ATTACHMENT 1

PROPOSALS FOR AMENDING ENVIRONMENTAL REVIEW RULES REGARDING "CUMULATIVE IMPACTS OR EFFECTS"

May 2, 2007

This memorandum has been prepared by EQB staff to present to the public the current EQB thinking on amending the Environmental Review program rules (chapter 4410) regarding the treatment of "cumulative impacts" or "cumulative potential effects." It is based upon material discussed with the Board at its April 19, 2007 meeting. This memorandum is organized around three "issues" relating to the general topic of cumulative impacts or effects: (1) a response to the opinion of the Supreme Court in a 2006 case concerning cumulative impacts or effects; (2) the fact that the content requirements for EAWs, EIS, and AUARs do not explicitly include treatment of cumulative impacts or effects; and (3) a response to an opinion of the Court of Appeals in another 2006 case regarding the treatment of cumulative analysis in AUAR documents.

ISSUE I: responding to the Supreme Court opinion from the Citizens Advocating Responsible Development ("CARD") vs. Kandiyohi County case.

For many years, environmental review practitioners have been uneasy over inconsistencies in the EQB's rules with respect to cumulative impacts (or cumulative effects). This topic has regularly come up in discussions of problems with the existing rules, but no one was ever able to offer satisfactory ideas for how to amend the rules, so the rules were left as they were adopted in 1982. Specifically, the following inconsistencies exist in the rules:

(1) the rules define "cumulative impacts" (in a manner very similar to that used by the federal government and other states) but this term is used only in the Generic EIS section of the rules;

(2) the rules use term "cumulative potential effects" in the criteria for determining if a project has the "potential for significant environmental effects," and hence requires an EIS, but this term is not defined nor is it used anywhere else in the rules;

(3) nowhere in the rules for EAW, EIS or AUAR preparation is it actually stated that cumulative impacts/effects must be considered in the analysis (although the EAW and AUAR forms ask about this topic and some amount of "cumulative" analysis is almost always done in review documents).

The lack of clarity finally caught up with us in a dispute between a group of citizens ("Citizens Advocating Responsible Development" or "CARD") and Kandiyohi County over two gravel mining proposals. When the county prepared EAWs for these projects but decided that neither required an EIS, those decisions were challenged in court by the CARD organization. The case eventually made its way to the state Supreme Court. The issues primarily dealt with in the Supreme Court's opinion are issues about the proper treatment of what the rules now term "cumulative potential effects." One of the Court's

conclusions was that the EQB's long-standing interpretation of the rule provisions regarding cumulative-type analysis was wrong. (EQB had filed an *amicus* brief arguing that the meaning of cumulative impacts as defined should apply throughout the rules despite the wording differences.) This finding by the Supreme Court is forcing EQB's hand to finally deal with the cumulative-analysis issues in the rules.

The EQB staff presented three basic options as a response to the CARD opinion to the EQB at its April 2007 meeting and the EQB agreed that stakeholder opinions about these (and other possible options) should be sought. These options are described below and their basic features are summarized and compared in a table at the end of this memorandum.

Option A: do not amend the rules in response to the CARD case; rely on Supreme Court opinion.
Under this option there would be no amendments to the definitions or to part 4410.1700. Instead, EQB would direct program participants to the opinion of the Supreme Court in the CARD case for direction on how to handle cumulative analysis issues. Likely, the relevant parts of the case would be incorporated into the EQB's guidance documents. In its guidance the EQB could expand on the Court's interpretation if it chose, but the rules would be left as they were when the Court made its interpretation. This would be the most conservative of all approaches. (Note: there would be amendments to the rules relating to cumulative analysis issues II and III, as described below, but those amendments are unrelated to the issues of the CARD case.)

Option B: incorporate the Supreme Court's interpretation into the rule language.
Under this option, the EQB would concur with the interpretation of the Supreme Court in the CARD case but amend the rules to express that interpretation more clearly in the rule language itself. The Supreme Court had to provide an extensive analysis to reach its interpretation; this demonstrates that the existing rule language is on its face difficult to understand and correctly apply. This option would seek to make the wording of the rules more clearly express the interpretation given by the court so that a reader is guided toward the proper interpretation by reading the rules themselves. This option preserves the wording by which the Supreme Court differentiated the broad cumulative impacts approach of a GEIS from the narrower cumulative potential effects approach appropriate to project-specific review.

The following amendments would be made in the rules indicated:

- At 4410.0200, subpart 11a add a definition of "cumulative potential effects:" <u>"Cumulative potential effects" means the effect on the environment that results from the incremental effects of the project in addition to other projects in the surrounding area which might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects. Cumulative potential effects can result from individually minor but collectively significant projects taking place over a period of time.</u>

- (The definition of "cumulative impacts" given at 4410.0200, subpart 11 would be left unchanged, and this term would continue to appear in the rules only in the section on Generic EISs.)
- Part 4410.1700, subpart 7, item B would be amended thusly: "cumulative potential effects ~~of related or anticipated future actions;"~~ The new definition of "cumulative potential effects" added at 4410.0200, subp. 11a will encompass the meaning formerly conveyed (according to the Supreme Court) by the deleted words, thus they are redundant here.

Option C: Concur with the Supreme Court interpretation, but revise our terminology. This option seeks to preserve the interpretation of the Supreme Court but switch to the more universally-used term "cumulative impacts" instead of "cumulative potential effects." The federal government and most other states that do environmental review use the term "cumulative impacts" for the concept. However, by amending the rules to have only one term (cumulative impacts) instead of two (cumulative impacts and cumulative potential effects) we would loose the distinction between the terms which the Court used as a main support for the principle that cumulative potential effects analysis for a specific project is narrower than the cumulative impact analysis in a GEIS. Thus, part of the Court's interpretation would no longer be relevant to the rules if amended this way.

The following amendments would be made in the rules indicated:

- at 4410.0200, subpart 11, redefine "cumulative impacts" to mean what Supreme Cout interpreted "cumulative potential effects of related or anticipated future projects" to mean. The definition would read as for the Option B definition of "cumulative potential effects."
- At part 4410.1700, subpart 7, item B the wording would be amended: "cumulative <u>impacts</u> ~~potential effects of related or anticipated future actions;"~~ The amended definition of cumulative impacts will encompass the meaning formerly conveyed (according to the Supreme Court) by the deleted words, thus they are redundant here.

Possible Additions to Options B and C:
Staff have identified three possible "enhancements" that could be added to Options B or C that would create additional guidance about what phrases used by the Supreme Court mean or how to consider the significance of a cumulative-type effect.

The first phrase used by the Court that could be amplified upon is "projects in the surrounding area that might reasonably be expected to affect the same natural resources." In the rule amendments "natural resources" could be changed to "environmental resources," because "environment" is a defined term and it includes historic and aesthetic resources, as well as "natural resources." (It is not clear whether the Supreme Court realized that its wording might at least appear to exclude certain resources that come under the EQB's definition of "environment.") In addition, a list of factors to consider in determining the meaning of this phrase as it applies in a specific case could be added (if appropriate factors can be identified).

The second phrase that could be further interpreted is "actually planned or for which a basis of expectation has been laid," as used with respect to future projects. One possibility that staff has identified is to state that an adopted comprehensive plan or zoning ordinance establishes a basis of expectation for projects identified in the plan or zoning, and that filing an application for a permit of some sort means the project is "actually planned." Other factors to consider could also be added if identified.

The third enhancement identified by staff would be to add wording at part 4410.1700, subpart 7, item B, guiding the RGU about how it should consider the incremental contribution of the specific project under review in view of the total cumulative effect. The rules presently give no guidance about how to think about that topic. (Actually, neither the federal rules nor those of any other state we have examined provides any clear guidance about this either – this question is perhaps the trickiest of all aspects of cumulative-type analysis.) The best idea staff has been able to think of would be to add a list of factors an RGU should consider, without specifying how they must be used. Possible factors we have identified are:

- the size of the contribution from the project compared to the size of the total aggregate impact;
- the degree to which the project complies with any mitigation measures specifically designed to address the cumulative impact;
- the efforts of the proposer to minimize contributions from the project;
- the size of the contributions from the project compared to those of the likely contributions from reasonable alternatives to the project; &
- the extent to which an EIS on the specific project would be able to address the aggregate impact.

Other Options for response to the CARD decision

In its presentation to the EQB at the April 2007 meeting, the staff noted that there are other possible options for addressing the CARD case issues beyond the 3 options presented by the staff. One option that has been identified through previous comments is to scrap the existing rule language altogether (and ignore the Supreme Court's interpretation of that language) and instead use the terminology and interpretations from the federal NEPA process. However, to date commenters have not explained in any detail why that option would be superior. Based upon its understanding of the federal case law, EQB staff is skeptical that adopting the NEPA approach would create more clarity in the rules than adopting the Minnesota Supreme Court's approach.

Other Amendments to Rules Relating to Cumulative Impacts/Effects

In addition to, and independent of, a response to the CARD decision, the EQB is considering whether to make other amendments to chapter 4410 relating to other cumulative-type analysis issues. The second issue is whether to add language explicitly directing that cumulative impacts or effects be considered in preparing an EAW, an EIS, or an Alternative Urban Areawide Review (AUAR) document. The third issue involves correcting an error of interpretation made by the Court of Appeals in a 2006 case relating to how cumulative-type analysis is geographically bounded in preparing an AUAR.

ISSUE II: incorporate clear & explicit instructions in rules about including cumulative analysis in EAWs, EISs & AUARs.

The EQB staff believes that language should be added explicitly directing that cumulative impacts (or effects) be considered in preparing an EAW, an EIS, or an AUAR document. While in practice this is usually done, the rules do not actually explicitly direct that it be done (apparently due to an oversight in the 1982 rulemaking). (The EAW form and AUAR guidance do include a question regarding cumulative effects although the rules upon which it is based do not mention cumulative effects or impacts.) It seems logical to make these amendments at the same time as other amendments regarding cumulative-analysis issues are being made. The rule provisions that would be amended are: 4410.1200, EAW content; 4410.2300, item H, content of an EIS, impacts; and 4410.3610, subpart 4, AUAR content. At part 4410.2300, item H, regarding analysis of impacts in an EIS EQB staff also advocates adding a sentence adapted from recent federal CEQ guidance stating that in dealing with contributions from past projects to cumulative impacts/ effects it is generally sufficient to deal with them as an aggregate, and that it is not normally necessary to identify and quantify the individual past projects. Also, an unnecessary and confusing item that appears to relate to the cumulative-type analysis at 4410.2100, subpart 6, item F, EIS scoping decision content, would be deleted as part of this revision.

The rules would be amended as shown below. The terminology used in the amendment would depend upon whether Option A or B or Option C is chosen for Issue I; the staff has included both choices in the amendments below.

- At 4410.1200, EAW content, item E would be amended: "E. major issues sections identifying potential environmental impacts and issues that may require further investigation before the project is commenced, including identification of cumulative potential effects/ cumulative impacts;"

- At 4410,2100, subpart 6, EIS scoping decision content, item F, would be deleted as it is unnecessary and confusing:

  ~~F. identification of potential impact areas resulting from the project itself and from related actions which shall be addressed in the EIS;~~

- At 4410.2300, item H, content of an EIS, amend as follows: "H. Environmental, economic, employment, and sociological impacts: for the proposed project and each major alternative there shall be a thorough but succinct discussion of potentially significant ~~direct or indirect,~~ adverse~~,~~ or beneficial impacts /effects generated, be they direct, indirect, or cumulative. Data and analyses shall be commensurate with the importance of the impact and the relevance of the information to a reasoned choice among alternatives and to the consideration of the need for mitigation measures; the RGU shall consider the relationship between the cost of data and analyses and the relevance and importance of the

information in determining the level of detail of information to be prepared for the EIS. Less important material may be summarized, consolidated, or simply referenced. The EIS shall identify and briefly discuss any major differences of opinion concerning significant impacts of the proposed project on the environment. In analyzing the contributions of past projects to cumulative impacts/cumulative potential effects it is sufficient to consider the current aggregate effects of past actions; it is not required to list or analyze the impacts of individual past actions, unless such information is necessary to describe the cumulative impact/cumulative potential effects of all past actions combined."

