they’ve been in a ‘red’ lake.	Diluted chlorine rinse available for bilge, live well.
Recognition of license plates.	Higher resolution camera, move footing closer.
Frequent changing of batteries.	Provide power to ILIDS on high usage launches.
Cannot accurately view vehicles moving quickly thru stop sign.	Move ILIDS footing to ramp where vehicles slow. Enforce stop sign laws. Increase stop sign size. Push button gate.
Night viewing under boat/trailer.	Install external light to ILIDS for temporary lighting.
Time to review videos.	Automated recognition. Citizen review and highlighting. 4 pane playback.
Ignorance/indifference to law.	Consequence for violations by issuing warnings and citations.
Spring Park launch flow	Modify traffic flows to ensure single lane entrance to ramp for pre-launch inspection.

Video Count Summary

Launch name: Grays Bay
Launch-id: 3
Launch videos at Grays Bay: 1549

Date => Number of video clips

06 22 2005=>2
08 10 2006=>52
08 16 2006=>34
08 23 2006=>1
08 24 2006=>4
08 25 2006=>4
08 26 2006=>76
08 27 2006=>91
08 28 2006=>12
08 29 2006=>61
08 30 2006=>13
08 31 2006=>14
09 06 2006=>8
09 12 2006=>55
09 13 2006=>112
09 14 2006=>76
09 16 2006=>35
09 17 2006=>94
09 28 2006=>18
09 29 2006=>102
09 30 2006=>149
10 01 2006=>4
10 02 2006=>48
10 03 2006=>93
10 06 2006=>53
10 07 2006=>204
10 08 2006=>134

Launch name: Spring Park
Launch-id: 4
Launch videos at Spring Park: 134

Date => Number of video clips

01 01 1970=>1
08 05 2006=>5
08 06 2006=>2
08 07 2006=>1
08 08 2006=>6
08 09 2006=>2
09 01 2006=>10
09 21 2006=>27
09 22 2006=>6
09 23 2006=>36
09 24 2006=>38

Appendix A. I-LIDS Images, Violations, and Launch Design

Grays Bay exit ----- Grays Bay entrance---------Interior of ILIDS bolts---Spring Park site

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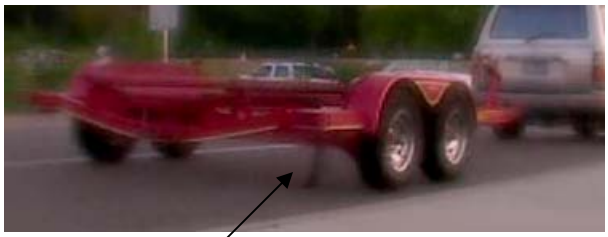
Offender Images

