

Final Report
Rusk County Lake Classification Grant LPT-306-07
Ken Parejko, Lake Classification Coordinator
June 27, 2008

HISTORY OF PROJECT

Rusk County received notification of funding for our grant on Sept. 13, 2006. In early December Mike Russell was hired as Lakes Classification Coordinator, and an office established for him in the County Zoning Office. An ad hoc committee of 18 members was put together and first met on Dec. 11, 2006. Discussions began in that committee on the direction the project should take, including educational presentations on lake classification, terminology, etc., and Mike started the process of planning. Town boards were notified of the project. Initially the ad hoc committee was provided with handouts to educate them on lake types and lake biology and what other counties had done visavis lake classification. The committee then turned to discussion of regulatory issues. The ad hoc committee has met in December of 2006 and every month since, except the April 2007 and the February, 2008 meeting which was not held due to lack of a quorum.

A webpage has been developed for the project, which provides for the public nearly all the documents created during the process, and linked at www.flambeauvalley.com. Meeting minutes are also being placed on the Rusk County Zoning Office official website.

Mike Russell left for another position in March, 2007. I (Parejko) was hired on May 15, 2007 and since my retirement date from UW-Stout was May 27, I was scheduled to begin my position on June 1, 2007. I attended the May 15 ad hoc committee meeting, and was directed to put together a plan for the project. At that meeting the committee expressed its desire to move away from discussion of regulations, which had grown increasingly combative and unproductive. The committee wanted to first 1) inform itself better about the present water quality status of our lakes, and 2) if possible determine if there was an effect of heavy boating pressure on lake quality. The committee asked me to come to the June, 2007 meeting with a proposal for the water quality work, and begin exploring classification schemes, with discussion of regulation to follow.

I volunteered for some hours before being officially employed, and put together a proposal for the committee's June 11 meeting. Lynn Markham, UW-Extension Stevens Point attended the meeting at which I brought this proposal forward.

RUSK COUNTY WATER QUALITY

Briefly the proposal, approved by the committee at that meeting, was to first focus on water quality sampling to determine present water quality of our lakes, and possible effects of boating. I proposed addressing water quality with a three-prong approach A) Paleocores, B) Monthly sampling of water quality of paleocore lakes and C) Snapshot sampling of as many other county lakes as feasible. We would also do a small boating-effects study.

A) Paleocore lakes, 5 relatively pristine, 5 relatively developed. Paul Garrison paleocored our lakes Aug. 14 & 15. A copy of his report is attached.

B) We sampled the 10 paleocore lakes in June, July, August and October of 2007 for secchi depth, phosphorus and chlorophyll, and in some cases for alkalinity. Water analyses were done at UW-Stevens Point. Data from our analyses is presented in the attached Excel spreadsheet "Paleocore water qualities." Note that this spreadsheet also includes data downloaded from the DNR SWIM site, which is shown in italics. Note that though Bass Lake Sec(16) was paleocored I did not sample it regularly. This is because I was told by DNR personnel that it would be sampled regularly by citizen sampling during the summer of 2007. As it turns out the full suite of chemical analyses were not done on that lake by citizen monitoring. In hindsight I should have sampled that lake along with the other Paleocore lakes.

C) A snapshot of one sample of trophic status, of an additional 14 county lakes beyond the Paleocore lakes. This data is attached in the spreadsheet "Non-paleocore Lakes."

A small-scale boating effects study of at least three no-wake lakes compared with 3 heavily boated lakes was carried out. Samples were taken before and after the July 4 holiday, and secchi depth and phosphorus measured. The results of this study are attached ("Boating Study Data".) The boating study was unable to show effects of heavy usage of the lakes on the July 4th weekend. This is not surprising, since most lakes were sampled at sites greater than 8 foot depth, and previously published work suggested only in shallower waters is the effect of boating turbulence apparent. One of the issues regularly raised by one or two members of our committee was that previous studies of the effects of human activities on water quality were not done on Rusk County Lakes, thereby questioning their validity. So though the results of the boating study were inconclusive, they did establish the mind-set of doing local work whenever possible.

One committee member suggested that lakes have varying degrees of chlorophyll (algal growth) because they have different temperatures, with warmer lakes developing more chlorophyll. While collecting water samples I also measured water temperature at the one-foot depth. There was no correlation at all (correlation coefficient -.08) between water temperature and chlorophyll concentration. The highest correlation found was between the temperature and minimum temperature the day before sampling (58%), and time of day of sampling (43%.) A significantly high negative correlation (-31%) was found between maximum depth of a lake and temperature, with shallower lakes being somewhat warmer. Again, the principle of answering questions with our own data was followed.

The water quality work was considered more useful than the soil analyses originally proposed in the Rusk County grant. With as many lakes as the County has, and the varied soil types and slopes (sampling issues), soil analyses would not be very informative. And without mass loading information, complicated and expensive to obtain, snapshot soil nutrient analyses tell one little about the contribution of shoreland soils to water quality.