- At 4410.3610, subpart 4, AUAR content, amend as follows: "Subp. 4. **AUAR document form and content.** The content and format must be similar to that of the EAW, but must provide for a level of analysis comparable to that of an EIS for direct, indirect, and cumulative potential effects/ cumulative impacts typical of urban residential, commercial, warehousing, and light industrial development and associated infrastructure.

ISSUE III: correct the error made by the Court of Appeals in the River's Edge project AUAR case

The third cumulative-analysis issue is also the result of a court case, *Minnesota Center for Environmental Advocacy vs. the City of St. PaulPark*, commonly referred to as the "River's Edge case" after the name of the project involved. In that case, the City of St. Paul Park prepared an Alternative Urban Areawide Review analysis (a substitute for EAWs or EISs allowable under certain conditions) for development of land along the Mississippi, much of which was proposed for construction of a large project called River's Edge. The Center for Environmental Advocacy challenged the adequacy of that review, partly on the grounds that the review did not adequately consider cumulative-type impacts on resources outside of the AUAR boundary. In its decision, the Court of Appeals declared that the RGU did not need to consider impacts or sources of impacts outside of the AUAR boundary. Apparently, the court believed that in setting the AUAR boundary an RGU factors in consideration of the scope of analysis – which is not true of any case with which the EQB staff is familiar.

The EQB staff believes that a fundamental error was made here by the Court of Appeals. To correct that error, the EQB can amend its rules to state the AUAR boundary chosen by the RGU is not intended to set any limits on the scope of the technical analysis.

The following amendment would be made at part 4410.3610:

"Subpart 3. **Order for review; geographic area designation and specification of development**. The RGU shall adopt an order for each review under this part that specifies the boundaries of the geographic area within which the review will apply and specifies the anticipated nature, location, and intensity of residential, commercial, warehousing, and light industrial development and associated infrastructure within those boundaries. The geographic extent of the

analyses of direct, indirect and cumulative potential effects/cumulative impacts conducted under subpart 5 is not limited by the boundaries set under this subpart*. The RGU may specify more than one scenario of anticipated development provided that at least one scenario is consistent with the adopted comprehensive plan. At least one scenario must be consistent with any known development plans of property owners within the area. The RGU may delineate subareas within the area, as appropriate to facilitate planning and review of future development, and allocate the overall anticipated development among the subareas."

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* The EQB staff invites commenters to suggest alternative language that would make the intended point clearer than the sentence suggested.

NOTE: Table comparing Issue I, options A, B & C follows on next page.

Comparison Summary of features of Issue I, Options A, B & C

	Option A	Option B	Option C
Rule amendments?	No	Yes	Yes
Term(s) used in rule	Cumulative impacts for GEIS. Cumulative potential effects elsewhere.	Cumulative impacts for GEIS. Cumulative potential effects elsewhere.	Cumulative impacts
Amendment at 4410.0200, Definitions	None	Add defn. for cumulative potential effects based on existing defn. of "cumulative impacts" with Supreme Court interpretations on geographic and temporal limits added. (Keep defn. of cumulative impact also.)	Amend defn. of cumulative impacts as per defn of cumulative potential effects in Option B
Enhance definition[A]	No	Optional	Optional
Amendment at 4410.1700, subpart 7, item B, EIS need criterion	None	Delete words after "cumulative potential effects."	Delete all and add "cumulative impacts."
Add factors to consider in 4410.1700, s 7, I B[B]	No	Optional	Optional

Add directions to consider cumulative impacts/potential effects in EAWs, EIS, & AUARs (at 4410.1200, 4410.2300 H, 4410.3610, subp. 4)	Yes	Yes	Yes
State that only current aggregate effects of past projects must be consi-dered (at 4410.2300 H)	Yes	Yes	Yes
Delete 4410.2100, subp. 6, item F	Yes	Yes	Yes
Add language at 4410.3610, subp. 3 stating that designated AUAR boundary does not limit geographic scope of technical analyses in AUAR ("undo" Appeals Ct. opinion.)	Yes	Yes	Yes

[A]Enhancements could include:

"Surrounding area" = (?)
Change "natural resources" to "environmental resources"
"Actually planned" = permit applied for
"Basis of expectation laid" includes identified in adopted comprehensive plan

[B]Factors could include:

- the size of the contribution from the project compared to the size of the total aggregate impact;
- the degree to which the project complies with any mitigation measures specifically designed to address the cumulative impact;
- the efforts of the proposer to minimize contributions from the project;
- the size of the contributions from the project compared to those of the likely contributions from reasonable alternatives to the project; &
- the extent to which an EIS on the specific project would be able to address the aggregate impact.

Attachment 2
Shoreland Projects Survey
Data request to local governmental units by the Environmental Quality Board
May, 2007

The Environmental Quality Board (EQB) is in the process of amending the Environmental Review program rules by adding new mandatory Environmental Assessment Worksheet (EAW) and Environmental Impact Statement (EIS) categories that would apply to certain projects built in shorelands (i.e., within 1,000 feet of a lake or 300 feet of a river). (The EQB is accepting informal public comments on the proposed categories through June 25, 2007; the notice of the opportunity to comment can be found at the EQB website, www.eqb.state.mn.us, in the Notices section.)

As part of developing rule amendments, the EQB needs to estimate the impact of creating the new categories, such as the additional number of EAWs or EISs that would need to be prepared if the proposed categories are adopted, and how those numbers would increase or decrease if the size thresholds were lowered or raised. To be able to do that, the EQB needs data from local governments on the types and sizes of projects that have been approved in shoreland areas in the past.

The EQB is asking local units with shoreland within their jurisdiction to respond to this survey. The more data we receive, the better we can estimate the consequences of adopting new EAW and EIS categories.

If you can fill out some parts of the survey but not others, please complete whatever you can. In the survey we have provided spaces for up to ten years of data (going back to 1997). We realize that many units will not be able to supply data back that far. We are hoping that most units that respond will be able to report on at least the last three years (2004, 2005 and 2006). However, if you can only report on fewer years, please respond with what you can – all data will be helpful. Also, we recognize that not all land divisions go through a platting or other permit process, so that you will not have records on all of them; don't worry about actions for which you do not have records.

If you have any questions about the survey, please contact: Gregg Downing, EQB staff, 651/201-2476, gregg.downing@state.mn.us.

RETURN COMPLETED SURVEYS (by mail, fax or email) to:

Gregg Downing
EQB
300 Centennial Building, 658 Cedar Street
St. Paul, MN 55155
Fax #: 651/296-3698
Email: Gregg.downing@state.mn.us

PLEASE RETURN SURVEYS BY MONDAY, JUNE 18, 2007

Name of unit of government: _____.

Number of lakes in/bordering your unit: _____.
Number of rivers/streams (with shoreland) in/bordering your unit: _____.

This survey applies only to projects located within the shoreland zones of lakes or streams. "Shoreland" is defined in M. S. 103F.205, subd. 4:

"Shoreland" means land located within the following distances from the ordinary high water elevation of public waters:
(1) land within 1,000 feet from the normal high watermark of a lake, pond, or flowage; and
(2) land within 300 feet of a river or stream or the landward side of a floodplain delineated by ordinance on the river or stream, whichever is greater.

Throughout this survey please count only projects that were located within shorelands.

RESIDENTIAL PROJECTS

I. "Conventional lot and block subdivisions" or "High-density residential planned unit developments" – either common open space < 50% of parcel OR density > density calculated using unsewered, single residential lot size standard of MR 6120

Instructions: please write the total # of projects meeting the above description reviewed in each of the years in the various size categories (if the # is 0, you can leave the cell empty, or enter 0). Table A applies to Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers. Table B is for all other shorelands. Provide as many years of data as you feel is appropriate given the level of effort needed to obtain the data. Please try to provide at least 2004 to 2006.

Table A – projects on Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers.

Project size: # lots/units in development:	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
Unknown										
9 or less										
10 to 14										
15 to 19										
20 to 24										
25 to 49										
50 to 99										
100 to 199										

200 or more										

Table B – projects NOT on Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers.

Project size: # lots/units in development:	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
Unknown										
9 or less										
10 to 14										
15 to 19										
20 to 24										
25 to 49										
50 to 99										
100 to 199										
200 or more										

II. "Density-neutral residential planned unit or conservation developments" – common open space > 50% of parcel AND unit density consistent with density calculated using unsewered, single residential lot size standard of MR 6120

Instructions: please write the total # of projects meeting the above description reviewed in each of the years in the various size categories (if the # is 0, you can leave the cell empty, or enter 0). Table A applies to Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers. Table B is for all other shorelands. Provide as many years of data as you feel is appropriate given the level of effort needed to obtain the data. Please try to provide at least 2004 to 2006.

Table A – projects on Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers.

Project size: # lots/units in development:	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
Unknown										
9 or less										
10 to 14										
15 to 19										
20 to 24										
25 to 49										
50 to 99										
100 to 199										
200 or more										

Table B – projects NOT on Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers.										
Project size: # lots/units in development:	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
Unknown										
9 or less										
10 to 14										
15 to 19										
20 to 24										
25 to 49										
50 to 99										
100 to 199										
200 or more										

III. Projects with controlled access lot(s) on Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers.

Instructions: please write the total # of projects each year that included an access lot in the appropriate cell according to how many nonriparian lots or boats were given access through the access lot. This table only applies to shorelands of Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers. Provide as many years of data as you feel is appropriate given the level of effort needed to obtain the data. Please try to provide at least 2004 to 2006.

# projects with access lots serving:	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
Unknown										
< 10 boats or lots										
10 or more boats or lots										

IV. Resort and commercial PUD conversions to residential where the resulting density exceeds the density calculated using unsewered, single residential lot size standard of MR 6120.

Instructions: please write the total # of conversion projects each year that exceeded the indicated density limit in the appropriate cell according to the # of residential lots/units created. Table A applies to Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers. Table B is for all other

shorelands. Provide as many years of data as you feel is appropriate given the level of effort needed to obtain the data. Please try to provide at least 2004 to 2006.

Table A – conversions on Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers.

# units/lots created:	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
Unknown										
9 or less										
10 to 19										
20 to 29										
30 to 39										
40 or more										

Table B—conversions NOT on Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers.

# units/lots created:	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
Unknown										
9 or less										
10 to 19										
20 to 29										
30 to 39										
40 or more										

(Survey continued on next page)

COMMERCIAL-INDUSTRIAL-INSTITUTIONAL PROJECTS

Instructions: please write the total # of projects each year that exceeded the indicated # acres (total parcel size) in the appropriate cell. Table A applies to Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers. Table B is for all other shorelands. Provide as many years of data as you feel is appropriate given the level of effort needed to obtain the data. Please try to provide at least 2004 to 2006.

