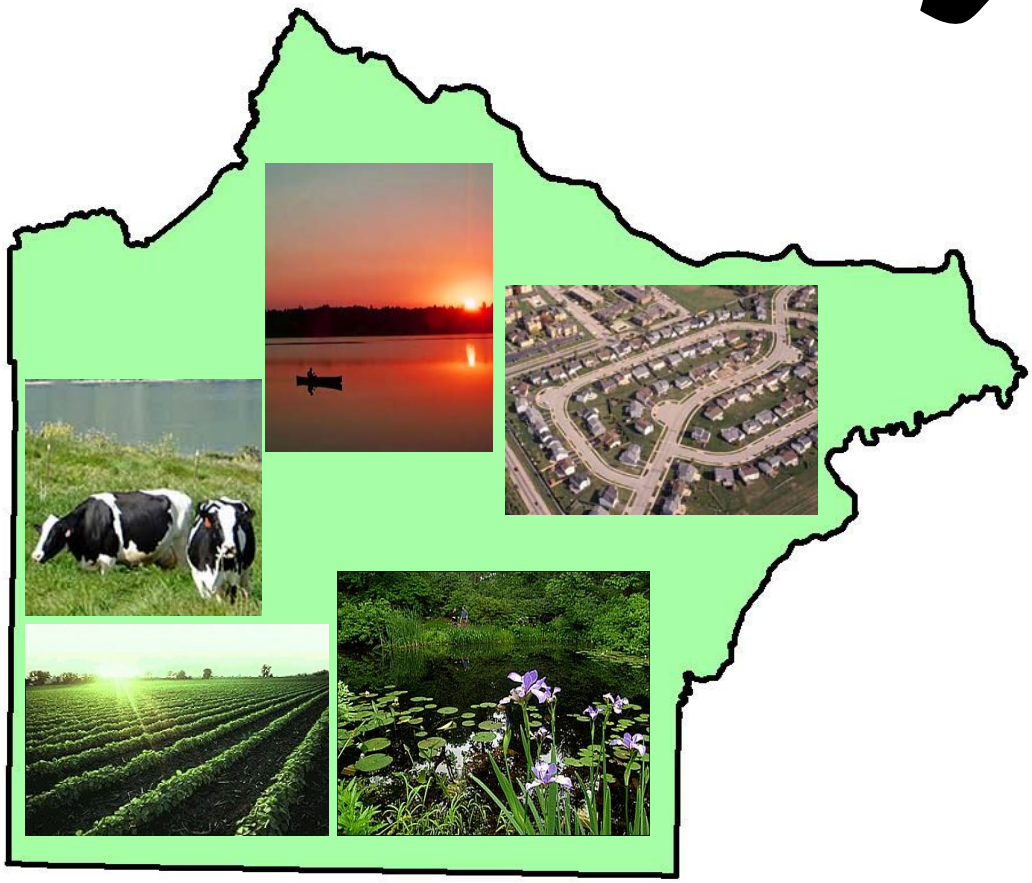
Wright County



Local Water Management Plan

2006-2015

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I. EXECUTIVE SUMMARY

Introduction

Wright County has experienced a continual progression of development being located on the northwestern fringe of the Minneapolis-St. Paul metropolitan area. This progression has changed the county's land use from hardwood forests dotted by countless wetlands and numerous lakes all dissected by miles of streams and rivers to mostly cleared agricultural land. As the dichotomy of agriculture has changed in the last half of the century, so has the land use of Wright County. The previous strong dairy and livestock component has steadily transitioned to intensive row-cropping operations. Combining the major transportation corridors (Hwy 12 through the south, Hwy 55 through the center and I-94 through the north) along with Wright County's close proximity to the metropolitan area, agriculture is succumbing to large lot residential and the denser suburban/urban land uses ***(Figure One and Table One)***. This progression of land use is not unique to Wright County nor is the potential inherent impacts to water quality. What truly is unique to Wright County is its combination of lakes, rivers and streams and its blend of topographical formations and the current mix of land uses.

