II. Priority Concerns

Assessment of Priority Concerns:

The three priority concerns of Contaminated Runoff, Excessive Runoff, Management of Shoreland Areas and Surface Water use are described in detail in this section. Each assessment will examine why the particular concern is a priority and what risks the County faces if the concern is not addressed.

Assessment of Priority 1: Contaminated runoff from both urban and agricultural land entering surface waters.

When water from rainfall or melting snow flows across the landscape, it washes soil particles, bacteria, pesticides, fertilizer, pet waste, oil and other toxic materials into our lakes, streams, and wetlands. This is called "non-point source pollution" or "contaminated runoff." Non-point source pollution comes from a diverse number of activities in our daily lives including fertilizing lawns and farm fields, driving and maintaining our cars, constructing buildings and roads, plowing our fields for crops, and maintaining our roads in the winter.

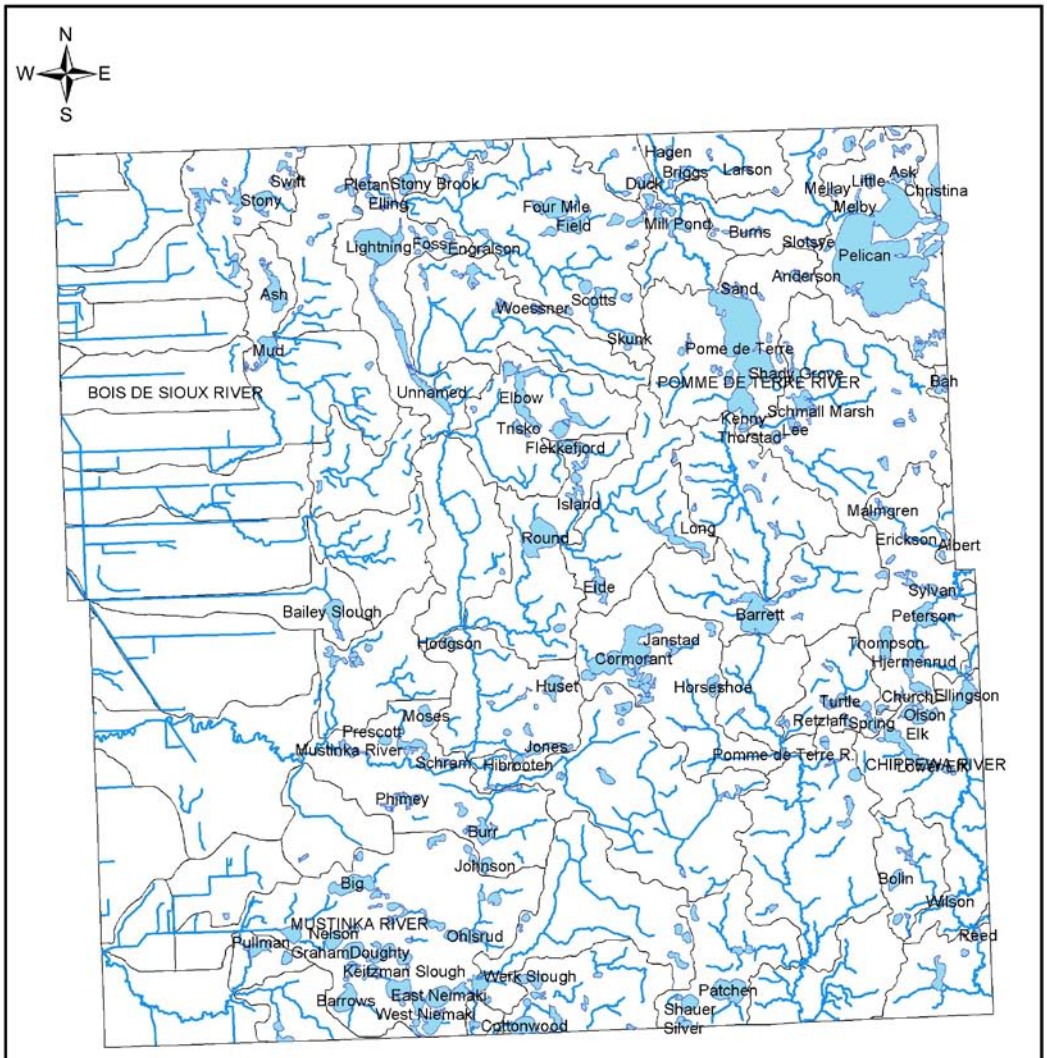
Urban and rural non-point pollution is the leading cause of surface water quality problems. Polluted runoff contributes to habitat destruction, fish kills, reduction in drinking water quality, stream siltation, and a decline in recreational use of lakes.

Grant County surface water resources include 310 bodies of water listed on the Department of Natural Resources (DNR) protected waters inventory in Grant County, 179 are defined as protected waters, and 131 are defined as protected wetlands. The protected waters, range in size from 3.2 acres to 3,680 acres, and cumulatively cover 24,037 acres of the county. These lakes and wetlands are distributed throughout the county with the majority located in the eastern portion of the county. Historically the lakes that have received the most use and development are located within the Pomme de Terre and Chippewa River Watersheds, however the potential exists for additional development and use of lakes in the Mustinka River watershed as well. (Map 1 – page II-2, displays surface water resources in Grant County)

Surface water resources also include the Pomme de Terre River a tributary to the Minnesota River, and it runs from north to south through the county. Located on the main stem of the river are numerous small lakes and wetlands as well as Pomme de Terre Lake and Barrett Lake. Pelican Creek which is a major tributary to the Pomme de Terre River flows through Christina and Pelican lakes and joins the Pomme de Terre River north of Pomme de Terre Lake. The Chippewa River which is also a tributary of the Minnesota River, flows in a north to south direction for approximately 14 miles along the southeastern edge of Grant County. The Mustinka River which is in the Red River of the North basin, originates in southwestern Ottertail County travels through Grant County and outlets to Traverse Lake in Traverse County. The Rabbit River and many legal and private ditches drain water in this watershed to the north and west where it eventually meets the Bois de Sioux River in Wilkin County and then drains to the Red River of the North. Other surface waters located in the County include numerous small wetlands, intermittent streams and drainage ditches.

These surface water resources provide settings for seasonal and permanent homes and provide unlimited recreational opportunities and economic value to the county through tourism and tax base. In addition to the recreational value of surface water, these resources also contribute a significant recharge area for groundwater, the major source of drinking water in the county. Degradation of surface water from sedimentation, and nutrient loading which causes eutrophication, has the potential to have a significant negative impact on the health and welfare of Grant County residents.

GRANT COUNTY SURFACE WATER RESOURCES



Map 1

The enrichment of waters with nutrients is termed eutrophication and is a concern for several reasons. Excess phosphorus causes elevated growth of algae and aquatic vegetation in lakes and streams. Excess nitrogen can have a similar effect in surface waters. The excessive plant growth interferes with the use of water bodies for recreation, and fish and wildlife habitat. It can also lead to foul odors, and poor aesthetic quality of the receiving water and eventually can cause fish kills.