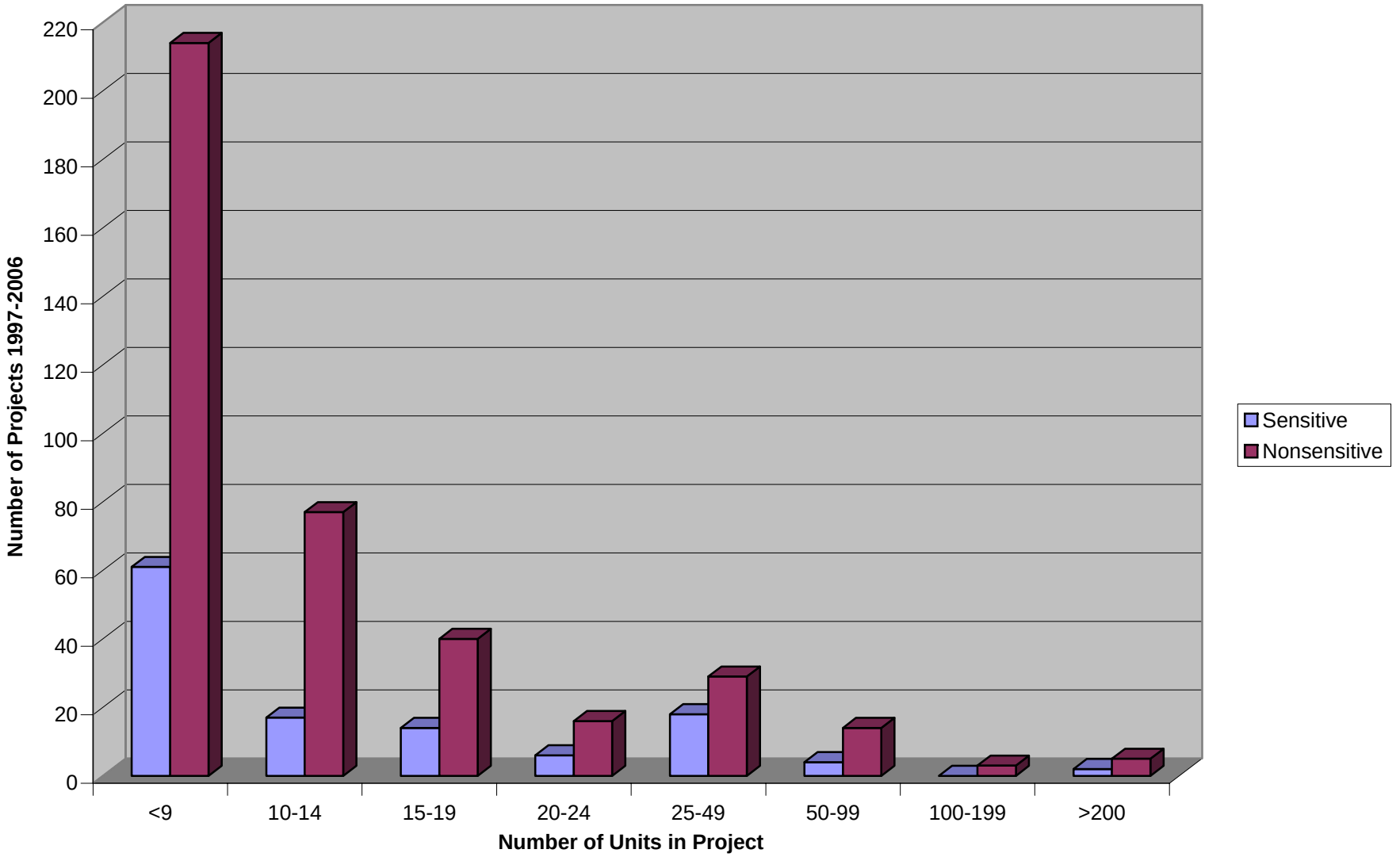
Table A – projects on Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers.

# acres in project	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
Unknown										
19 or less										
20 to 39										
40 to 79										
80 or more										

Table B – projects NOT on Natural Environment-classed lakes and designated trout streams, wild & scenic rivers, and forested & transitional rivers.

# acres in project	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
Unknown										
39 or less										
40 to 79										
80 to 159										
160 or more										

Attachment 3 -- Graph 1: Size Distribution of Residential Shoreland Projects



ATTACHMENT 4

BACKGROUND INFORMATION
IN SUPPORT OF THE

STATEMENT OF NEED AND REASONABLENESS
FOR THE
EAW AND EIS
SHORELAND THRESHOLD CATEGORIES

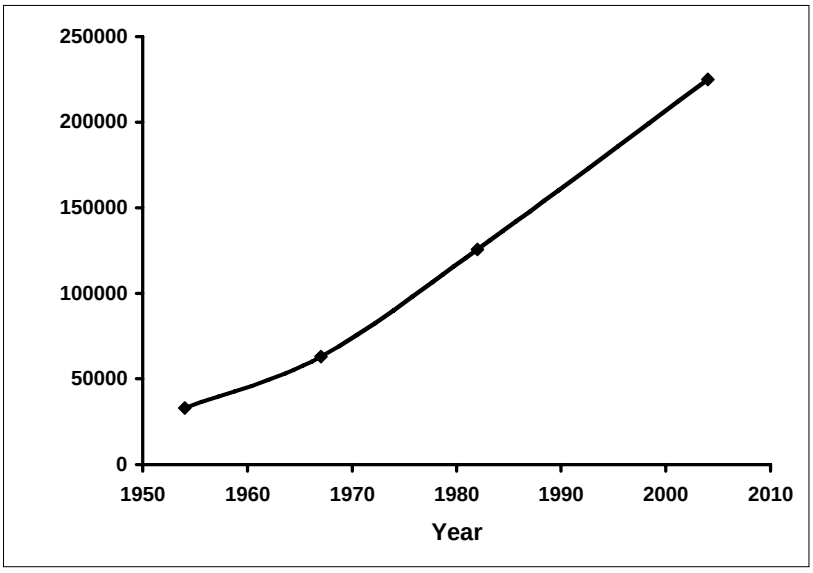
MINNESOTA DNR STAFF
APRIL 2007

I. BACKGROUND AND INTRODUCTION

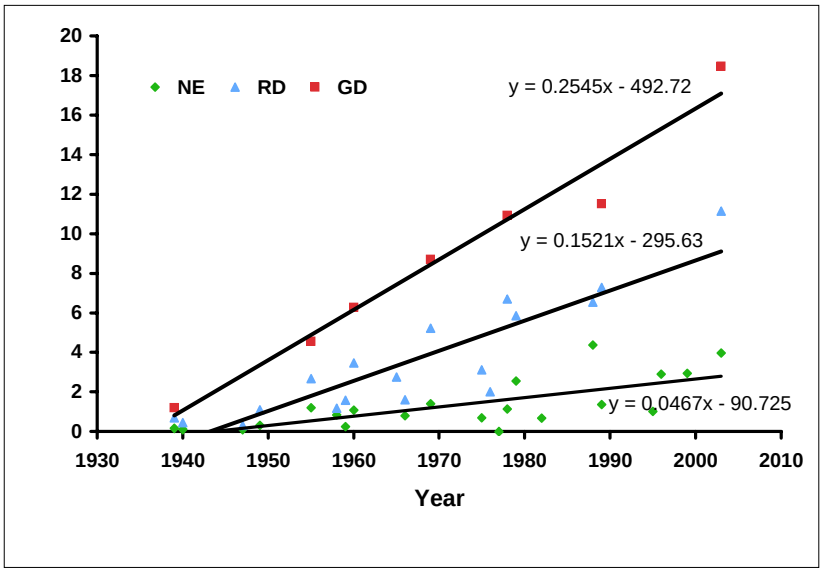
The Environmental Quality Board (EQB) is required by statute (see Minnesota Statutes, Chapter 116D) to promulgate rules to implement the environmental review procedures established by the Minnesota Environmental Policy Act. The Minnesota Environmental Policy Act recognizes that the restoration and maintenance of environmental quality is critically important to our welfare. The act also recognizes that human activity has a profound and often adverse impact on the environment. The two forms of environmental review procedures include an Environmental Assessment Worksheet (EAW) and an Environmental Impact Statement (EIS).

The major impetus for the proposal was the significant change in the pattern of development being experienced on the lakes across the state. During the 1960's and 1970's, most shoreland development was directed toward the traditional seasonal cabin or lake home. During the late 1970's and 1980's, the trend was to convert seasonal lakeshore dwellings into year-round lake homes. Finally, the advent of the internet and a diverse economy has allowed many people to work and live in the lake districts across the state. As a result, there are an ever-increasing number of large, modern homes being built on lakes.

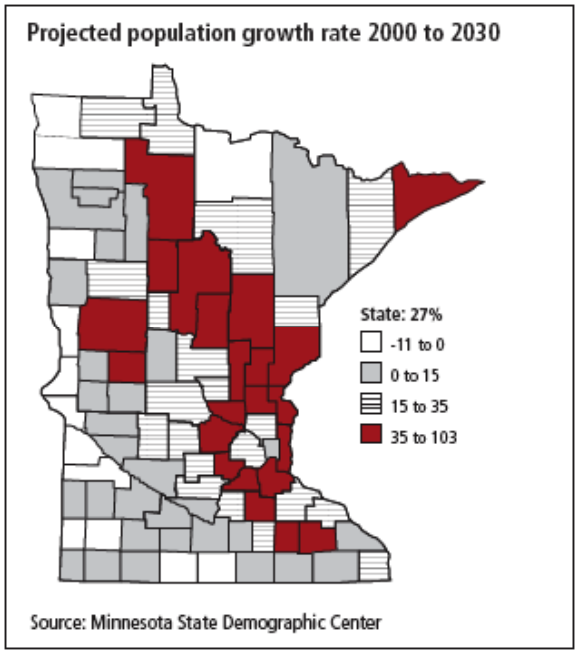
As undeveloped lakeshore has diminished, shoreland areas once considered less desirable or more difficult to develop are now being proposed for development. These areas are often low-lying and marshy, with shallow water offshore and frequent beds of aquatic vegetation. These same features often make these areas especially important to the ecology of the lake. Another change being seen is the increase in higher-density residential projects (more units per acre) in shorelands. A type of especial concern appears to be projects where most of the units are not actually on the lakeshore, but have access collectively through a few lots on the shore. There is a concern that such developments will result in over use of the lake, and this concern is increased when the lake also has an established public access.



Development pressure is increasing with more dwellings per lake each year (Kelly and Stinchfield 1998). Based on estimates of the number of Minnesota lakehomes, which have some measurement error and uncertainty, development appears to be increasing at an average rate of over 4000 homes per year (Cohen and Stinchfield 1984; Minnesota DNR 1989). The estimate of Minnesota lakehomes in 1954 and 1967 of 33,000 and 63,000, respectively, were only from development records for lakes outside the 7-county metro area of size greater than 145 acres (1923 lakes surveyed). Payton and Fulton (2004) estimated that there were about 181,000 lakehomes in 2004 on fish lakes in the state. About half of all lakeshore homes are seasonal residences, and 75 percent are located on less than 200 feet of lakeshore frontage (median lot width was 130 feet). The DNR estimate for total lakeshore dwellings in 2004 was about 225,000 for all lakes in the state.



Development around northcentral Minnesota lakes, as indexed by dock sites per mile from DNR aerial photos, has varied by shoreland development class (Radomski 2006). General development lakes have had a faster rate of development than recreational development class lakes, whereas natural environment lakes were just beginning to be developed. In 2003, mean development density was 4.0 homes per mile for natural development lakes, 11.2 homes per mile for recreational development lakes, and 18.5 homes per mile for general development lakes. Jakes et al. (2003) modeled future development potential for Itasca County lakes by identifying seven constructs influencing lakeshore development: current general development, current housing development, and availability, accessibility, suitability, aesthetics, and proximity to services.



More people are choosing to live and recreate in the lakes counties of Minnesota. These areas are likely to see a large influx in migrants (Radeloff et al. 2001; Brown et al. 2005). The Minnesota State Demographic Center has projected growth in many of the lake-rich counties to exceed 35 percent in the next 25 years. The Brainerd lakes area is one of the nation's fasting growing micropolitans (4th fastest growing mini metro area in the Midwest and 28th nationally; U.S. Census Bureau 2005).

There is widespread concern about the consequences of poor development on water quality and fish and wildlife habitat. Population increase with the associated loss of vacant lakeshore areas appears to have led to this greater public concern (Stedman 2003; Stedman and Hammer 2006). A recent study found that 33 to 42 percent responded that fishing, scenic quality, water quality, and condition of shoreline on their most-visited lake was "fair or poor" (Anderson et al. 1999). Respondents reported by a 2:1 margin that lake environments were becoming "worse" rather than "better". A survey of lake associations conducted at the University of Minnesota found that more than 50 percent of respondents felt that water quality, zoning, lake levels, agriculture, exotic species, plants and fishing were "very important" problems to their lake associations.