Figure 1

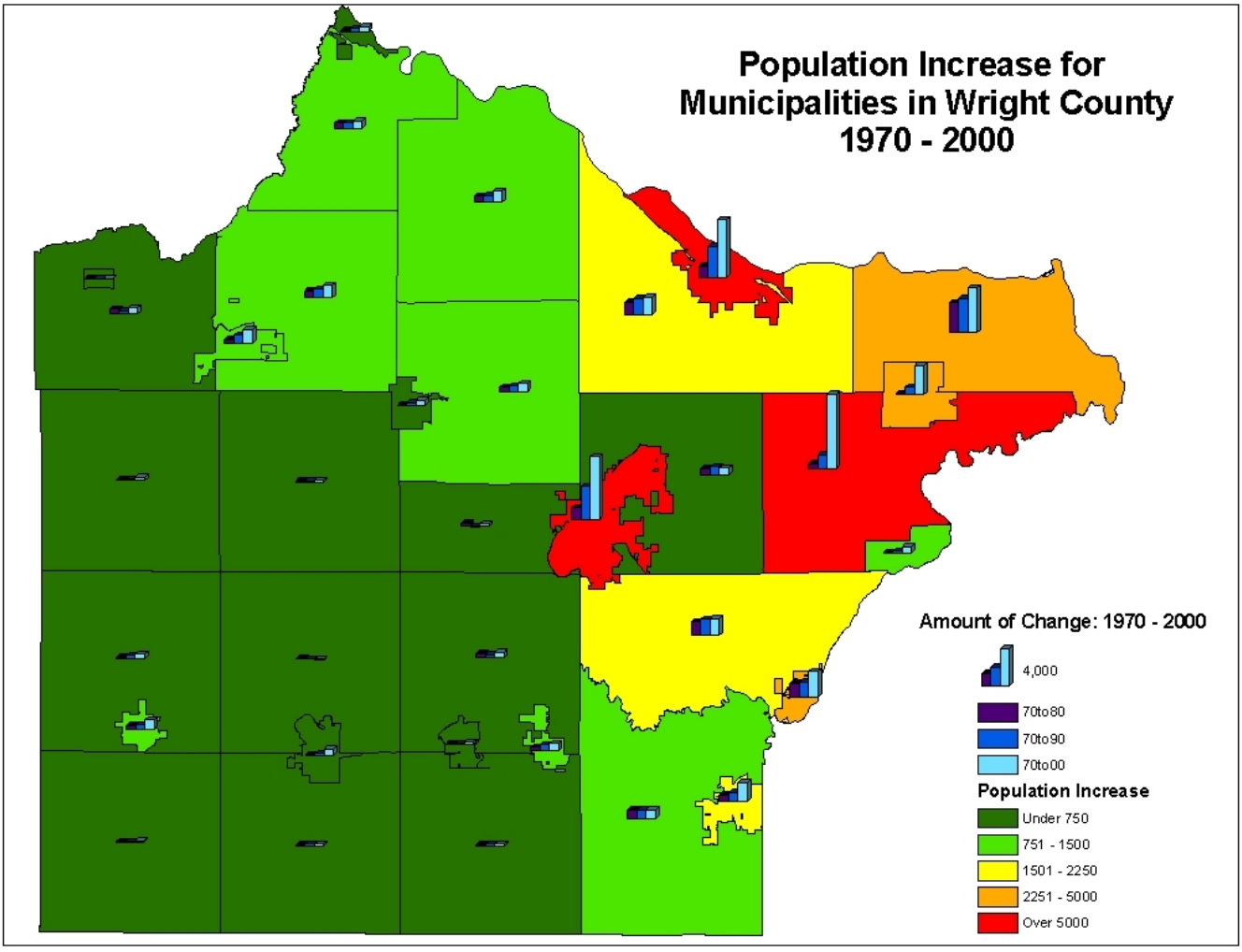


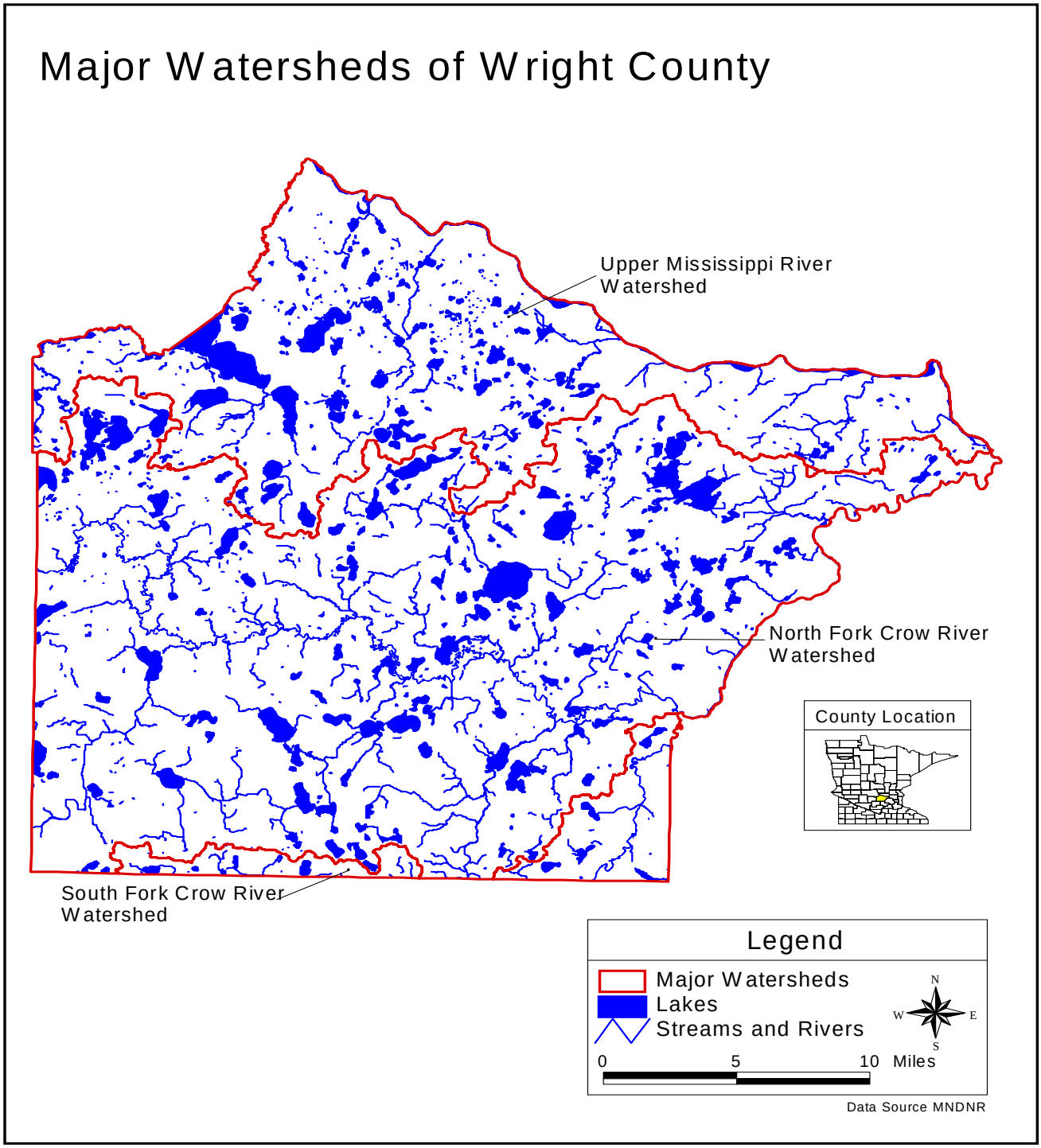
Table 1

2004 Extrapolated Population Projections (based on State Demographic Center data)

MCD	2002	2005	2010	2015	2020	2025	2030	% change 2005 vs. 2030
Wright County	98410	100260	109710	118530	126410	133240	139010	38.65%
Albertville city	4517	4875	5951	6978	7911	8698	8753	79.55%
Albion township	1189	1168	1182	1197	1206	1216	1227	5.05%
Annandale city	2713	2732	2919	3100	3257	3406	3548	29.87%
Buffalo city	11422	11807	13305	14394	15290	16311	17270	46.27%
Buffalo township	1919	1850	1804	1761	1714	1673	1638	-11.46%
Chatham township	1191	1210	1318	1421	1512	1598	1679	38.76%
Clearwater city (part)	883	901	990	1075	1152	1238	1308	45.17%
Clearwater township	1396	1396	1468	1538	1598	1655	1711	22.56%
Cokato city	2745	2756	2925	3089	3230	3365	3494	26.78%
Cokato township	1300	1299	1363	1426	1480	1531	1581	21.71%
Corinna township	2461	2467	2611	2749	2869	2982	3092	25.33%
Dayton city (part)	21	18	15	14	13	12	12	-33.33%
Delano city	3978	4056	4451	4831	5168	5484	5783	42.58%
Franklin township	2714	2642	2618	2596	2567	2544	2528	-4.31%
French Lake township	1153	1154	1217	1279	1331	1381	1430	23.92%
Hanover city (part)	1407	1503	1803	2089	2348	2589	2815	87.29%
Howard Lake city	1876	1893	2031	2164	2280	2390	2495	31.80%
Maple Lake city	1650	1646	1721	1795	1857	1917	1976	20.05%
Maple Lake township	2145	2137	2229	2320	2396	2469	2540	18.86%
Marysville township	2121	2109	2193	2274	2342	2408	2472	17.21%
Middleville township	938	916	912	910	905	901	900	-1.75%