Water quality monitoring for selected lakes from 1991 to 1995 revealed the following data:

Lake	91-95 avg. water clarity (meters)	91-95 avg. Total Phosphorus (PPB)	91-95 avg. Chlorophyll "a" (PPB)	91-95 avg. TSI
Barrett	1.48	61.42	10.78	57.27
Pomme de Terre	1.12	52.80	10.20	56.72
Pelican	0.92	48.50	11.00	58.06
Elk	2.34	33.00	7.00	50.67
Lightning	2.08	112.00	30.40	58.98
Cottonwood	1.37	100.75	14.25	60.89
Mustinka Flow.	0.72	247.40	15.60	68.63

Based on this data Elk Lake has good water clarity, low total phosphorus and low algae counts with a trophic state index of 50.67 it is considered Mesotrophic and fully supports recreational use. Pelican, Pomme de Terre, Barrett, Cottonwood, and Lightning lakes exhibit high total phosphorus, high algae counts and poor water clarity, with trophic state indexes over 55 these lakes are considered eutrophic and only partially support recreational use. The Mustinka Flowage is hypereutrophic, and would not support recreational use under the Trophic State Index criteria.

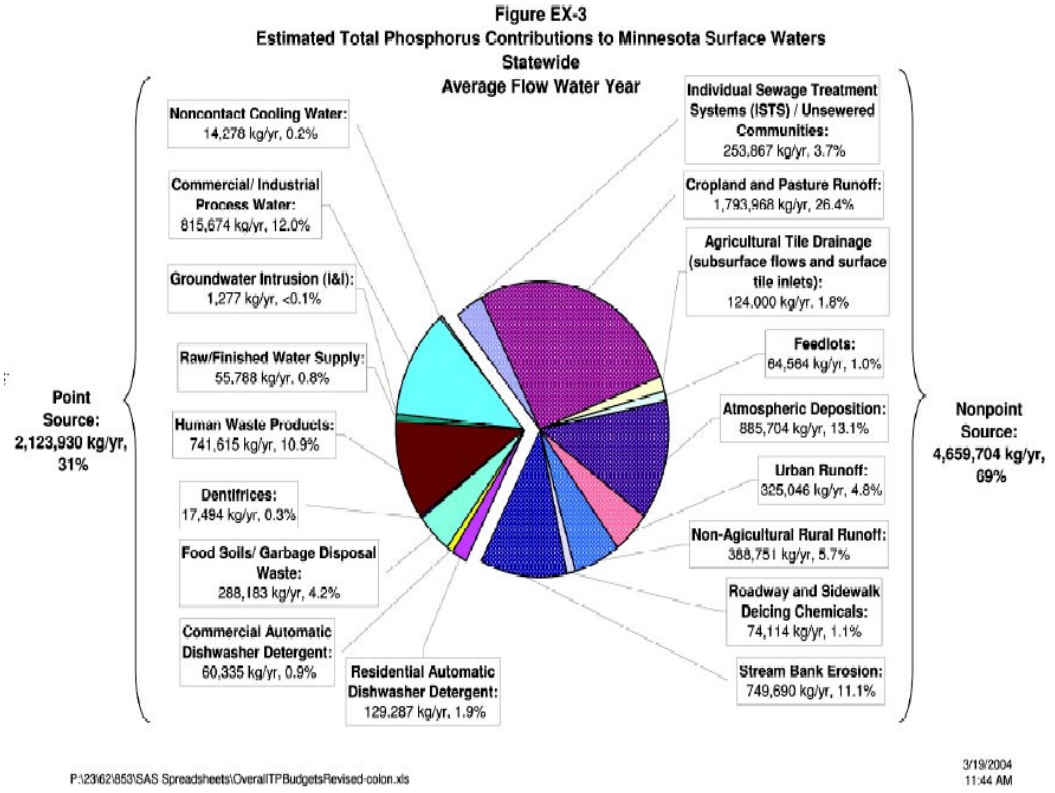
Many of these problems are a direct result of land use. Agricultural production on many of the steep slopes can result in severe erosion and sedimentation problems if proper conservation practices are not installed. Sediment that is transported to the river or directly to the lake carries abundant amounts of phosphorus and contributes to reduced water clarity by providing nutrients for excessive algae growth and suspended solids. Uncontrolled runoff from feedlots is a source of phosphorus as well as fecal coliform bacteria. Farmsteads and rural residences with non-conforming septic systems are a source of phosphorus and fecal coliform bacteria. Development can have many consequences in our surface waters as well. More roads, roofs and parking lots accelerate runoff, which gathers contaminants along its way into our waters. Without proper management of urban runoff, nutrients, toxic chemicals and organic materials pollute nearby waters. Over fertilization of lawns and non-conforming septic systems in lakeshore development areas also contributes significantly to water quality problems. Shoreland and watershed development, expanding uses and users, the spread of exotic species and water pollution all threaten lakes and rivers. Too much phosphorus and nitrogen, which act as fertilizer to algae and weeds, are reaching our lakes, carried in soil erosion and runoff from roads, yards, farms and septic systems.

Experience tells us that once a lake or stream declines, recovery is costly, can take many years, and full recovery may not be possible. Prevention is the key. What happens to Grant County lakes and their watersheds in the next 10 years, and how well we handle all the converging pressures will essentially determine the quality of these lakes for the future.

A recent approach to help control water pollution is through Total Maximum Daily Loads (TMDLs). The Clean Water Act requires states to adopt water quality standards to protect the nation's waters. These standards define how much of a pollutant can be in a surface and/or ground water while still allowing it to meet its designated uses, such as for drinking water, fishing, and swimming. Many of Minnesota's water resources cannot currently meet their designated uses because of pollution problems from a combination of point and non-point sources. TMDLs determine all sources of pollutants in a water body which is not meeting its designated uses, including non-point sources and those that may not be located near the water body but are in its watershed. The information is used to allocate load limits from all sources in the watershed for each pollutant in violation. Minnesota has recently begun to implement TMDLs on some impaired water bodies as required by the Clean Water Act.

Currently no surface water resources located in Grant County are listed as impaired for nutrients or sedimentation. However it is clear that at some point this may occur. Grant County residents will be better served by working toward a reduction of pollutants entering our surface waters now to avoid surface waters from being listed as impaired or achieve a reduction in daily loads while incentive programs are available to assist in the cost of implementing best management practices.

The report, "Estimating Phosphorus Losses from Agricultural Lands for MPCA's Detailed Assessment of Phosphorus Sources to Minnesota Watersheds," by D.J. Mulla & P. H. Gowda, University of Minnesota and G. Wilson & H. Runke, Barr Engineering, is a technical appendix to the MPCA's Report on the sources of phosphorus to Minnesota watersheds.



Mulla recommended that phosphorus loading from runoff from agricultural lands could be reduced using the following practices:

• Tillage management – reducing moldboard plowing (which lifts, fractures and inverts the soil, producing furrows) has reduced phosphorus export 7% in the Red – 28% in the MN Basin.