Limnological data support many of these perceptions. Human habitation along the shore usually has a cumulative effect on fish and wildlife habitat, water quality, and biota of lake ecosystems (Engel and Pederson 1998). The Minnesota Pollution Control Agency (PCA) has classified nearly half of Minnesota's "assessed" lakes as "impaired" or "partially supporting" of their designated uses. "Trophy"

catches of northern pike, bluegill, and crappie have declined dramatically since the 1930's (Olson and Cunningham 1989). Shoreline development has been estimated to have reduced emergent and floating aquatic plant abundance by 20 to 28 percent in northcentral Minnesota lakes (Radomski and Goeman 2001). There is a growing problem with invasive species. Lakeshore development increases nutrient inputs to lakes. Many lakeshore homes are serviced by on-site septic systems. According to the PCA, 39 percent of individual sewage treatment systems are failing or pose "imminent" threats, creating a serious potential for nutrient and bacterial contamination (PCA 2004). In addition, shoreline development (impervious surfaces and lawns) increases both the amount of runoff and the quantity of nutrients reaching a lake.

Nutrients reaching the lake result in eutrophication (Wetzel 2001). Eutrophication conditions include: higher occurrence of noxious algae blooms, excessive plant growth, loss of water clarity, and low dissolved oxygen. The addition of phosphorus, a plant nutrient common in Minnesota soil, has been shown to dramatically reduce water clarity. Many lakes in northcentral Minnesota have good water clarity; however, small changes in the amount of total phosphorus in the water can produce large reductions in clarity. Once a lake has an excess of phosphorus, water clarity becomes poor. For some lakes it is difficult to reverse the consequences of these phosphorus additions, as many lakes will fail to recover even after excessive nutrient additions are eliminated (Genkai-Kato and Carpenter 2005).

Water quality problems associated with eutrophication can be determined by measuring the volume of anoxic water in the hypolimnion (i.e., the bottom water layer in a lake). A study on a single forested, hourglass-shaped lake in northern Wisconsin, with two distinct basins of sharply differing levels of development, found that the more developed basin had a larger volume of anoxic water than the lesser developed basin (Ganske 1990). A 20-year study of a Michigan lake with three distinct basins used similar oxygen deficit methodology to track the rate of eutrophication at ten-year intervals. The most developed basin was found to be the most eutrophic (greatest oxygen deficit) over time, and a lesser developed basin had a consistently lower oxygen deficit, while one basin showed wide anomalous fluctuations (Lind and Davalos-Lind 1993). Two basins showed an increased rate in eutrophication during the time period of the study (1971 to 1991). By extrapolating their data backward and comparing with a measure of eutrophication in 1922, the authors approximate that the rate of eutrophication began increasing in about 1950, coincident with an increase in summer home construction during the postwar economic boom.

An interesting relationship was found for one Wisconsin lake. As wealth increased in the drainage basin, water clarity decreased and phosphorus concentrations increased (Gergel et al. 2004). This model could predict the future for Minnesota lakes.

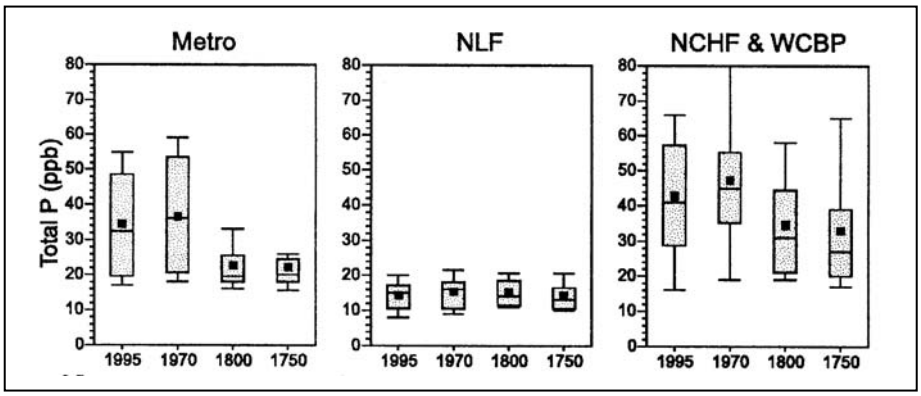
Lakeshore development and drainage basin alterations have resulted in long-term declines in lake water quality. Because sediment naturally builds up on a lake bottom over time, an accurate record of environmental change can be found in the lake's sediment layers. Paleontologists drive plastic tubes into the bottom sediments and bring a core up to be analyzed. Researchers have found that certain tiny algae called diatoms live under very narrow environmental conditions. If the water quality is poor, all types of diatoms cannot exist there, so diatoms are good indicators of past water quality.

Many of us use our memories to determine how the lake we live on or the lake we visit has changed. Scientists, however, can use paleolimnology techniques, which allow reconstruction of past conditions (Garrison and Wakeman 2000; Heiskary and Swain 2002). Their studies have documented the consequences of shoreland development on lake water quality.

These studies usually show several key events for a lake.

- First, in many lakes, there is an increase in lake sediment accumulation in the early 20th century due to logging and other land disturbances.
- Second, the initial shoreland development on a lake generally had minimal impact on lake water quality.
- Third, the highest sediment accumulation often occurred during the peak construction phase of converting shoreland cabins to year-round homes. Water clarity may have remained stable; however, in many low-alkalinity lakes, water clarity decreased with development.
- These studies found no difference in phosphorus levels or water clarity from 1750 to 1995 for undeveloped or lightly developed Itasca County lakes; however, substantial increases in phosphorus levels and resulting decreases in water clarity were found for this same time period for central Minnesota lakes due to urbanization or agriculture.

Ramstack et al. (2004) found about a third of metro and central (NCFH&WCBP) Minnesota lakes had a significant increase in total phosphorus between 1800 and the present. These changes were attributed to increases in nutrient runoff. Lakes in the forested region of the northeast (NLF) saw little change in lake total phosphorus concentrations.



Many of Minnesota lakes and rivers are impaired. A water body is "impaired" or polluted if it fails to meet one or more of the federal Clean Water Act's water-quality standards. Federal standards exist for basic pollutants such as sediment, bacteria, nutrients, and mercury. The Clean Water Act requires the PCA to identify and restore impaired waters. Minnesota's Impaired Waters list – updated every two years – identifies assessed waters that do not meet water quality standards. The 2006 list, currently in draft form, includes 2,274 impairments on 1,304 waters in Minnesota. Listed waters include 1,008 lakes and 296 rivers and creeks, many with multiple impairments. Assessments are complete on 10 percent of Minnesota's stream miles and 16 percent of the state's lakes. The list will expand as assessments continue throughout the state.

In addition to water quality degradation, there is loss of habitat. Initially the greatest impact of shoreland development is habitat alterations, which results in the decline of fish and wildlife populations. Then, as a lake's watershed becomes more urbanized, nutrient levels increase and water clarity decreases due to pollutant runoff, poor stormwater management, and shoreline phosphorus inputs from shoreland septic systems and lawns to the lake. However, development done right can reduce the negative consequences, while increasing property values. In addition, for some deeper lakes that are resilient to the additions of nutrients and pollution, restoring shoreline vegetation, rehabilitating rainwater infiltration in the watershed, and using conservation or low-impact development designs may reverse lake quality degradation.

The EQB sets rules that determine thresholds for additional review of the environmental impact of developments to assist and guide wise development. A first step in achieving a more harmonious

relationship between human activity and the environment is understanding the impact which a proposed project will have on the environment. The purpose of these rules is to aid in providing that understanding through the preparation and public review of environmental documents. Environmental documents must contain information that addresses the significant environmental issues of a proposed action. This information is available to governmental units and citizens early in the decision making process.

During the 2004 legislative session, bills were introduced in the House and Senate directing the EQB to develop special Environmental Review categories for lakeshore development. Although the legislation did not pass during the session, Senator Sams and Representative Ozment wrote a letter to the EQB asking for the development lakeshore categories.

The EQB asked its staff to examine the mandatory category threshold levels in the environmental review rules (Minnesota Rules parts 4410.4300 and 4410.4400). Board members wanted to know if the thresholds are still appropriately placed to balance environmental protection and public benefit with administrative burden.

On March 25, 2005, the EQB asked the Department of Natural Resources (DNR) to serve as the state agency lead in developing a new environmental review category for lakeshore development. On April 13, 2005, the DNR accepted leadership for the development of lakeshore thresholds, and it used an advisory committee approach.

Sample Rule Development Process

The DNR assembled a diverse advisory committee. The 19-member citizen's advisory committee represented the many public and private interests within the state including resorts, conservationists, government representatives, and lakehome property owners. The following persons, with their representation, were members of the advisory committee:

1st Name	Last Name	Organization / Company / Representation / Position
Annalee	Garletz	Association of Minnesota Counties; Policy Analyst
Michael	McDonough	Metropolitan Council; Landscape Architect
Dan	Greensweig	Minnesota Association of Townships; Attorney
Jan	Beliveau	Lake Association Representative
Les	Martin	Cedar Lake Conservancy; President
Richard D.	Hecock, Ph.D	Becker County EAW task force
Theresa	Greenfield	McCombs Frank Roos Associates, Inc.; Planner (AICP)
Henry	VanOffelen	Minnesota Center for Environmental Advocacy; NR Scientist
Joseph	Blaha	Citizen; Arden Hills, Minnesota
James	Peters	Peters Sunset Beach Resort
Michael	North	Minnesota Chapter of the Wildlife Society; representative
Molly	Shodeen	DNR Waters Area Hydrologist
Bob	Neal	Minnesota Waters (formerly Minnesota Lakes Association)
Paula	West	Minnesota Waters; Director
Robert	Deutschman, Sr.	Dead Lake Association; President
Dave	Leuthe	DNR Waters Regional Manager
Jeff	Smyser	City of Lino Lakes; City Planner
Karen	Ebert	Minnesota Counties Insurance Trust
Terry	Neff	Aitkin County; Environmental Services Director

The advisory committee met numerous times from October 2005 through January 2006. The advisory committee reviewed the issues identified by the EQB staff and assisted the DNR in developing specific amendments to the existing environmental review rules to address those issues. EQB and DNR staff assisted in crafting various draft lakeshore development category thresholds. With the use of an iterative process, the advisory committee members provided important guidance in the development of sample rules. Russ Schultz, DNR Division of Waters, facilitated the advisory committee process, and he managed the project to the completion of the sample rules.

The advisory committee reached general agreement on the issues identified. Although some of the sample rules did not represent the views of all committee members, it was believed by the committee members that the sample rules provided a pragmatic framework for shoreland thresholds.

Following the advisory committee process, the EQB issued a public notice of the opportunity to comment on possible amendments to the Environmental Review program rules (Phase 2 process where the comment period was from August 14, 2006 to October 16, 2006). The sample shoreland thresholds for EAW and EIS developed by the advisory committee process were offered for comment. Proposed rules were then developed from the advisory committee framework and the comments received from this public notice.

II. STATUTORY AUTHORITY

Minnesota Statutes (section 116D.04, Environmental impact statements) require that the Environmental Quality Board establish rules for categories of actions for which environmental impact statements and for which environmental assessment worksheets shall be prepared as well as categories of actions for which no environmental review is required.

III. REGULATORY ANALYSIS

These proposed rules focus on new residential developments and other large land alteration projects within the shoreland. The proposed rules could impact large resort expansions in the state. The proposed rules cover areas not addressed by federal law, and they do not involve any new regulatory, permit, or license fees or any other charges to the public, and would not affect farming operations.