The above water quality sampling & analyses provided the ad hoc committee with considerable information about the water quality of our lakes. This information provides them with a base for making decisions about lake classification. The information was also used in presentations to the Rusk County Board and public. It also brings together into one resource all the available data including off the SWIM site and should be a valuable resource for future use by concerned citizens, local government and agencies. All the above information is available on the Lake Classification website.

EDUCATIONAL/OUTREACH EFFORTS

On June 18, 2007 Zoning Administrator Mark Steward and I appeared on a half-hour Ladysmith (WLDY) radio talk show to discuss the lake classification process. We asked for citizen input, if any. A newspaper article also appeared in early July, 2007 *Ladysmith News*. Several local residents contacted us expressing interest in and/or volunteering to help with the project.

On June 14 in a letter to all Rusk County Lake Associations I introduced myself and reminded the Associations of the scope of the grant, offered my assistance and requested volunteer help in sampling. This led to an initial interchange with Bass Lake and Island Lake Associations.

I have created two posters summarizing the classification process and asking for concerned citizen input, which have been posted in a hallway of the Courthouse and in the Zoning office.

Several ad hoc members attended WALs conferences during this process. We also subscribed to the WALs newsletter for all members.

I presented to the Rusk County board on Feb. 26, 2008 for about 90 minutes, updating them on the water quality data and the classification process.

By request I also provided the ad hoc committee, historical data from the Flambeau Mine input into the Flambeau River (copper and zinc), and surface water quality analyses provided by the Waste Management Timberline disposal site. In neither case were there any clear water quality problems from these two industries.

I put together a summary of research results concerning the effects of development on water quality (see handout "Summary of Development Effects.")

A public meeting summarizing the work of the committee was held at the beginning of our final, June 9, 2008 meeting. Several residents and members of the Rusk County Board attended this meeting.

LAKE/STREAM CLASSIFICATION PROCESS

1. Lake Vulnerability -- The goal of lake classification is to develop a vulnerability/development matrix which is used to classify lakes, as has been done by previous counties. Stream classification will be discussed below. After detailed consideration the ad hoc committee decided to use eight different criteria for the lake vulnerability estimation. Criteria were chosen from among those used previously by other counties. The ad hoc committee felt it was best to use as many criteria as possible, so that potential vulnerabilities factors would not be left out. The criteria are shown below. The

“Revised” Shoreland Development factor is Shoreland Development factor calculated only for privately-owned land (public lands removed.)

Note that in this method, a *higher* total vulnerability score means the lake is considered to be *less* vulnerable to development. Data provided by the DNR was used to calculate vulnerability scores. The soil factor was determined after consulting with Farm Service Agency personnel and using available soil maps. The methodology for calculating soil vulnerability is described in the attachment “Soil Vulnerability Score Methodology.”

The results of the vulnerability ranking are shown in the Excel attachment “Full Vulnerability Ranked.”

After consideration the ad hoc committee chose vulnerabilities of 10-13 = high vulnerability, 14-16 = moderate vulnerability and 17-22 = low vulnerability.

Rusk County Criteria used to estimate Lake Vulnerability

1. Surface area of the lake:
 - a. Less than 50 acre = 1
 - b. 50 – 249 acres = 2
 - c. 250 or more acres = 3
2. Lake Volume:
 - a. Less than 500 acre/ft. = 1
 - b. 500 – 2000 acre/ft. = 2
 - c. >2000 acre/ft. = 3
3. Watershed area:
 - a. Less than 1 square mile = 1
 - b. 1-9 square miles = 2
 - c. > 9 square miles = 3
4. Shoreland Development Factor (S.D.F.) for privately-owned shoreline:
 - a. S.D.F. is 2 or more = 1
 - b. S.D.F. is 1.5-1.99 = 2
 - c. S.D.F. < 1.5 = 3
5. Lake Type:
 - a. Seepage = 1
 - b. Spring = 2
 - c. Drainage = 3
6. Flushing Index:
 - a. Seepage lakes = 1
 - b. 0 - 15 times per year = 2
 - c. 16-30 times per year = 3
 - d. >30 times per year = 4
7. Stratification Factor ($\frac{\text{maximum depth} + 4.5}{\log(\text{lake area})}$):
 - a. Stratification Factor is 13.5 or more (lake stratifies) = 1
 - b. Stratification Factor less than 13.5 = 2
8. Soils in 300 foot buffer around the lake, classified by erodability, run-off potential, and slope. Scored 1 – 4 with most erodable soils with highest run-off potential and slope being scored 1, least scored 4.

As requested by the committee, I performed a series of sensitivity analyses on the vulnerability ranking. We had developed a list of five, seven and our final eight vulnerability criteria. I tried averaging the calculated vulnerabilities using the vulnerabilities calculated for each of these methods. No lakes changed their vulnerability ranking using the averaged values for all three criteria compared to the eight criteria calculation, so the committee decided to go ahead with the eight criteria.