• Fertilizer management – not applying phosphorus fertilizer above UM threshold recommendations would reduce phosphorus export 16 %.

• Manure management – phosphorus loads to surface waters could be reduced by 20% (75,000 kg/yr).

• Decreasing cropland within 100 m of surface waters, would decrease phosphorus loadings to levels that are comparable to non-ag rural runoff - U of M researchers estimate that for every percent of acreage buffered within 100 m of surface water, the phosphorus loading will be reduced by one percent.

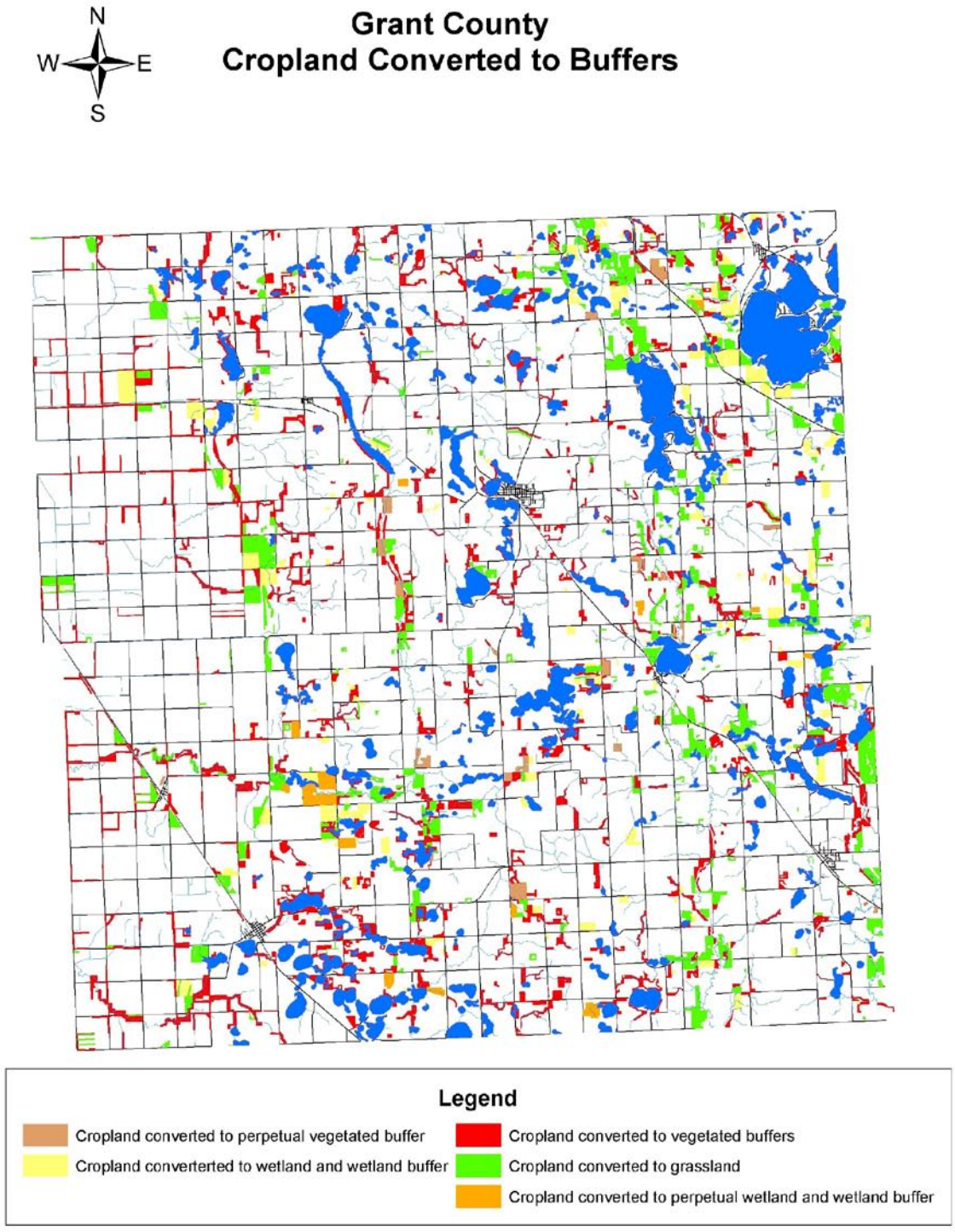
• Reducing soil erosion – soil dust is the largest source of atmospheric deposition – reduce wind erosion from ag fields through ag BMPs –shelterbelts, no till planting, and use of cover crops.

• Streambank erosion – especially use measures to reduce additional runoff from developed areas.

Improving and protecting surface water quality is a high priority objective of this water plan. To achieve this objective the county will work with private and public landowners and the appropriate agencies to accelerate the implementation of Best Management Practices (BMPs) on agricultural, urban and shoreland areas. The Conservation Reserve Program (CRP), Reinvest in Minnesota Reserve Program (RIM), Environmental Quality Incentives Program (EQIP), Wetland Reserve Program (WRP), State Cost-Share Program and the Wetland Banking Program will all be important incentives to be utilized in this effort.

As depicted on Grant County Buffers Map (Map 2 – page II-6), Grant County has had a great deal of success in implementing various types of buffers on agricultural lands. Data collected through voluntary secchi disc monitoring substantiates that buffers are an effective means of protecting the water resource. For example, Barrett Lake which has a well buffered watershed today has an average water clarity of 8.5 feet, compared to 4 feet in 1991 prior to the implementation of buffers. Many of these buffers were installed through ten and fifteen year contracts with landowners and will be expiring in the next ten years. A major action item of this water plan will be to re-enroll these areas and place additional lands into vegetated buffer practices. In addition, landowners will be encouraged to adopt conservation tillage and nutrient management plans to enhance the effectiveness of the buffers.

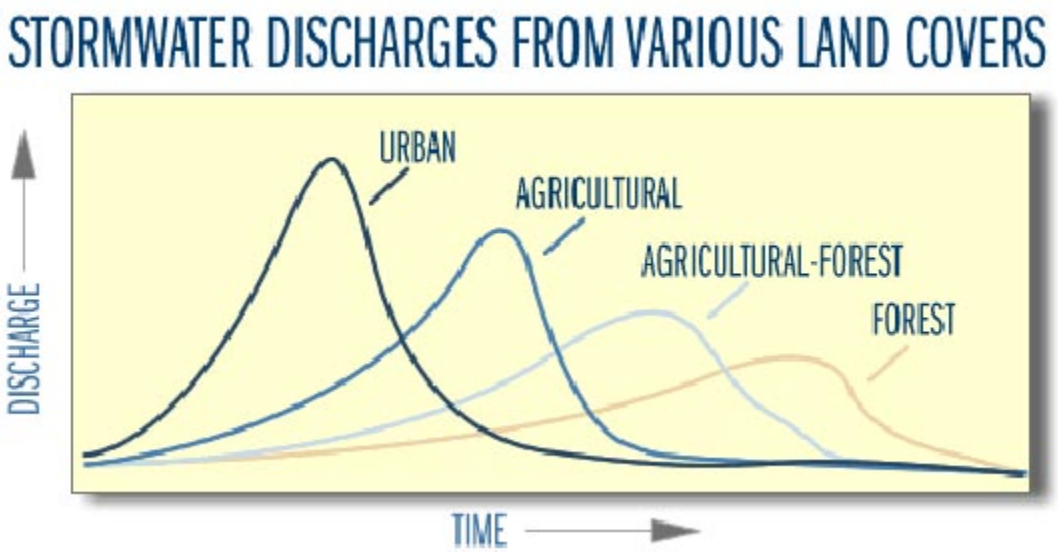
The Grant County Shoreland Ordinance, Stormwater Permit Rules and The Department of Natural Resources Lakescaping Program will all serve to assist landowners in controlling contaminated runoff from occurring in urban and developing areas by protecting existing vegetated buffers and establishing new buffers and BMP's where appropriate.