Large development projects in the shoreland may adversely affect the public health, safety, and general welfare by contributing to pollution of public waters and by impairing the local tax base. The proposed rules are intended to preserve and enhance the quality of surface waters, conserve the economic and natural environmental values of shorelands, and provide for the wise use of water and related land resources of the state. Nothing in the proposed rules shall be construed as prohibiting or discouraging a local government from adopting and enforcing controls that are more restrictive.

The EQB staff has noted that over the past several years the number of citizens' petitions on lakeshore projects has increased noticeably and that the types of projects involved are the very types described as of concern by the legislators and Minnesota Waters (formerly the Minnesota Lakes Association). While development of Minnesota's lakeshores is nothing new, especially for permanent or seasonal residential development, the diminishing amount of undeveloped lakeshore has led to noticeable changes in the types of development projects being proposed and in the nature of the lakeshores under consideration for development. The increasing pressure of these new developments has led to a recognition that the existing mandatory review categories may no longer be adequate to ensure the needed review of today's lakeshore development projects.

Economic consequences of adopting the proposed rules

Shoreline property owners, local governments, and taxpayers benefit economically as a result of the amenities that good shoreland management preserves: clean water, fish and wildlife, and natural beauty (Dempsey 2006). Good water quality is critical to the tax base and economic assets of the state.

Water clarity is strongly related to the price people are willing to pay for lakefront property. In a five-year study of 900 shorefront properties on 34 lakes in Maine, declining water clarity was shown to reduce lakefront property values and could increase the tax burden of offshore properties (Michael et al. 1996). A 3-foot difference in average minimum water clarity was associated with property value declines of up to 22 percent. In a lake-rich township in Maine, it was predicted that a 3-foot decline in average minimum water clarity would cause a loss of 5 percent in total property value and likely an equivalent loss in taxes paid (Maine Department of Environmental Protection 1996).

A similar study showed a direct relationship between property values and water clarity for Minnesota lakes (Krysel et al. 2003). Lakes with clearer water were associated with higher property values, while lakes with less clarity were associated with lower property values. The study looked at 1,205 properties sold on 37 lakes in the communities of Aitkin, Brainerd, Grand Rapids, Walker, Park Rapids, and Bemidji. This study found that a 3-foot increase in water clarity has an economic worth of $50 per foot for lake frontage, or about $5,000 for a typical property with 100 feet of lakeshore. And, a 3-foot decrease in clarity has a much higher proportionate loss in economic worth, averaging $70 per foot of lake frontage. This study and those in Maine are evidence that protecting water quality of lakes is important in maintaining the economic assets of a region.

Tourism in the lake regions of Minnesota is economically important. Our tourism industry is based primarily on Minnesota's water resources, so water quality is important to a healthy business economy. Clean water and lakes draw visitors and these amenities are important in the quality of life for local residents. The travel and tourism industry in Minnesota generated $9.2 billion in gross receipts and sales in 2003, resulting in $1 billion in state and local tax revenues (Explore Minnesota Tourism). Tourism is comparable to agriculture in terms of its contributions to gross state product. It has been estimated that the outdoor recreation industry alone—fishing, hunting and wildlife watching—contributes $4.2 billion annually to the gross state product and generates over 70,000 jobs in Minnesota. Thirty percent of Minnesotans fish, and fishing is the third most popular tourist activity in Minnesota. Ninety-eight percent of our resorts, 80 percent of our campgrounds, and nearly a fourth of Minnesota's hotels are located on lakes and rivers. Fishing generates $1.28 billion in expenditures per year. It has been estimated to create 49,700 jobs in the state and generates approximately $100 million per year in income and sales tax. The American Sports Fishing Association ranks Minnesota 4th in the nation in the overall economic output from fishing.

The highest ranked reasons visitors identified in selecting the Brainerd Lakes and Itasca areas were the natural environment; area lakes, streams, and rivers; boating/water recreation, and scenic views (Love et al. 2001). Unplanned development and inadequate shoreland zoning threaten these amenities.

Dziuk and Heiskary (2003) estimated that 10 Itasca County lakes generated an estimated total income of $7 million; whereas, real estate taxes for shoreland properties paid to the county accounted to about $333,000. They concluded that the substantial income from lakes is adequate justification for keeping them in a healthy state through use of best management practices. They hoped that recognition of the amount of income from healthy lakes would lead to a greater commitment on the part of local officials in supporting efforts to take better care of such resources.

Scenic quality attributions are generally higher for lightly developed than poorly or overly developed landscapes, and especially for lakes (Macbeth 1989). Stedman and Hammer (2006) found that when people perceived the lake they owned property on as more developed, they were more likely to see that lake as polluted. The effect of shoreline development on the perception of polluted water was as strong as that of the actual measure of water greenness (i.e., chlorophyll or total phosphorus concentration). Therefore, the type of development and the perception of the development are both important if an area is to continue to attract tourist and resort business.

Resorts are vital to Minnesota's economy. Resort visits annually generate millions of dollars to local economies, and their guests contribute to the success of other businesses when they explore restaurants, shops, and local entertainment. While there are several large resorts in the state, many of which are located in the Brainerd Lakes area, 90 percent of the resorts in northcentral Minnesota have less than 20 cabins. Approximately half the resorts are 10 acres or less in size, and most resorts are seasonal, being fully operational from May to September. Most resorts are also family businesses. Many of these entrepreneurs have gross sales between $25,000 and $100,000. Resort owners have noted that the increasing value of lakeshore property negatively affects their properties. For some resorts, the land value of the resort exceeds the value of the business. Add this factor to increasing operating costs from higher insurance and the necessity for more guest amenities, Minnesota resort owners face issues of sustainability.

State, county and municipal governments must administer the resulting proposed rules. The net cost to the local government of administering an environmental review process is a public cost, which is borne by its taxpayers. When an EAW and EIS is to be prepared, the completion of these environmental review documents is borne by the project proposer. The proposer incurs a cost for data collection as the proposer must submit the completed data portions of the EAW to the responsible governmental unit (RGU), and the RGU assesses the project proposer for its reasonable costs of preparing and distributing an EIS.

It is anticipated that these proposed rules will generate additional EAWs and EISs. [add information from survey of local governments to determine the likely consequence of these rules]

IV. EXISTING RULES RELATED TO SHORELANDS

While there are no existing mandatory categories directed specifically at lakeshore developments, the following mandatory category thresholds may apply to lakeshore projects:

Mandatory Environmental Assessment Worksheet

Residential Development in unincorporated areas (4410.4300, Subp. 19, item A):
· 50 or more unattached or 75 or more attached units (in groupings of 4 or more units per building) if wastewater is treated on-lot (by ISTS), by a series of centralized septic systems, or by a single centralized septic system that is not owned by either the homeowners collectively or by a unit of government;
· 100 or more unattached or 150 or more attached units (in groupings of 4 or more units per building) if wastewater is treated either by a public sewer and wastewater treatment facility or by a single centralized septic tank system owned by the homeowners collectively or by a unit of government.

Residential Development in incorporated areas (4410.4300, Subp. 19 B–D):

· 100 or more unattached or 150 or more attached units (in groupings of 4 or more units per building); or 250 or more unattached or 375 or more attached units if the project is consistent with an adopted comprehensive plan that meets the conditions specified in the EQB rules (at 4410.4300, subp. 19, item D). (Note: a certification of the plan to the EQB may be required).

Mixed Residential and Commercial Developments (4410.4300, subp. 32):
If a project combines residential units and any commercial components (such as hotel/motels, restaurants, retail space, etc.) the commercial components must be taken into account as well as the residential units, and the effect is that review will be required for fewer residential units as the commercial space increases. The exact method of calculation is prescribed in the rules.

Marinas (4410.4300, subpart 25):
Construction or expansion of a marina or harbor that results in a 20,000 or more square foot total or increase in water surface area used temporarily or permanently for docks, docking, or maneuvering of watercraft. A "marina" is defined to include an area for the concentrated mooring of 5 or more watercraft with at least one ancillary service such as storage, fueling, launching, repair, sanitary pumpout, or restaurant service.

Campgrounds & RV Parks (4410.4300, subpart 20):
Construction of, or expansion by, 50 or more sites of a seasonal or permanent recreational development accessible by vehicle.

Land Use Conversion (4410.4300, subp. 32):
Residential development where the lot size is less than 5 acres, golf courses and other development resulting in the permanent conversion of 80 or more acres of forest, naturally vegetated, native prairie or agricultural land (except for agricultural land in the Twin Cities metropolitan urban service area). (Where some residential lots are under and some over 5 acres, only those under 5 acres are counted toward the 80 acre threshold.)

Forestry; harvesting (4410.4300, subp. 28 B):
Clearcutting 80 or more contiguous acres of forest, any part of which is within a shoreland area and within 100 feet of the ordinary high water mark of a lake or river.

Protected Waters & Wetlands (4410.4300, subp.27):
Projects impacting 1 or more acres of a DNR-protected water or wetland require an EAW.

Mandatory Environmental Impact Statement

Residential Development in unincorporated areas (4410.4400, Subp. 14 A):
· 100 or more unattached or 150 or more attached units (in groupings of 4 or more units per building) if wastewater is treated on-lot (by ISTS), by a series of centralized septic systems, or by a single centralized septic system that is not owned by either the homeowners collectively or by a unit of government;
· 400 or more unattached or 600 or more attached units (in groupings of 4 or more units per building) if wastewater is treated either by a public sewer and wastewater treatment facility or by a single centralized septic tank system owned by the homeowners collectively or by a unit of government.

Residential Development in incorporated areas (4410.4400, Subp. 14 B–D):

400 or more unattached or 600 or more attached (in groupings of 4 or more units per building) units; or 1,000 or more unattached or 1,500 or more attached units if the project is consistent with an adopted comprehensive plan that meets the conditions specified in the EQB rules (at 4410.4300, subp. 19, item D). (Note: a certification of the plan to the EQB may be required).

Mixed Residential and Commercial Developments (4410.4400, subp. 21):
If a project combines residential units and any commercial components (such as hotel/motels, restaurants, retail space, etc.) the commercial components must be taken into account as well as the residential units, and the effect is that review will be required for fewer residential units as the commercial space increases. The exact method of calculation is prescribed in the rules.

Marinas (4410.4400, subpart 19):
Construction of a new or expansion of an existing marina, harbor, or mooring project on a state or federally designated wild and scenic river.

Protected Waters & Wetlands (4410.4400, subp.20):
Projects that eliminate a DNR-protected water or wetland require an EIS.

V. RULE-BY-RULE ANALYSIS

The proposed rule amendments for lakeshore categories include two key concepts:

Sensitive Area
First, it includes the concept of sensitive shoreland. Shorelines along lakes may vary greatly with a variety of water quality functions and ecological characteristics that provide varying habitats for wildlife and fish species. Sensitive shoreland is defined as any government designated sensitive or vulnerable shoreline or shoreland. The proposed rule allows higher thresholds in non-sensitive areas.

Sensitive shoreland includes natural environment classified lakes and shorelands of special protection districts (or equivalent districts). These places often have extensive areas with less than 15 feet water depth, and these healthy systems usually have abundant aquatic plant communities. Recent research has demonstrated that such waterbodies are very susceptible to nutrient loading. Shallow lakes are known to exhibit two alternating stable states (Scheffer et al. 1993). The first state is characterized by clear water, abundant aquatic vegetation, shallow bays covered with emergent vegetation, desirable fish and invertebrates, and enhanced waterfowl production. The second state, equally stable, is less species-rich and less diverse, with very turbid water, little or no submerged vegetation, heavy algal blooms, poor fish communities, and limited waterfowl production. These shallow lakes can exist for years as either a clear or turbid water state. Both of these states are relatively stable and it takes a major perturbation to move from one state to another.