Monticello city	8839	9177	10431	11632	12711	13153	13552	47.67%
Monticello township	4143	4075	4134	4194	4235	4278	4326	6.16%
Montrose city	1413	1436	1564	1687	1795	1898	1995	38.93%
Otsego city	8210	8396	9240	10119	11051	11798	12504	48.93%
Rockford city (part)	3529	3620	3980	4342	4663	4963	5246	44.92%
Rockford township	3397	3316	3303	3294	3275	3261	3255	-1.84%
St. Michael city	11197	11799	13795	15705	17429	19035	20539	74.07%
Silver Creek township	2380	2400	2571	2735	2879	3016	3146	31.08%
South Haven city	191	186	184	182	180	178	177	-4.84%
Southside township	1576	1585	1689	1790	1877	1960	2039	28.64%
Stockholm township	832	819	833	847	857	867	878	7.20%
Victor township	1075	1046	1036	1028	1016	1007	1000	-4.40%
Waverly city	747	747	785	823	855	885	915	22.49%
Woodland township	1142	1123	1137	1152	1162	1173	1185	5.52%

Two major basins drain Wright County - the Upper Mississippi Basin and the Crow River Basin ***(Figure Two)***. Into these basins flow the Clearwater River, the Mississippi River and the North and South Fork of the Crow River as well as 40,081 acres of lakes and 34,399 acres of wetlands. The total surface water of Wright County comprises 16% of the total 457,084 acres of the county.

Figure 2



Wright County's Local Water Management Plan (LWMP) has been in effect since it was formally adopted in 1990. The Plan was revised in 1992 and 1997. This Plan will mark the third revision of the LWMP and when adopted will be in effective through December 31, 2011. As the field of "water Management" evolves, so will the roles of this Plan evolve as it addresses the changing world we live in.

Purpose

The purpose of this Local Water Management Plan is to identify existing and potential problems and opportunities for protection, management and development of water resources and related land resources in Wright County. This plan is formulated in accordance with the requirements of Minn. Stat. 103B.311subd.4, which states that:

1. The plan must cover the entire county
2. The plan must address problems in the context of watershed units and ground water systems
3. The plan must be based upon principals of sound hydrologic management of water, effective environmental protection and efficient management
4. The plan must be consistent with local water management plans prepared by counties and watershed management organizations wholly or partially within a single watershed unit or ground water system.
5. The plan must cover a five year period (2005-2011)

Description of Priority Concerns

With public participation and comment taken from both surveys and a public meeting, the citizens of Wright County as well as various governmental agencies, addressed their concerns on the water resources within the county. From this process, the following priority concerns were identified:

1. Groundwater quality
2. Surface water quality
3. Development pressure
4. Agricultural issues

The focus of these four priority concerns will form the goals, objectives and action items which will be implemented for the duration of this plan.