Map 2

Assessment of Priority 2: Excessive runoff water volumes from urban and agricultural land.

Prior to development, the landscape of the County consisted of a mosaic of prairie and wetlands with networks of prairie streams coursing throughout (see Map 3 – page II-9). The landscape throughout the County has been extensively altered, with over 20,000 acres of wetland basins drained (see Map 4 – page II-10) primarily to improve agricultural production. While the agricultural lands have been highly productive, much of the natural landscape values once present in the County have been replaced with agricultural values. Many of the original streams have been channelized and riparian corridors have been diminished or lost. Similarly, waterways have been ditched, straightened, and their hydrographs have been altered while lakes have had their shorelines developed with ever increasing impervious surfaces such as roofs and lawns. Rapid snowmelt in the spring, convective precipitation, and soils of generally low permeability throughout the County leads to a natural variation of stream discharge. Peak yearly flow generally occurs during the period immediately following spring runoff. Although most precipitation during the growing season is quickly lost to evapotranspiration, unusually large and sustained rainfall occasionally leads to summer season floods. The County has experienced major flood events in the past, most recently in 1993 and 1997 however minor flood damages to public roads and private property occur on a more frequent basis. Flooding has been exacerbated by land use changes, such as agricultural drainage, and impervious surfaces in developed areas that make surface runoff from upland areas even flashier.



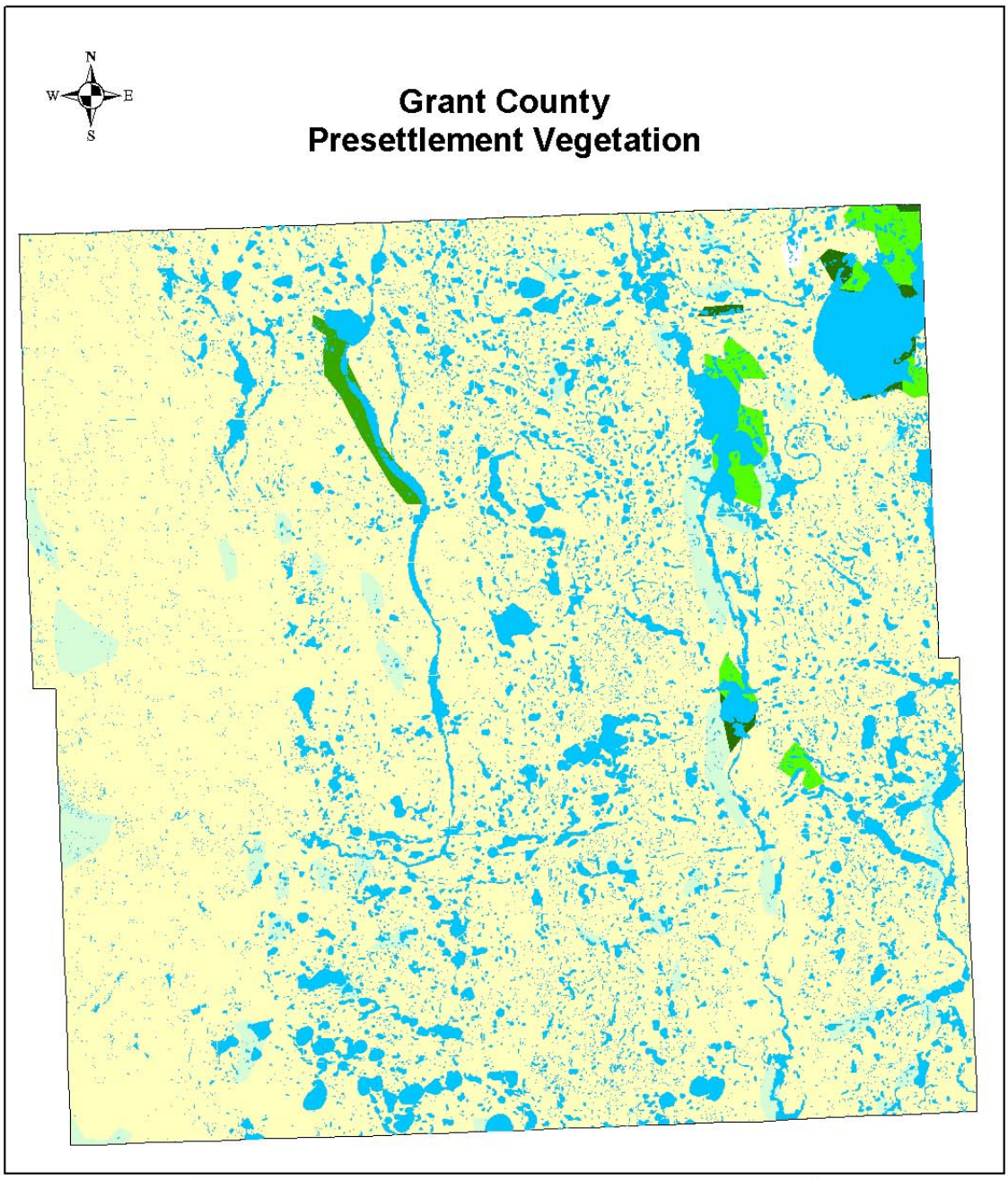
Drainage from impervious surfaces increases velocity and volume of discharges into wetlands, lakes and rivers. Results from the Long Term Hydrologic Impact Assessment (L-THIA) model (Appendix B) indicates that based

on the land use change on 40 acres of grass to 40 acres of low density residential development, a 40 percent increase in average annual runoff can be expected. The increase becomes over 100 percent when grassland is converted to high density residential development. The most dramatic consequence of increases in the volume and rate of stormwater runoff is flooding and property damage. Undeveloped areas such as woodlands, grasslands and wetlands serve as sponges for excess rainwater, so when these areas are eradicated, filled in, or replaced with impervious cover such as asphalt, the volume of water entering streams and rivers increases. One study estimated that because of the increase in impervious cover in a watershed, a flood event that should be expected once in 100 years could occur once every 5 years when the impervious cover reaches 25 percent, and could become an annual event when impervious cover reaches 65 percent.