The degradation of Minnesota shallow lakes has been broad-based, cumulative and persistent (PCA 2004). The majority of the lakes in central or southwest Minnesota are non-supporting of aquatic recreational uses. The reasons for non-support of swimmable use vary. Many northern and northcentral Minnesota shallow lakes do not support swimmable use due to some past or present source of excess phosphorus loading in their watershed, such as a wastewater treatment plant discharge. The vast majority of shallow lakes in the southwest or northwest have highly agricultural watersheds. Runoff from these agricultural lands is typically very high in phosphorus. This high nutrient loading from the watershed and shallowness of the lakes (which promotes poor retention of phosphorus by lake sediments

and internal recycling of phosphorus) typically leads to high in-lake phosphorus concentrations and subsequently nuisance algal blooms and low transparency. The combination of high watershed nutrient loading and the limited assimilative capacity of shallow lakes often limit the degree to which water quality of these lakes might be improved.

Shallow lakes are also more vulnerable to water surface use. Asplund (1997) studied water clarity for both weekdays and weekends for shallow and deep lakes in Wisconsin. Boat density increased on weekends, and water clarity decreased by about 16 inches in the shallow lakes and about 8 inches in the near-shore areas of all lakes. Beachler and Hill (2002) found that at boat speeds near 6 to 8 mph, where the boat was near-plane, there was maximum turbulence to the lake bottom in shallow areas (less than 8 feet deep), and re-suspension of lake sediments was less at high or idle speeds. Boat traffic on shallow lakes can result in an increase in phosphorus concentrations (Yousef et al. 1980). This phosphorus can then stimulate growth of attached or planktonic algae, thereby degrading or eliminating important aquatic plant communities (Murphy and Eaton 1983). In addition, boat traffic on shallow lakes and in littoral areas can damage or destroy aquatic macrophytes (Asplund 2000).

Shorelines and shoreland are often heterogeneous with pockets of critical habitat. For example, government designated sensitive bays may possess a large portion of the valuable floating-leaf and emergent plant stands for a lake (Radomski 2006). Numerous fish species use sensitive embayments, wetland fringes, and the associated vegetative cover disproportionately to other shorelines (Wei et al. 2004). Fish prefer wetland embayment areas associated with lakes because they generally warm up faster in the spring, the presence of emergent and floating-leaf vegetation provides cover, and productivity is higher in these areas. In addition, such areas are often used for fish spawning and nursery grounds.

Waterfowl production is reduced with overdevelopment of shallow lakes. Disturbance can cause female nesting ducks to take flight, leaving eggs exposed and chicks more prone to predation. Korschgen and Dahlgren (1992) reviewed over 200 journal articles which revealed that disturbance from development displaced waterfowl from feeding grounds, increased energetic costs associated with flight, and likely lowered productivity of nesting or brooding waterfowl. Kahl (1991) found that disturbance in a Wisconsin lake resulted in about a 50 percent reduction in feeding time for canvasbacks. Knapton et al. (2000) found that disturbance lead canvasbacks, redheads, and scaup to feed in less productive areas. Belanger and Bedard (1990) found for snow geese that disturbance caused a 5.3 percent increase in hourly energy expenditure.

Hunters and bird watchers are wondering what is happening to Minnesota duck populations. There appears to be fewer ducks nesting in the local area and fewer migrating ducks stopping over. In 2005, Minnesota's breeding duck population was the lowest since the drought years of the 1980's, according to annual aerial survey data. The duck hunting harvest was down 23 percent in 2004. So, why are there fewer ducks? Loss of habitat and reduced quality of remaining habitat are probably large factors.

In recent years, migrating ducks have seemed to find Minnesota waters less hospitable than in the past. This may be, at least in part, because today our waters generally have more disturbances from motorized watercraft, less aquatic vegetation, and fewer invertebrates for ducks to eat. Nesting ducks need quality places to raise their young. Minnesota once had vast areas of high quality wetland/grassland duck nesting habitat; however, development has largely reduced these quality duck rearing areas. Our vast prairies and associated wetlands are gone. With the loss of wetlands and prairies has come the loss of ducks.

Shorelands of designated wildlife and migratory waterfowl feeding and resting lakes across Minnesota play an important ecological role as well. These lakes have an abundance of aquatic plants and invertebrates, which makes them valuable to ducks and other wildlife. However, these aquatic plant communities are vulnerable to shoreline activities. Lakeshore development in the forested region of the state has also resulted in a loss of duck habitat. Many north central Minnesota clear water lakes are extensively developed, leading to fewer wood ducks, hooded mergansers, and ring-necked ducks. The few remaining pockets of undeveloped shoreline, both in the prairie and forested areas of the state, are under increased pressure for development. Given that realization, higher environmental review rules could help the wise development of these significant natural resources.

Better environmental review in these areas may likely help protect water quality and other resources. Shallow lakes, as mentioned, are especially sensitive to the addition of nutrients like phosphorus – a nutrient that can lead to algae blooms. Wild rice is often found in these shallow lakes, and it is important food and cover for waterfowl broods and migrating ducks. Wild rice lakes also have important social and cultural value for many Minnesotans.

Different environmental review thresholds for sensitive areas with critical fish and wildlife habitat are warranted and needed given documented and predicted losses to habitat from resulting development. Shorelands of designated trout lakes and streams, outstanding resource value waters, special protection lakes and districts, and natural environment classified waters are reasonable shorelands to include within this provision given their vulnerability to development.

Higher Thresholds for Projects that use Higher Development Standards
The second key concept included the allowance of higher thresholds (or no thresholds) for projects that meet certain design criteria. It is reasonable to allow higher thresholds for developments that meet higher standards.

The remainder of this section will follow the organizational structure of the proposed rules. Part 4410.0200 DEFINITIONS will be skipped, with proposed definitions addressed as they appear in subsequent parts.

4410.4300 MANDATORY EAW CATEGORIES

Subp. ??. Residential Developments in Shorelands.
Residential subdivisions are an important element in the development of shoreland. A well thought out subdivision process and ordinance to govern the same is an essential element in good land use planning. Good subdivision standards reflect and compliment the community vision for itself and its comprehensive land use plan and support the same.

Items A. Conventional Subdivisions.
Traditional lot and block developments, or conventional subdivisions, have greater environmental impact than other types of subdivision. These developments generally have low amounts of common open space. Conventional subdivisions spread development throughout a parcel of land without considering natural or cultural features. This has led to shoreland fragmentation, with homes and docks every 100, 150, or 200 feet regardless of vulnerable or unique natural features or conditions. Conventional subdivisions essentially produce only lots and streets. Conventional subdivisions provide few green spaces for walking, little habitat for wildlife, and few opportunities for residents to interact with their neighbors. In addition, this development approach comes with a high cost of community

services. For every dollar of tax revenue raised from such traditional residential developments, it costs on average $1.15 in public services (American Farmland Trust 2004).

Dense developments, where density is proposed to exceed the applicable M.R. 6120 unsewered, residential density standard by more than 15 percent, also generally have more environmental impacts. Higher density means higher impervious surface coverage. One predictor of nutrient runoff to our lakes is the amount of impervious surface coverage. Roofs are an impervious surface, as are paved or gravel driveways and other constructed hard surfaces that prevent or retard rainwater infiltration. Impervious surfaces inhibit recharge of groundwater, and they provide an express route for pollutants to lakes and rivers.

Imperviousness is also an important index in the amount of alteration of the landscape. Scientific evidence relates imperviousness to changes in the hydrology, habitat availability, water quality, and fish and wildlife conditions. Impervious surface is defined as a constructed hard surface that either prevents or retards the entry of water into the soil and causes water to run off the surface in greater quantities and at an increased rate of flow than prior to development. Examples include rooftops, sidewalks, patios, storage areas, and concrete, asphalt or gravel driveways.

As impervious surface coverage increases on a lot or in a watershed, the amount of nutrients entering our lakes increases linearly (using traditional stormwater practices; Schueler 1994). Hydrology research consistently shows that when impervious surface coverage exceeds about 10 to 12 percent, water quality is negatively impacted (Schueler 2003). In addition, the proximity of impervious surfaces and development is often as important as the amount with regard to fish, wildlife and habitat effects (Wang et al. 2001; Brabec et al. 2002), which again stresses the importance of large natural vegetated shoreline buffers (DeLuca et al. 2004).

In areas with low amounts of imperviousness, only 10 percent of the rainwater runs off. In high development density areas, 50 percent of the rainwater becomes runoff. This runoff pollutes receiving waters and changes the character of streams. Higher runoff changes the hydrology of streams. Stream channels change with the increase in energy brought by higher flows. Stream banks blowout and in-stream habitat is degraded with the loss of pool-riffle sequences and bank cover (Schueler 2003).

Stream studies from around the country in a variety of urbanized areas have identified a threshold of 10 percent impervious area in a watershed beyond which stream water quality and habitat begin to degrade (Schueler 1994). The mechanisms of the degradation process are well known. As impervious surface increases, surface runoff increasingly dominates over infiltration and groundwater recharge. This allows more rapid runoff and higher peak flows in streams, increases stream bank erosion and sediment loading to the streambed. The result is wider, straighter sediment-choked streams, greater temperature fluctuation, loss of streamside habitat, and loss of in-stream habitat. The naturally variable stream substrate is covered over by sand and silt. Nutrient, pathogen, and pollutant loading are increased. Engineering responses to flooding have exacerbated the ecological damage by severely simplifying stream habitat. Research has documented the impact of impervious areas on alterations in stream hydrology (FISRWG 1998). The degradation of wetland water and habitat quality as surrounding development intensifies has also been documented.

There is a definitive link between fish assemblages and impervious surface cover. Sedimentation and toxic pollutant runoff to streams and lakes increases with imperviousness, which reduces fish reproductive success and survival. In addition, increased imperviousness results in increased stream water temperatures and reduced base flows. Increased imperviousness lowers base flow because less

precipitation infiltrates into the groundwater, leading to a lowered groundwater table. Increased stream temperatures and high annual temperature fluctuation have a negative impact on fish communities, particularly for fish that thrive at cooler water temperatures. Generally, it has been observed that between 10 to 12 percent imperviousness there is a decline in stream fish communities and above 25 percent fish are usually absent (Paul and Meyer 2001). Increases in imperviousness also affects species richness. In Wisconsin, fish coldwater index of biotic integrity decreased rapidly at 10 percent urban land cover (Wang et al. 1997) and 8 to 12 percent connected impervious surface coverage resulted in major changes in stream condition (Wang et al. 2001). In Minnesota and Wisconsin, trout streams degraded quickly at 6 to 11 percent connected impervious surface coverage, so even low levels of urban development can damage these streams.

Data indicates that better site design and stormwater management practices can reduce phosphorus loads as much as 40 to 60 percent (Scheuler and Caraco 2001). However, even with inclusion of some elements of low-impact development principles, high density and high levels of imperviousness will likely result in substantial phosphorus loading to lakes and streams, which leads to water quality degradation.

It is reasonable to have lower thresholds for conventional subdivisions and high-density developments than other forms of subdivisions given their higher environmental impacts.

Items B. Common Open Space Developments.
Developments with common open space include conservation subdivisions and planned unit developments in the shoreland. Conservation subdivisions are an important development approach used elsewhere to provide better lots for homeowners while protecting water quality, promoting economic development, and creating open space for recreational use, wildlife, and riparian buffers to protect water quality (Arendt 1996). Open space has come to be recognized as an important human need and as a necessary element in both comprehensive land use plans and in ordinances. Not only does open space provide social amenities for humans, such as a space to play or relax or socialize, they confer economic benefit. For Minnesota shorelands, open space is vital for the survival of native flora and fauna and biodiversity by allowing them to securely move and migrate and giving them areas to grow. A healthy natural environment is essential for human existence.

A conservation subdivision is a method of subdivision characterized by common open space and clustered compact lots. The purpose is to create greater community value through open space amenities for homeowners and protection of natural resources, while allowing for the residential densities consistent with prevailing densities. Site designs should incorporate standards of low impact development, such as the use of some single-load roadways and narrower rights-of-way, looped road-ways versus cul-de-sacs, maximum road setbacks for structures, and preservation of trees, shoreline, unique resources, and scenic vistas. These developments can use stormwater designs that emphasize on-site retention and infiltration through the preservation of native vegetation within the shore impact zone, use of pervious surfaces, rain gardens, and swales. In Minnesota's Alternative Shoreland Management Standards, conservation subdivisions are essentially density neutral, that is, they would have densities consistent with the typical residential densities for the class or district.