Summary of Goals and Actions

The process of choosing the above priority concerns highlighted specific activities within our society which are negatively impacting Wright County's water resources. These challenges bring opportunities to reverse both the perceived and observed degradation of the county's water quality.

Goal A: Groundwater Quality*:* Provide high quality groundwater supplies to the citizens of Wright County. Actions focus on the implementation of the following objectives:

- Increase available background information of Wright County's groundwater through monitoring, analysis, outside data sources and better information distribution
- Work to prevent failure of individual septic treatment systems (ISTS) and related sewage pollution in Wright County

Goal B: Surface Water Quality*:* Position Wright County to maximize local control and funding for TMDLs. Actions focus on the implementation of the following objectives:

- Expedite the TMDL process for all of the 303d listed waters in Wright County
- Identify and prioritize all the impaired river systems and "General Development and Recreation Lakes" of Wright County

Goal C: Development Pressures: Develop regulations, educate and offer incentives to ensure orderly development with minimal impacts to Wright County's water quality. Actions focus on the implementation of the following objectives:

- Guide new development with comprehensive planning, accessible information and consideration for natural resources
- Influence existing developments and landowners use practices which reduce and/or mitigate negative human impact on natural resources

Goal D: Agricultural Land Use: Achieve countywide use of environmentally conscious practices by agricultural producers to protect and enhance Wright County's natural resources. Actions focus on the implementation of the following objectives.

- Continue Wright County's partnership with the MPCA to ensure all county feedlots are in compliance with 7020 rules.
- Influence agricultural operators to use practices which either reduce and/or mitigate negative human impact on natural resources

Consistency of plan with other pertinent local, state, and regional plans

The lake and river management plans overlaying Wright County have been considered in the completion of this document. Plans from neighboring counties were also reviewed to ensure consistency in the protection of regional water resources. There are no known conflicts between the Wright CWMP and other local plans regarding water resources.

II. ASSESSMENT OF PRIORITY CONCERNS

The priority concerns of the residents of Wright County have been well documented through a survey process and a public meeting. Even though citizens and agencies have differing stakes and perspectives regarding the County's water resources, reoccurring concerns do present themselves. These reoccurring concerns will be the focus of this chapter and will be addressed at length. For reference, the complete Priority Scoping Document can be found in the Appendix of this plan.

The common thread to these concerns is water resource protection; more specifically, surface water and groundwater protection. Though these two resources are dynamically connected, they are quite often threatened by different factors. To reduce the impacts of these concerns, the causes of these concerns must be identified and addressed. Until then, the most one could expect is a prolonged deterioration of the county's most valued resource - water.

The following sections will address the priority concerns in Wright County. All maps and tables will show watershed boundaries and the assessments will reflect those illustrated drainage areas. Due to the unchanging nature of the data involved with some of the priority concerns, the previous Water Management Plan can and will be referenced.

A. Groundwater Quality

Assessment 1: Groundwater Issues

There are many activities that can and do affect groundwater quality. Agricultural chemicals have been suspected but are certainly not the only possible source of pollution for contaminated groundwater supplies. Virtually any chemical or activity that can affect surface water can also affect groundwater.

Anywhere that the groundwater table intersects the surface there is a body of water it may be a lake, a wetland, or a stream. Depending upon the current hydrologic conditions, groundwater may be recharged or discharged at any of these points. Wetlands have traditionally been considered groundwater recharge areas. This may be too simplistic of a view as research becomes more advanced. Recent data suggests groundwater recharge is a very complex and dynamic process.