Agricultural development has led to an extensive ditch system that now conveys water much faster. Drainage ditches tend to convey water quickly from the landscape, thereby increasing the magnitude of peak flows. These factors reduce vegetative filtering, and infiltration and ultimately leads to additional flooding which threatens property, causes stream bank and lakeshore erosion and damages aquatic habitat and water quality. Adequate drainage is essential for efficient agricultural production and development in this area. However, adverse impacts should be avoided or mitigated through the restoration of drained wetlands.

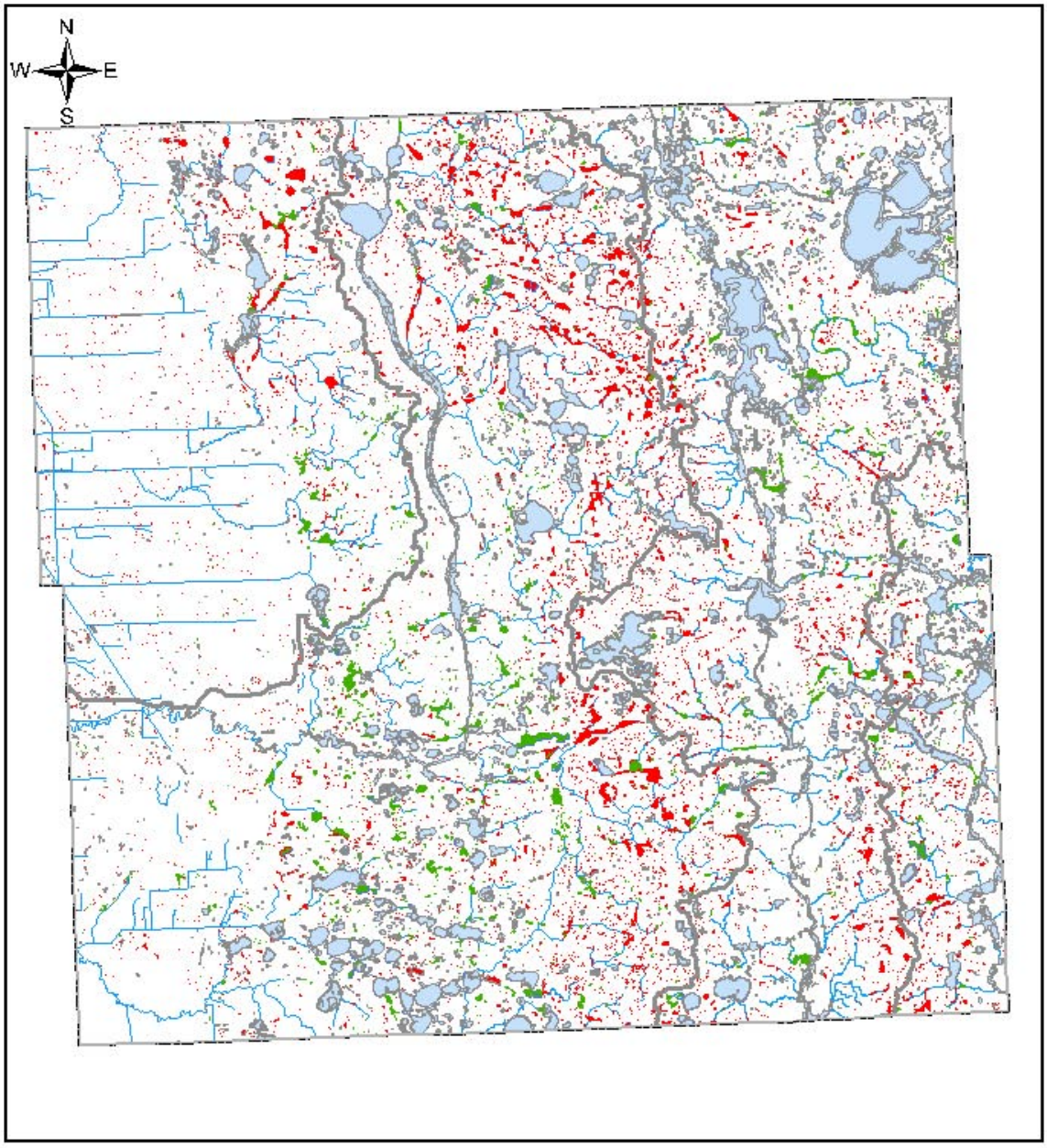
Conversion of cropland to grasslands or wetland restoration via voluntary land retirement programs will achieve a significant reduction in runoff. Cultivated cropland produces a significantly higher volume of runoff from rainfall events than does grassland. Converting from crops to grass or trees will reduce flood volume. The amount of runoff reduction that can be achieved from a conversion during a 100-year, 24-hour storm ranges from 1/4” on fine clay soils to 1½” on coarse sandy soils. Retired croplands provide the additional benefit of significantly reducing sediment, phosphorus and other pollutants contained within runoff entering surface waters.

The effect of drainage on downstream flooding conditions is a complicated issue and requires site-specific analysis. If the outflow rates can be controlled, some drainage improvements can actually reduce downstream peak flows. This can be accomplished in a number or ways, for example, appropriate culvert sizing, or some soils will also provide greater absorption capacity with tile drainage, which slowly draws down subsoil moisture, which may be particularly effective in reducing runoff rates. Management of crop residues during tillage has long been a key component of an erosion control and water management strategy. Implementing storm water control practices such as rain gardens and storm water ponds in developed areas will also contribute significantly to reducing runoff rates and down stream flood events.


N
W
E
S
Grant County
Presettlement Vegetation
Legend
Vegetation Type
Hardwoods
Lakes and wetlands
Oak openings
Prairie
River Bottom Forest
Wet Prairie
Grant County Water Plan 7/19/05

Map 3

GRANT COUNTY DRAINED WETLANDS



Grant County Drained Wetlands

Existing

Altered

Drained

Grant County Local Water Plan 4/19/05

Map 4

Assessment of Priority 3: Management of shoreland areas and surface water use. Specifically, on natural environment lakes, rivers, and sensitive areas on recreational, and general development lakes.

Shoreland Management:

Grant County's agricultural production and its varied lakeshore environment continue to offer economic and quality-of-life benefits to county residents and visitors.

In recent years, Grant County has seen increasing pressures on the county's agricultural and lake resources. Development is occurring more frequently on natural environment lakes and sensitive areas of recreational and general development lakes and in more intensive development patterns than historically seen. This development pressure may be attributed to economic incentives to sell and divide property due to high land values, potential investment returns, and demand for riparian properties. Development pressure and impacts are a concern due to poor land use decisions resulting in poor land management, and the cumulative effects of development on surface and groundwater resources. Traditional agricultural areas have experienced an increase in the development pressures being placed on many of the County's shallow lakes. For these reasons citizens have identified management of shoreland areas and surface water use, as a critical issue for Grant County. With a majority of development occurring in shoreland areas, effects on water quality are a concern. Overall surface water quality throughout the county is generally good but some basins and streams are showing signs of degradation. Some of this water quality degradation can be attributed to these land use conversions and shoreland development.