Conservation subdivisions are similar to golf course developments. First, critical natural areas, community recreational areas, and common open space are identified and protected. Then, buildable areas are identified and a majority of the lots and homes are clustered around these protected areas. Common open space is defined as a portion of a development site that is permanently set aside for public or private use, is held in common ownership by all individual owners within a development, and

will not be developed. Common open space shall include wetlands, upland recreational areas, wildlife areas, historic sites, and areas unsuitable for development in their natural state. Common open space is not the space between buildings of a cluster in a conservation subdivision or planned unit development, and it does not include an area of 25 feet around each structure or any impervious surface.

Conservation subdivisions have additional benefits. They create a greater sense of community and they allow more interaction with the outdoor environment. People find these developments more attractive than conventional subdivisions (Nassauer 2004). Open spaces provide walking and biking trails, play areas, and community gathering places. Protected natural areas mean lower development costs, preservation of wildlife habitat, and less pollution runoff into lakes and wetlands.

In a study comparing conservation and conventional subdivisions, streams downstream of conservation subdivisions had lower concentrations of total suspended solids, phosphorus, and nitrate than those downstream of conventionally developed catchments (Nassauer et al. 2004). The Center for Watershed Protection (Caraco et al. 1998) estimated that phosphorus runoff and export may be reduced 60 percent and nitrogen export may be reduced 45 percent using conservation subdivisions and better site designs over conventional developments.

It is reasonable to allow higher environmental review thresholds for conservation subdivision developments since they more often incorporate protection of natural resources in their design. Conservation subdivisions can be a valuable tool for protecting water quality and wildlife habitat. These developments may have less impervious surface coverage than conventional subdivisions of the same size, since houses are clustered on only a portion of the land. Also, vulnerable natural features can be incorporated within the open space, instead of being a part of someone's lot, as with conventional subdivisions.

Planned unit development is defined in the proposed rule as a method of land use or development characterized by a unified site design for a number of dwelling units or dwelling sites on a parcel, whether for sale, rent, or lease, and that incorporates clustering of these units or sites to provide areas of common open space, and a mix of structure types and land uses. These developments may be organized and operated as residential or commercial enterprises such as individual dwelling units, townhouses, condominiums, time-share condominiums, cooperatives, common interest communities, shared-interest communities, apartment buildings, non-resort campgrounds and youth camps, recreational vehicle parks, manufactured home parks, hotels, motels, or any combination of these. Planned unit developments also include any conversion of pre-existing structures and land uses in order to utilize this method of development. Since planned unit developments with the improved design principles, such as those in Minnesota's Alternative Shoreland Management Standards which include adequate common open space and are density-neutral, provide environmental protection and greater community value over conventional subdivisions and PUDs that lack such design elements, preference is given to these forms of development. Higher environmental review thresholds are allowed for such PUD developments.

The threshold values proposed for subdivisions (conventional, conservation, and PUDs) are based on expert opinion on the magnitude of potential significant environmental issues of variously sized subdivisions, the perception on the distribution of the number of lots created with shoreland subdivisions, and advisory committee and public comments.

Item C. Lake Access.

The proposal addresses the need for lake access thresholds. On the issue of need and reasonableness, the question is, how many boats are too many? How many boats should be parked in the productive

zone of lakes, and how many boats should be allowed from a recreational boat safety perspective? In the publication "LAKE DEVELOPMENT, How Much Is Too Much?" (Barstad and Karasov 1987) it was shown that lakes have a threshold of recreational and physical carrying capacities up to which they can reasonably sustain development. Safety standards for boat density vary. Minnesota DNR's guideline for access development is 10 acres/boat. For metro lakes, public access sites are developed to reach a 20 acre/boat standard without resident or commercial additions (e.g., on a 200 acre metro lake, 10 parking spaces in the public access is the design goal).

Common standards cited elsewhere are 20 acres per boat on lakes with high-speed watercraft and 9 acres per boat on small lakes with low-powered watercraft. Most Minnesota lakes currently do not exceed these standards. In 1998, boating intensities at peak times on weekend/holiday afternoons averaged about 90 acres per boat (Minnesota DNR 1999). One can estimate when boat densities may approach or exceed such standards. DNR boat surveys show that 10 percent of the lakehome owners are out boating during high use weekend afternoons.

If every lake in the state had the maximum number of lakehomes (i.e., using existing state shoreland standard lot dimensions to generate full residential buildout conditions) and 10 percent of those lakeshore residents would be boating on nice summer weekends, a large percentage of our lakes would exceed safe boating capacity. Using the same methods for existing densities for northcentral Minnesota lakes, it was also estimated that a low percentage of the lakes are exceeding safe boating densities, consistent with 1998 estimates. This analysis simplified the issue, as boats from public accesses and resorts were not included. On average, for northcentral Minnesota, public accesses contribute 28 percent of boats on the water, commercial accesses contribute another 23 percent (e.g., resorts and private campgrounds), and all other sources (mainly riparian residents) contribute nearly half. In addition, boat density guidelines and standards are dynamic or fluid. For example, people can compensate for higher densities by choosing different times and places to recreate on the water. Also, when densities increase, water-surface zoning and boater education can mitigate problems associated with the higher densities. However, the analysis is useful for boat density comparisons and potentials.

Many Midwest lakes already exceed safe boating capacities, and several Minnesota lakes have also reached that point (especially Metro lakes as boating intensities at peak times on weekend/holiday afternoons averaged about 20 acres per boat; Minnesota DNR 1999). For northcentral Minnesota, boaters' perception of congestion and crowding on the water went up between 1985 and 1998 (15 percent of boaters thought lakes were crowded in 1998, up from 5 percent in 1985, likely from the increase in size and horsepower of boats as lengths had increased an average of two feet and motor sizes had nearly doubled for this time period). Naturally, local governments have responded to overcrowding with regulations for those waterbodies to promote safe enjoyment of these public spaces.

For example, Lake Minnetonka has an ordinance related to boating activity, including size of watercraft, no wake zones, quiet times, speed of watercraft, and docking. In addition, mooring areas and multiple dock areas are regulated on Lake Minnetonka so that boat density criteria and goals are obtained.

White Bear Lake also has a docking ordinance to deal with overcrowding. Recently, Wisconsin DNR discussed the merits of limiting boat docking to two boat slips per the first 50 feet of shoreline and one slip for each additional 50 feet of shoreline owned.

Local governments are also debating the wisdom of controlled access lots. Controlled access lots give accesses to public waters for owners of non-riparian lots (i.e., non-lakeshore lots). DNR has created many public boat launching facilities across Minnesota so that all of us have good public access to

hundreds of fishing lakes. For northcentral Minnesota lakes, the majority of lakes (79 percent) had at least minimal public access in 1998, up from 66 percent with access in 1985. Thus, the often-cited reason for the allowance of these lots appears no longer relevant.

The use of public accesses has changed since 1985. Public accesses are becoming more and more an asset that all lake interests take advantage of, including riparian residents and commercial boating-related interests. In 1998, for northcentral Minnesota accesses, riparian residents and resort-campground guests were estimated to account for nearly 40 percent of traffic through the public accesses, up from 17 percent in 1985. The reason for change in the use of public accesses was unknown, but one hypothesis is the increasing size of boats and motors, and the need to launch/land these boats at a well-designed access facility. Boaters give high marks to public access facilities for launching and landing a boat. Positive ratings ('good' to 'excellent') comprised 84 percent of boater ratings, while few boaters gave negative ratings (3 percent). The majority of all boaters (56 percent) and nearly half of riparian residents (46 percent) use additional lakes near the lake where they were surveyed. Access to these additional lakes is dominated by public access.

Given that future development may result in potential overcrowding, environmental review thresholds for controlled access lots appears appropriate. The use of controlled access lots has recently become a serious issue in Minnesota. In addition, the use of controlled access lots was a serious issue in nearby states (Minnesota DNR 1989), and their development continues to remain both an environmental and a social concern. Therefore, these thresholds are needed to address concerns that have recently surfaced in the state.

Item D. Resort Conversions in Shorelands.

Resorts are vital to Minnesota's economy. Resort visits annually generate millions of dollars to local economies, and their guests contribute to the success of other businesses when they explore restaurants, shops, and local entertainment.

A resort is defined as a commercial establishment that includes buildings, campgrounds, lodges, structures, dwelling units/sites, enclosures or any part thereof kept, used, maintained or advertised as, or held out to the public to be a place where sleeping accommodations are furnished to the public and primarily to those seeking recreation, for periods of one day, one week, or longer, and having for rent three or more cabins, rooms, campsites, or enclosures. These establishments must be primarily service-oriented for transient lodging of guests. All cabins, rooms, dwelling units/sites, or enclosures must be included in the resort rental business. Resorts allow no residential use of a dwelling unit/site for more than 30 days within a calendar year, except dwellings used as residences for the service providers or dwelling units/sites for renters. In order to qualify as a resort pursuant to this definition, a resort shall also be fully licensed and permitted under appropriate state and local regulations. The entire parcel of land must be controlled and managed by the licensee.

While there are several large resorts in the state, many of which are located in the Brainerd Lakes area, 90 percent of the resorts in northcentral Minnesota have less than 20 cabins. About half the resorts are 10 acres or less in size, and most resorts are seasonal, being fully operational from May to September. Most resorts are also family businesses. Many of these entrepreneurs have gross sales between $25,000 and $100,000. Resort owners have noted that the increasing value of lakeshore property negatively affects their properties. For some resorts, the land value of the resort exceeds the value of the business. Add this factor to increasing operating costs from higher insurance and the necessity for more guest amenities, resort owners face issues of sustainability.

Given their cultural and economic value to the state, creating environmental review thresholds specific to resorts seems reasonable. The proposal requires an EAW for resort conversions. Resort conversions have recently been a serious issue with the public. Citizens are concerned about the creation of nonconforming lots that may jeopardize or degrade water quality or the environment. To address these environmental issues, Minnesota's Alternative Shoreland Management Standards requires that once a resort ceases to be a resort, the property be converted to a planned unit development or residential lots using the same procedures and standards as if it were a new development (following the alternative standards provisions for PUDs and residential lots). Therefore, it seems reasonable to require an EAW for resorts that convert to a PUD or a residential development where the proposed densities would exceed the applicable M.R. 6120 unsewered residential density standard by more than 15 percent, which is not consistent with the alternative standards.

Subp. ??. Commercial, Industrial, or Institutional Projects in Shorelands.
Environmental review threshold values proposed for projects, other than residential developments, are based on expert opinion on the magnitude of potential significant environmental issues of variously sized shoreland alterations and advisory committee discussions.

The proposed thresholds are based on the consequences of altered nearshore areas (i.e., the shore impact and secondary shoreline buffer zones) on fish and wildlife resources and the value of shoreline buffers. The shore impact zone is defined as the land located between the ordinary high water level of a public water and a line parallel to it at a setback of fifty (50) percent of the structure setback, but not less than fifty (50) feet. This area serves as the primary shoreline buffer. The secondary shoreline buffer zone is defined as the land located between the shore impact zone and the required structure setback.

In Minnesota, the shore impact zone provides a management framework for: the reduction of non-point source pollution problems by managing vegetation and soil resources; the regulation of the size, type and placement of nearshore structures (water oriented accessory structures); and the maintenance and preservation of shoreline vegetation for the screening of shoreland area development activities. For river segments, implementation of a shore impact zone protects riparian soils and stream banks from the natural meandering characteristics of channels, thereby reducing accelerated erosion, sedimentation, and channel shift problems. Buffers less than 50 feet deep are generally inadequate to provide long-term water quality protection (Wenger 1999; Emmons and Olivier Resources, Inc. 2001). Finally, a study has found that 95 percent of buffers less than 50 feet saw direct adverse results from human impact, whereas only 35 percent of those over 50 feet experienced a similar adverse impact (Castelle et al. 1994). Therefore, it is reasonable to have such a standard for the shore impact zone definition.