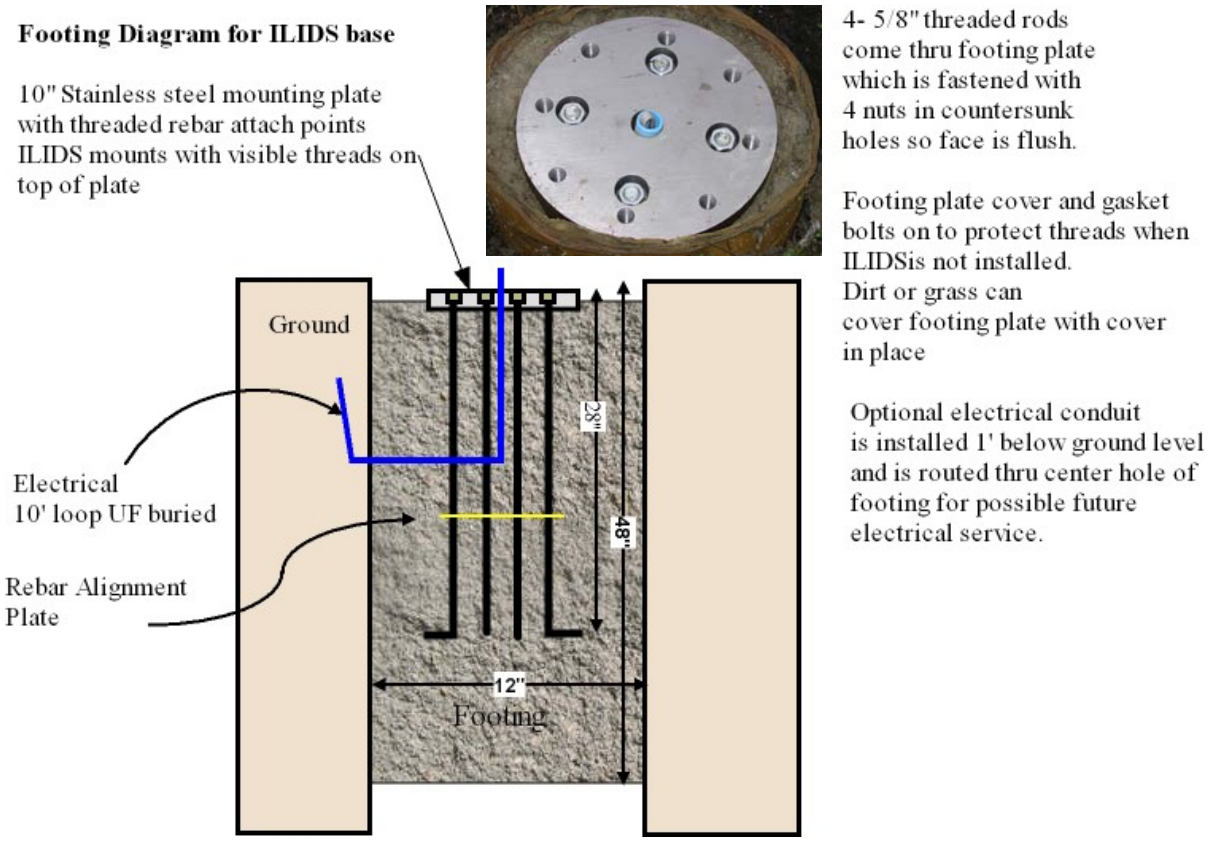
Images below were captured at Spring Park on a trailer owned by an "educated boater" where I asked the intern to re-educate the boater when they returned.