The consequences of uncontrolled and unplanned development can be devastating to our land and water resources. Overbuilt and poorly designed shoreland areas degrade the value of the entire water body. Without controls, land with water frontage tends to be divided into smaller parcels. Scattered cabins, homes, and resorts merge to form an unbroken strip of buildings and structures along shores of lakes, resulting in the destruction of natural vegetation and scenic beauty. An initial row of structures may be followed by a second and third until the entire shoreland area is developed. Marginal lands with high water tables, flooding hazards or steep slopes fall under increasing development pressure after more suitable lands are occupied.

The consequences of overdevelopment are increased risks of flooding, pollution, and scenic degradation. Nutrients like nitrogen and phosphorous, other pollutants, and improperly designed sewage treatment systems can contaminate wells and surface waters. Development in or near floodplains can reduce the natural storage capacity of the watershed, causing increased flooding threats.

Degraded lakes, flood damages, lower property values and increased public service costs may be the result if proper planning and implementation of appropriate ordinances are not instituted.

The following Figures II-F through I reflect a study conducted by the Wisconsin Department of Natural

Resources which shows the effects of development as natural cover is removed and impervious surfaces increased.

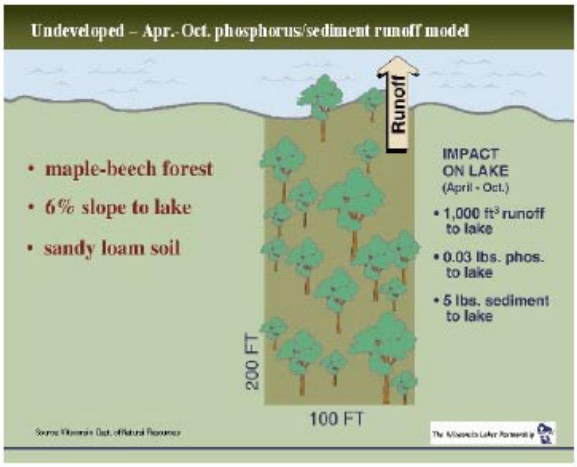


Figure II-F The first is a lot with its vegetation intact. Note the amount of phosphorus that enters the lake.

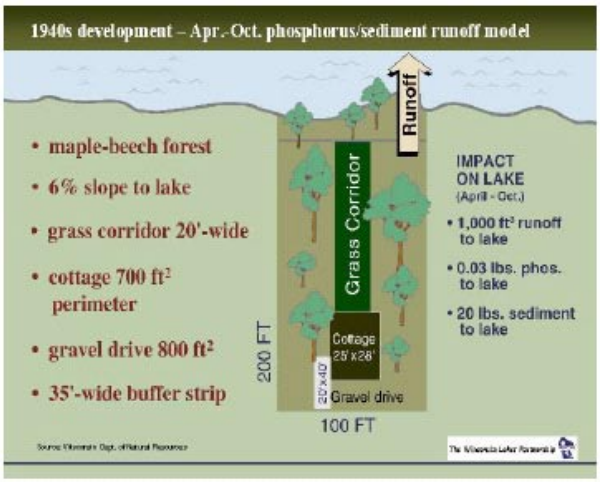


Figure II-G Here is the same lot with a 1940s type cabin and a 20-foot wide grassy path to the lake. There is a 35-foot buffer of vegetation and much of the lot is still wooded. The grass corridor is a typical lawn turf. The model is based on vegetation after it has recovered from construction.

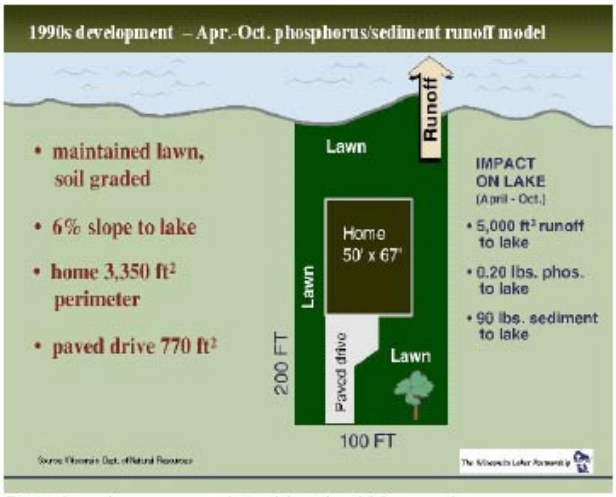


Figure II-H Here is the same lot with a 1990s type house, 50X67 feet: the 35-foot buffer of vegetation is gone, there is more impervious area and most of the trees are gone. Again the lawn is a typical grass turf. Note the amount of phosphorous that washes off the land and into the lake. Again, the model is based on vegetation after it has recovered from construction.

Data has been completed by the Wisconsin Department of Natural Resources.

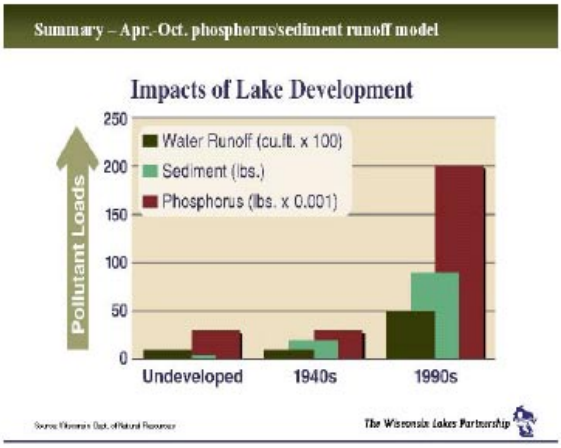


Figure II-I Change in runoff, compared to undeveloped lot:

- 1940s
  - runoff, no change
  - sediments, 4X increase
  - phosphorus, no change
- 1990s
  - runoff, 5X increase
  - sediments, 18X increase
  - phosphorus, 7X increase

This image summarizes the runoff of water, sediments and phosphorus at the three levels of development. When landowners remove the natural vegetation to build a home and establish a lawn, the amount of phosphorus and sediments that can be carried into the lake by rains greatly increases.

Shoreland Classification:

The issue of appropriate lake classification was brought to the county's attention during the water planning process. Basically the question is; are the lakes in the county correctly classified? The following is a brief background on how lakes were classified in Minnesota and information on Grant County lakes.

In Minnesota a classification system was developed so that the appropriate development standards could be applied. Lakes are divided into the following classes based on a combination of factors. The (DNR) commissioner shall classify all public waters in accordance with the following criteria:

A. size and shape;

B. amount and type of existing development;

C. road and service center accessibility;

D. existing natural characteristics of the waters and shorelands;

E. state, regional, and local plans and management programs;

F. existing land use restrictions; and

G. presence of significant historic sites.

Lake Classes:

Natural Environment Lakes usually have less than 150 total acres, less than 60 acres per mile of shoreline, and less than three dwellings per mile of shoreline. They may have some winter kill of fish; may have shallow, swampy shoreline; and are less than 15 feet deep. Natural environment lakes are generally small, often shallow lakes with limited capacities for assimilating the impacts of development and recreational use. They often have adjacent lands with substantial constraints for development such as high water tables, exposed bedrock, and unsuitable soils. These lakes, particularly in rural areas, usually do not have much existing development or recreational use.