Consequences of altered nearshore areas
It is necessary and important to require that thresholds be based on the alterations to vegetation and topography since the mismanagement of vegetation and soil has and will adversely impact the natural resources of shoreland areas. Examples of adverse impacts are: erosion and sedimentation to surface waters, which impairs or destroys fish and wildlife habitat; soil sedimentation; the intentional filling of areas that previously held and filtered surface water runoff for a period before drainage or discharge to a waterbody; and the clearing of shoreland vegetation that once provided natural screening of shoreland development and maintained the scenic vistas of our many lakes and streams. Most importantly, the conversion of the shoreline has adverse impacts on water quality.

Activities in the immediate shoreland or riparian areas of lakes are an important part of the overall impact on the lake and its ecological integrity. The extent of altered nearshore zones along streams is also important in determining the amount nutrient inputs to drainage lakes and impoundments,

especially in agricultural watersheds. Shoreland vegetation reduces stream bank erosion and subsequent lateral migration of the stream channel because channel bank roots protect against fluvial erosion and anchor against collapse.

Alteration or conversion of nearshore zones destroys annual and perennial ground cover for small animals. With ground cover gone, amphibians lose shelter and songbirds lose habitat (Meyer et al. 1997). In addition, nutrient runoff to the lake or river increases dramatically.

Bald eagles will nest on developed, altered shores but most nest in areas of less alteration and disturbance; thus, they have to spend significantly more time and energy feeding (Fraser et al. 1985). Since loons are shoreline nesters that can be sensitive to human disturbance, it has been shown that the probability of loons on the lake decreases with increased housing density (Newbrey 2002; Caron and Robinson 1994). Loons will not likely nest on a groomed and manicured beach – they prefer to nest near shore on vegetated hummocks, small islands, or masses of emergent vegetation (McIntyre 1988). Therefore, excessive shore impact zone alteration has affected loons and the structure of native bird communities.

The loss of trees along shore from shoreland alteration means less trees that fall into the water. Fallen trees provide habitat for fish. Biologists have determined that this loss of trees due to development will negatively affect fish for centuries. Downed trees provide important in-lake structure, habitat, food, and shelter for fishes, frogs, turtles, waterbirds, and mammals. This woody habitat is also important for aquatic invertebrates like snails and bryozoans. Turtles need to bask on deadfalls or floating logs (Boyer 1965). Nearshore downed trees also blunt waves and ice action that scour the lake bed. Recent studies have shown that shoreline alteration can reduce the available amount of woody habitat through removal and loss of recruitment (Christensen et al. 1996; Jennings et al. 2003).

Alteration of riparian areas associated with shoreline development can reduce green frog populations (Woodford and Meyer 2003). Male green frogs establish breeding territories within two feet of the lake's edge and disturbance to the shoreline vegetation eliminates their habitat (Oldfield and Moriarty 1994). Fragmented nearshore habitat forces frogs and other amphibians to spend extra time and energy seeking access to nesting, basking, and feeding sites, and with extensive alteration, these animal species can become isolated or extirpated.

Hydrologists and chemists have also found interesting differences with the altered shorelines compared to a native vegetated shoreline. In residential areas, the largest source of phosphorus is runoff from lawns and impervious surfaces (Waschbusch et al. 1999). Rainwater runoff from altered shoreline was measured to be 5 to 10 times higher than forested shorelines. Runoff from lawns occurs more frequently than previously thought with a high percentage of storms resulting in runoff (Garn 2002). Studies on hydrophobicity, or soil-water repellency, have revealed the complex interactions of soil and turf conditions. Lawns and urban soils are often very compacted (Barten 2005), and as the soil becomes more compacted, rainwater runoff increases. Lawns often comprise the largest fraction of land area within residentially and commercially developed shoreland, and they often have similarities with impervious surfaces. Water flowing over lawn surfaces picks up dirt, pesticides, toxic chemicals, pet waste, and other pollutants.

Important to lake water quality, the altered shoreline allows 7 to 9 times more phosphorus to enter the lake than a more natural native vegetated shoreline (Dennis 1986; Bernthal 1997; Graczyk et al. 2003). While absolute values of phosphorus entering the lake from an altered shoreline varies due to soil, slope, and other site specific conditions, a lawn to the lake shoreline has been estimated to average 0.2 pounds

per summer compared to 0.03 pounds per summer for a lot with a native vegetated shoreline buffer (Bernthal 1997). For many areas, the phosphorus yield to the lake due to the alteration of the shore impact zone may exceed the phosphorus yield from all other sources. Phosphorus is a plant nutrient, and more of it entering the lake means more aquatic plants or algae resulting in lower water clarity (0.2 pounds of phosphorus can produce 100 pounds of algae). Minnesota soils are usually phosphorus rich. Excess nitrogen will also be transported to lakes from these land uses. Nitrogen will enter attached to soil particles, as organic matter, or dissolved in the form of nitrite, nitrate, or ammonia – forms that are readily useable by algae and rooted plants.

Small construction sites are potential sources of large amounts of sediment erosion. Sediment loads from two monitored construction sites were 10 times larger than typical loads from rural and urban land uses in the area (Owens et al. 2000). Total and suspended solids concentrations data indicate the active construction phase produced concentrations that were orders of magnitude higher than pre- and post-construction periods. Furthermore, these concentrations were dramatically reduced when the site was seeded and mulched. These results support the need for rules that include environmental review for significant land alteration projects.

The value of shoreline buffers

Shoreline buffers are corridors of natural vegetation along rivers, streams, and lakes which help to protect water quality by providing a transition between upland development and adjoining public water. A shoreline buffer of natural vegetation traps, filters and impends runoff. Buffers stabilize lake and river banks, offer scenic screening of shoreland development, reduce erosion, control sedimentation, and provide habitat for shoreline species. Many chemicals easily adsorb or attach to individual sediment particles. Eroded particles frequently carry pollutants and nutrients, such as nitrogen and phosphorus, into lakes and streams. In addition, the sediment itself can be a pollutant, since it can impair the feeding and reproduction of many forms of aquatic life. Buffers act as a filter by reducing the amount of sediment reaching the water. By slowing the movement of rainwater runoff, buffer vegetation allows more time for sediment contained in the stormwater to settle out (Castelle et al. 1994). Buffers with natural ground cover, understory plants, and a forest floor duff layer are most effective in removing phosphorus from runoff (Woodard and Rock 1995). Native vegetation, with its deep root systems and natural duff layer, act like a sponge to hold runoff and associated pollutants. If runoff is allowed to "short circuit" a buffer by concentrating and forming channels or rivulets, the chance for filtration of runoff is greatly reduced. The more dense the vegetation is in a buffer and the higher the integrity of the understory, the better it will filter runoff.

Most Minnesotans strongly agree that the aesthetical value of the state's lakes are important to protect and that they would support regulations that protect lake resources (Schroeder et al. 2004). Waterfront residents often choose lakefront property based on water clarity, quality of swimming, and scenic beauty. Research has shown that people prefer to view lakeshores where the vegetation screens structures (Gobster 1982; Macbeth 1989; Macbeth 1992; Engel and Peterson 1998). The degree of vegetative screening and the attractiveness of the buildings were the most important predictors of overall aesthetic quality (Macbeth 1989). Many people like to look out across a beautiful lake or enjoy nature by fishing or boating. You can see the evidence of this on the highways heading north out of the cities on Friday afternoon. Visitor surveys note that the top reason people visit Minnesota lake areas is to escape to natural areas. Lakes that are seen as more developed are perceived as more degraded, which has important tourism and sense of place implications (Stedman and Hammer 2006). In a recent survey of Minnesotans, 85 percent cite development as a cause of decline in scenic quality (Anderson et al. 1999). These studies support the benefit of environmental review thresholds based on nearshore alteration size.

The nearshore areas adjacent to lakes and rivers are considered one of the richest zones for aquatic organisms, mammals, and birds (Castelle et al. 1992). Large numbers of birds, amphibians, reptiles, and mammals use Minnesota nearshore areas or those buffer transition areas. This area has an overlap of ecological zones between upland and aquatic habitats where species from both zones live. The tree canopy provides foraging and nest sites for many species of neotropical migratory birds. The understory is used by nesting birds and also provides cover, foraging sites, and travel corridors for mammals. Birds, such as thrushes and ovenbirds, nest among the ground cover on the forest floor, while shoreline grasses provide forage and shelter for small mammals.

An additional benefit of shoreline buffers is the shading function that it provides, which can keep the temperature down during the summer. This ecological service is especially important for trout streams. Buffer areas can also cool off warm runoff by slowing down runoff as it flows through vegetation. Additional benefits of cooling are that water will hold more oxygen at lower temperatures and more desirable aquatic life thrives in cooler water. Also, a mature forest canopy, along with shrubs and native groundcover, intercepts, diffuses, transpires, and evaporates rainwater, which decreases runoff. Wang et al. (2003) found that the amount of natural vegetated buffer along trout streams was an important variable for high stream quality and condition, and they conclude that buffers help ameliorate some of the negative effects of urban development.

4410.4400 MANDATORY EIS CATEGORIES

Under existing rule, an EIS shall be ordered for projects that have the potential for significant environmental effects. In deciding whether a project has the potential for significant environmental effects, the following factors must be considered: (1)type, extent, and reversibility of environmental effects; (2)cumulative potential effects of related or anticipated future projects; (3)the extent to which the environmental effects are subject to mitigation by ongoing public regulatory authority; and (4)the extent to which environmental effects can be anticipated and controlled as a result of other available environmental studies undertaken by public agencies or the project proposer, including other EISs. The Advisory Committee, EQB staff, and DNR staff considered the first three factors in development of shoreland thresholds.

There is, of course, uncertainty on the potential variability for significant environmental effects for the various shoreland threshold categories proposed. Given this uncertainty, it is reasonable to apply the precautionary management approach (FAO 1996). The precautionary approach errs on the side of action in advance of formal proof that a specific size of project will have a high potential for significant environmental effects. It is precautionary and reasonable to have different thresholds for different types of projects. In this context, the proposed EIS shoreland thresholds were generally based on the premise that some multiple of the EAW thresholds would provide a reasonable standard for significant and substantial environmental consequences for a proposed action.

Subp. ??. Residential Developments in Shorelands.
This proposed provision would require an EIS when a proposed residential development project would equal or exceed 100 units and/or site within sensitive shoreland areas and 200 units and/or sites within non-sensitive shoreland areas. An exemption is allowed in the proposal for subdivisions within a non-sensitive shoreland area under specific conditions. The conditions include the creation of a residential subdivision of an existing extensively developed parcel for purposes of redevelopment where an engineered rainwater management plan approved by the local government exists that meets the standards in M.R. 6120 and is consistent with current best management practices as found in the latest

Minnesota Stormwater Manual as determined by the local government. It is reasonable to eliminate the requirement of an EIS for redevelopment projects where adequate plans exist to address erosion and stormwater runoff.

This proposed provision would require an EIS when a proposed resort conversion was equal to or exceeded 20 units/sites within sensitive shoreland areas or 40 or more units/sites within non-sensitive shoreland areas where the density exceeds the applicable M.R. 6120 unsewered, residential density by more than 15 percent. These thresholds are reasonable given potential environmental impacts and the unit/site frequency distribution of Minnesota resorts (median number of units is about 10 units per resort and less than 5 percent of Minnesota resorts have more than 40 units).

Subp. ??. Commercial, Industrial, or Institutional Projects in Shorelands.
This provision of the proposal would require an EIS when a project, other than residential developments, will result in the alteration of shoreland that equals or exceeds 40 acres within a sensitive shoreland area or 80 or more acres within a non-sensitive shoreland area.

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