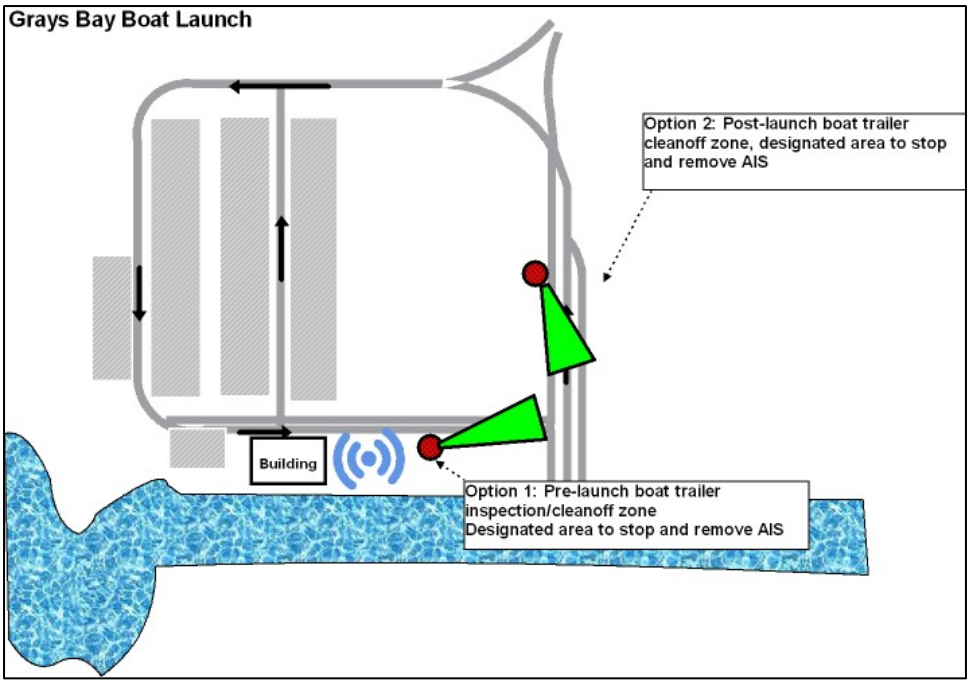


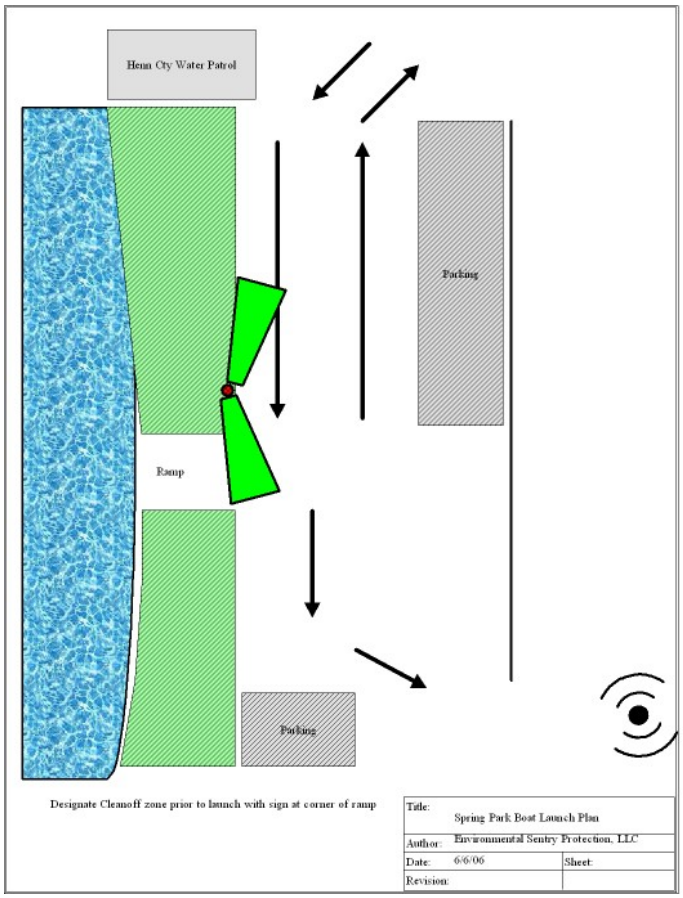
9/17/06 – 15:49 8/26/06 – 19:45 (repeat offender)

Two of the images from video showing aquatics hanging from the trailer just before they launched at Grays Bay. Photo on right shows boater who also transported EWM on road away from Spring Park.

Footings were installed with the ability to connect to electrical power in future seasons.




Grays Bay Boat Launch
Option 2: Post-launch boat trailer cleanoff zone, designated area to stop and remove AIS
Building
Option 1: Pre-launch boat trailer inspection/cleanoff zone
Designated area to stop and remove AIS


Henn Cty Water Patrol
Parking
Ramp
Parking
Designate Cleanoff zone prior to launch with sign at corner of ramp
Title: Spring Park Boat Launch Plan
Author: Environmental Sentry Protection, LLC
Date: 6/6/06
Sheet:
Revision:

Appendix B. Posted Sign

The sign below was reviewed by the LMCD Exotics Committee and posted at two locations at each boat launch.

Appendix C. Access to Captured Video

The LMCD board and staff have been provided with instructions and user-id/passwords to gain access to the website where the video for this project is available for review and download.

The website link is: http://esp.selfip.com/lakemonitor/login.php

A prerequisite to viewing the data is to have RealPlayer 10 downloaded and installed. It must be set as the default application for .ram and .mp4 file types. A link to this download site can be found on the website above.

At this time a Streaming Video Server has not been implemented for these MPEG and AVI video files. This means that the files must completely download before they can be played. On a broadband connection, this can mean anywhere from 30-60 second delay per video. We hope to have this feature available in a few weeks.

Two other methods of accessing video cameras were occasionally made available during the course of the study. One was a secured login to the camera itself where live video could be viewed. The other interface that was not used until late in the study provided access to stored videos on a server where snapshots of the video sequence could be previewed prior to downloading a video sequence.

If you would like to have access to any of the video information captured in this study, please contact the responsible authority per the Minnesota Data Practices Act:

Mr. Greg Nybeck
Executive Director
Lake Minnetonka Conservation District
18338 Minnetonka Blvd.
Deephaven, MN
952-745-0789

Environmental Sentry Protection, LLC

Environmental Sentry Protection, LLC offers a stand-alone system to monitor boat launch events with network video and make a history available for web review by lake constituents and enforcement officials. It is a tamper-proof, onsite solution to capture boater clean-off activities to ensure compliance with the Aquatic Invasive Species laws so lakes can be protected from the extensive and irreversible impact of Aquatic Invasive Species such a Eurasian Watermilfoil, Curlyleaf Pondweed, and Zebra Mussels. Utilizing Internet connectivity for video storage, alerting, and remote management, this system offers around the clock monitoring at boat launches, trails, or other remote facilities.

For more information visit www.environmentalsentry.com
Or contact Eric Lindberg at 763-473-0051