Recreational Development Lakes usually have between 60 and 225 acres of water per mile of shoreline, between 3 and 25 dwellings per mile of shoreline, and are more than 15 feet deep. Recreational development lakes are generally medium-sized lakes of varying depths and shapes with a variety of landform, soil, and groundwater situations on the lands around them. They often are characterized by moderate levels of recreational use and existing development. Development consists mainly of seasonal and year-round residences and recreationally-oriented commercial uses. Many of these lakes have capacities for accommodating additional development and use.

General Development Lakes usually have more than 225 acres of water per mile of shoreline and 25 dwellings per mile of shoreline, and are more than 15 feet deep. General development lakes are generally large, deep lakes or lakes of varying sizes and depths with high levels and mixes of existing development. These lakes often are extensively used for recreation and, except for the very large lakes, are heavily developed around the shore. Second and third tiers of development are fairly common. The larger examples in this class can accommodate additional development and use.

How lakes are classified by DNR in Grant County
(For locations of these lakes refer to Map 5)

Grant County Recreational Development Lakes

NAME	TYPE	SLCLASS	ACRES	Acres/Mile	Miles shore	area<15'd	max.depth
Pelican	5	RD	3790.9 3949total	140	27	3460	21
Christina **	5	RD	211.4gc	62	3	uk	uk
Four Mile	5	RD	208.6	91	2	uk	uk
Long	5	RD	211.9	42	5	uk	uk
Lightning	5	RD	540.0	109	5	500	11
Big	5	RD	269.5 247total	82	3	uk	uk
Cottonwood**	5	RD	174.6gc	85	2	243	16
Elk	5	RD	200.0	60	3	97	29
Cormorant	5	RD	1000.5	59	17	uk	uk

** portions located in another county uk=unknown

Grant County General Development Lakes

NAME	TYPE	SLCLASS	ACRES	ACRES/MILE	Miles shore	area<15' d	MAX. DEPTH
Little	5	GD	56.7	38	1	uk	uk
Unnamed	5	GD	63.0	39	2	uk	uk
Flekkefjord	4	GD	357.8	48	7	345	5
Barrett	5	GD	531.1	86	6	434	28
Pullman	4	GD	116.5	68	2	uk	uk
Pomme de Terre	5	GD	1819.7	127	14	1568	23

uk =unknown

All county lakes bordering upon a municipality were classified as General Development. DNR made this decision based on the assumption that shoreland was needed for urban use, as well as recreational use and the fact that the county does not have jurisdiction over municipal areas in applying land use controls.

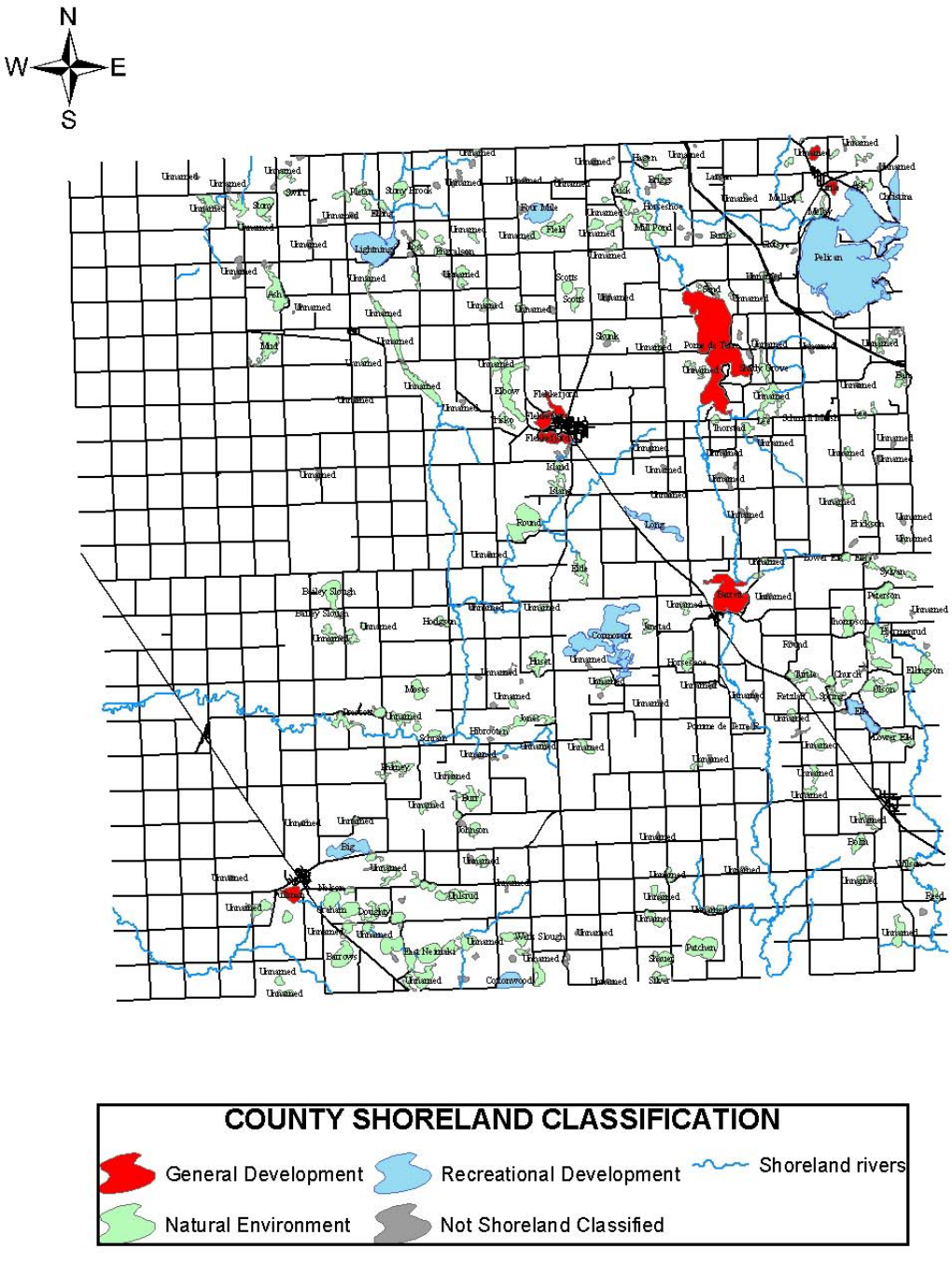
Today as cities have adopted land use controls similar to the county, and more information has been gained on the value of these water resources, it may be appropriate to make decisions that provide a greater level of protection to some of these shallow lakes.

The commissioner may, as the need arises, reclassify any public water. Also, any local government may at any time submit a resolution and supporting data requesting a change in any shoreland management classification of waters within its jurisdiction to the commissioner for consideration.