One committee member questioned the relevancy of our revised shoreland development factor. I took it out of our vulnerabilities, and only 6 out of 90 lakes changed their classification. I also doubled its weight in the vulnerability classification. This changed only 3 out of 90 lakes. The committee decided to leave this factor in.

This same committee member questioned the validity of the cut-off values used in our criteria (e.g. less than 50 acres, 50-249 acres, etc.) I tried doubling and then halving all the cutoffs for all the criteria (except soils, a more complicated formula.) Halving the cut-off values, essentially made it harder for lakes to be classified as vulnerable; doubling them made it easier. In neither case did more than 10% of the lakes change their vulnerability classification. Because the cutoff values were those used by other counties, and presumably had some justification behind them, the committee decided to use the original cutoff values.

2. Level of development and vulnerability/development matrix -- I used available aerial photographs, taken April 2005, and counted dwellings (not structures) within 300 feet of each of our named county lakes. I then calculated dwellings per mile of lakeshore. From this count the committee chose dwellings per mile of 15+ = highly developed, 4.1 - 14.9 = moderate, 0-4 = low development.

We then put each of our named lakes into a vulnerability/development matrix, shown in the attachment "Vulnerability/Development Matrix."

On Jan. 14, 2008 the ad hoc committee approved this classification of our named lakes.

3. Un-named lakes -- Rusk County has more than a hundred small un-named lakes. Because not all information is available to classify these lakes, and doing the soils analysis for all un-named lakes would be a long, tedious process, and since most are very small lakes on private property not likely to be developed, the committee decided not to classify un-named lakes at this time. Instead, if/when someone comes to the Zoning office with request for a permit within 300 feet of an undeveloped lake, that lake will be classified using the same process used for the named lakes. This might require a field visit. It will require consideration of soils within 300 feet of the lake. A spreadsheet has been made available to the Zoning administrator which contains data about the un-named lakes, and a handout has been created to help the administrator in classifying this process. That handout is attached ("Classifying Un-named Lakes.")

4. Stream classification – The committee was presented with a list of Rusk County Outstanding and Exceptional waters, and Class 1 trout streams. Exactly which waters are O & E and class I trout streams were verified with Kristi Minahan at Madison's DNR office. I suggested the committee approve a two-tier classification system as has been

done in other counties. Exceptional and Outstanding Waters and Class I trout streams would be placed in one class, all other streams in another. The O & E & trout streams would receive more protection than other streams.

At the March meeting the committee moved to not classify our streams, but returned to this issue in the May meeting and created a two-tier classification system for streams, with Outstanding and Exceptional streams and Class 1 Trout streams in one class, and all others in another (attached "Rusk County Outstanding & Exceptional Waters.")

REGULATION/MITIGATION OPTIONS:

Discussion of regulation and mitigation options took place at meetings early in this process. These discussions became somewhat conflictual and threatened the committee's progress. Consequently after Mike Russell left the coordinator position, we decided to focus on present water quality of the county's lakes and developing the vulnerability/development matrix before revisiting regulations. Several members of the committee, in particular, were assertively vocal that we not propose new regulations to the county board, and their assertiveness and delaying tactics exhausted and frustrated other members of the committee. One opinion shared by a number of committee members was that it would be premature to change Rusk County regulations before we know the final form of the revision of NR 115.

Along these lines we asked Lynn Markham to attend our April 14, 2008 ad hoc meeting to discuss the proposed new NR 115 rules and the relationship between them and Rusk County shoreland zoning ordinances. She told us that our shoreland zoning is quite robust and not likely to provide significantly less protection for our lakes than the revised NR115, but that we might consider increasing lot sizes on vulnerable streams to protect them.

At our final meeting, on June 9, 2008, the ad hoc committee created a resolution for the June 24 Rusk County Board meeting (attached) which asked the Board to adopt our lake and stream classification. We also created a recommendation (attached) which asked the Board to direct the Zoning Committee to consider a minimum width of new waterfront lots of 150 feet, and also consider providing additional protection to more vulnerable water-bodies.

At its June 24, 2008 meeting, the Rusk County Board approved adoption of our lake and stream classification by a 12-6 vote, but did not approve our recommendation for increased lot size and additional protection for more vulnerable water-bodies, by a 7-10 (one abstention) vote.

The work of the ad hoc committee, supported by this grant, has provided the County with a lake and stream classification system based on the best available information. Though this classification system does not presently include additional protection for more vulnerable water-bodies, should the political winds change such that Rusk County residents through their elected officials expect more protection of our lakes and streams, the classification system, officially adopted by the County Board, will be available to them, and that part of this process will not need to be repeated.

Equally importantly, classification of lakes and streams has been an educational process for the ad hoc committee, county board members, and the public at large. All these stake-holders have learned considerably about lake and stream ecology, present water quality status, and forces which effect that water quality.

For both these reasons – the officially adopted classification system, and the educational process which came with it – the time, energy and dollars invested have not been in vain.