The commissioner may, as the need arises, modify or expand the shoreland classification system to provide specialized shoreland management standards based upon unique characteristics and capabilities of any public waters.

In an effort to provide adequate protection for the surface water resource, Grant County will pursue reclassification or establishment of sub classes on a number of lakes. This activity will be based on many of the same criteria used by DNR initially. However, with new data and technology such as GIS this effort may produce a result that indicates a need to reclassify or establish a sub-class on selected lakes.

Grant County Shoreland Classification



Map 5

Surface Water Use:

There are a number of reasons why surface water use is an important issue. Data from the Department of Natural Resources shows that numbers of registered boats in Minnesota have increased by 28% in the last 20 years. The size of boats has also increased. Between 1980 and 2000 the number of boats 16 feet to less than 26 feet increased by almost 125 percent. There has also been a growth in recent years in new types of watercraft, especially personal watercraft (PWCs). PWCs in Minnesota increased from 6,298 in 1980 to 33,883 in 2000. These smaller, more powerful craft have unique issues, due to their maneuverability and accessibility to shallow and remote areas. Finally, increased development of lakes leads to increased boat activity, especially in shallow lake areas that have traditionally not been used for this type of recreation.

The following is a summary of a study completed by Timothy Asplund titled "The Effects of Motorized Watercraft on Aquatic Ecosystems":

Summary Section

Potential mechanisms by which boats impact aquatic ecosystems and the effects that they can have on the aquatic environment. Shaded areas indicate where a "Mechanism" has an "Effect."

Mechanism: / *Effect:*	Emissions and exhaust	Propeller or hull contact	Turbulence	Waves and wake	Noise	Movement
Water Clarity (turbidity, nutrients, algae)		■	■	■		
Water Quality (metals, hydrocarbons, other pollutants)	■					
Shoreline Erosion				■		
Macrophytes (plant communities)		■	■	■		
Fish	■	■	■			■
Wildlife (Birds, mammals, frogs, turtles)		■		■	■	■
Human enjoyment (air quality, peace and quiet, safety, crowding)	■			■	■	■

While the effects of boats on aquatic systems are complex and depend on a number of factors, a few general observations can be made. First, the physical effects of propeller, waves, and turbulence appear to be more of an issue than engine fuel discharge. Water clarity, aquatic plant disturbance, and shoreline erosion all are serious issues that can be exacerbated by boat traffic. Second, most of the impacts of boats are felt most directly in shallow waters (less than 10 feet deep) and along the shoreline of lakes and rivers not exposed to high winds (less than 1000 feet of open water). Third, these effects can have repercussions for other features of the aquatic ecosystem, including the fish community, wildlife use, and nutrient status. These observations all emphasize that the most important area of a lake or river to protect is the shallow water, near-shore habitat known as the littoral zone. Boats that operate in deep waters with large surface areas are not likely to be impacting the aquatic ecosystem.
Given these observations, there are still a number of unknowns regarding motor boat impacts. Most of the studies that are summarized here have focused on the short term or acute impacts of boat activity, pollution, disturbance, sediment re-suspension, etc. It is not very clear what role boats can play in the long term changes of a water

body, i.e. changes in macrophyte community, overall water quality, or fish and wildlife use. Many other factors influence these same features and many have changed along with boat activity. For example, increased shoreline development often causes increased boat activity, yet it is difficult to separate out which factor is more important for plant community changes. As another example, it has been demonstrated that boats and PWCs can disturb breeding bird activity, but it is difficult to determine what effect this may have on overall bird populations, due to the increasing amount of all human activities in historic breeding areas of many bird species.

The following are potential ways in which the environmental impacts of boats may be reduced:

No-wake zones:

Given that most impacts of boats are exhibited in shallow-water near-shore areas, protecting these areas with no-wake zones would be the most effective way of reducing impacts. No-wake zones have a dual benefit by both slowing boats down and directing traffic elsewhere. These restrictions appear to be adequate for protecting against shoreline erosion, at least in developed lakes. In many cases, however, these restrictions do not adequately protect shallow-water sediments or beds of aquatic macrophytes. Some communities have extended no-wake restrictions to 200 or even 300 feet through local ordinances. These extended no-wake areas have the potential to protect a much more significant proportion of the littoral zone and may help to reduce shoreline erosion. A much more useful way of establishing a no-wake area would be to determine the depth at which plants grow in a given water body, and then establish a no-wake zone based upon water depth and vegetation parameters. At minimum, a no-wake zone based upon a 6-foot depth would reduce disturbance to sediments. A deeper depth threshold could be justified if the tops of plants come within 5 feet of the surface, or if the sediments were particularly fine. These guidelines could then be coupled with the minimum 100-foot no-wake zone to protect shorelines.

Restricted areas:

In some cases, protection of aquatic resources may require restricting all boat activity, not just speed. Boats can still disturb plants, sediments, and wildlife at no-wake speeds. These types of restrictions need to be based upon unique features of a resource and are often used to provide a certain type of experience on remote or “wild” lakes. For example, to adequately protect waterbird breeding areas, a “buffer zone” of at least 100 m (300 feet) has been suggested, in which all human activity would be banned. Similar areas could be established for emergent or floating-leafed plant beds, which may be impacted by boats operating at any speed. Research on Long Lake in the Kettle Moraine State Forest – Northern Unit showed that no motor zones did a better job of preventing disturbance of submerged plants than simple no-wake zones (Asplund and Cook 1999). Some lakes currently have electric-motor only or no-boat restrictions, which may help to protect particularly unique or sensitive natural areas. These types of restrictions need to balance protection of the resource with the right of public access.

Enforcement and Education:

Many of the environmental problems associated with boat activity could be resolved with better enforcement of existing ordinances or regulations and promoting awareness among boaters. Slow-no-wake rules are often ignored or misunderstood by boaters, such that impacts to sediments, aquatic plants, and shorelines occur even in no-wake zones. Another important avenue is informing recreators about the value of plants, littoral zones, and natural shorelines and how their activities may affect the aquatic ecosystem. If people understand that their activities may be hurting the ecosystem, they may be willing to confine their activities to more appropriate places.

In Minnesota the following options are available for surface water use zoning:

Time zoning
Used in conjunction with other zoning methods to define times, days of the week or periods during the year when restrictions are effective.

Directions of travel
Useful for controlling conflict from high speed activities on a lake, where speed zones may also be established.

Motor type and size
Restrictions on boat type and size are found mostly on smaller lakes, especially where there has been minimal motorboat use on the lake and future development may be planned. It controls speed by controlling horsepower.

Speed limits
Useful for controlling watercraft speeds for safety or resource concerns. Requires more enforcement than other types of controls.

Area zoning
Also used in conjunction with other zoning methods to identify specific restrictions a lake or river. As an example, speed restrictions may be in place (near marinas or in narrow channels). These areas are normally marked with buoys or signs placed by the local unit of government.

Grant County will request public participation in developing a water surface use management policy. This policy will clearly define the goals and objectives as to what type of zoning can be utilized as an effective tool for the protection of the shallow lake resource.