An aquifer is an area where a volume of water is stored. There are two types of groundwater aquifers: bedrock and glacial drift. Bedrock aquifers are those that are found in layers of sandstone, fractured limestone or fractured granite. Shale and limestone or dolomite (manganese laden limestone), which is usually the confining layer that prevents the exchange of water between aquifers. Bedrock aquifers typically will yield vast quantities of water. The best known bedrock aquifer in Minnesota is the St. Peter formation which is a sandstone layer many hundreds of feet thick. Much of western Wright County's bedrock is consolidated granite which yields little water (see Figure I-4 1997 CLWMP). This means that a large part of Wright County has to rely on glacial drift aquifers for its drinking water supplies. Glacial drift aquifers are layers of sand and/or gravel from which water can be extracted in usable quantities. Intervening layers of clay contain a large volume of water; however, the water can not be extracted from clay at a usable rate. The rate at which water moves through clay is so slow that clay layers are

considered to be confining layers.

In Wright County, there has not been a documented problem with groundwater interference conflicts. Groundwater seems to be readily available in sufficient quantity so this to date has also not been an issue. The major regional groundwater quality concern in Wright County focuses on nitrate contamination. The Environmental Protection Agency (EPA) has set a level of ten parts per million of nitrates as the maximum contaminant level. The primary health issue concerning nitrates is their effect on infants under six months of age. Other groundwater quality concerns of a more sporadic nature include bacteria, volatile organic compounds and pesticides.

Issues Affecting Groundwater Quality

- On-Site Septic Systems
- Urban Runoff
- Feedlots
- Agricultural Chemicals
- Landfills
- Pipelines
- Storage Tanks
- Gravel Pits
- Abandoned/Active Wells

Special Geologic Conditions

As was previously discussed, Wright County is on the edge of the Twin Cities bedrock basin. The eastern half of Wright County is underlain by sedimentary rocks while the western half of the County is underlain by igneous metamorphic rocks. The erosion event that carved the bedrock of Wright County formed a valley just north and west of Montrose which angles northeast to Monticello (see Figure I-4). The slope of the bedrock has left deeper formations exposed in the northern portions of Wright County. This creates a situation where the Mount Simon-Hinckley is the first contact bedrock. Two to three hundred feet of glacial drift overlays the aquifers in this area. There may be some areas where groundwater can enter the Mount Simon aquifer from this drift: thus, land use conditions in this area could impact the quality of the water that comes from this aquifer. It is important to study groundwater recharge in this part of Wright County to help protect the quality of water located in lower formations. Another important geologic condition in Wright County is the area covered by the Anoka Sand Plains. These coarse textured soils have high infiltration and percolation rates. Contaminants can move very rapidly through the soil and into deeper formations. It is important to note that the Sand Plain Area is located along the rivers and over the bedrock valley that exposes the Mount Simon-Hinckley sandstone. An upper surficial aquifer once contaminated has the potential to contaminate deeper aquifers due to the vertical proximity of the two aquifers.

Land use in the County (primarily the northeast portion) will be the key to minimizing Wright County's detrimental affect on the Mount Simon-Hinckley aquifer. This region of Wright County is experiencing the greatest pressure from both industrial and residential development. Continued development in this area will increase the demand for water supply and escalate the potential for groundwater contamination by septic systems, industrial waste, as well as other urban by-products. The sand plains area of Wright County is the most geologic sensitive area of the County. Land use activities in this area can greatly impact the

groundwater and surface water resources.

Assessment 2: On-Site Septic Systems

With the exception of Middleville and Stockholm Townships who have adopted ordinances which assume septic regulation, the County Planning and Zoning Department is responsible for the regulation of on-site sewage treatment for Wright County's unincorporated areas ***(Table Two)***. Non-conforming septic systems are a source of potential pollution for both lakes and groundwater.

The primary problem with non-conforming septic systems is their location and/or the soil types associated with the septic system. The importance is that inadequate soils or separations do not allow for the proper treatment of the sewage in the soil. The two main pollution concerns from septic systems are nitrates and phosphates. Nitrates are a concern when the water supply is utilized as drinking water. Phosphates are primarily a concern to the lakes as they are the limiting nutrient for algae and nuisance weeds in freshwater ecosystems.

Table 2: Septic System - Selected Statistics

Wright County Septic Estimates	2004 Amounts	2005 Amounts
Estimated total number of all types of on-site septic systems (ISTS) in Wright County	35,400	35,700
Estimated number of ISTS systems that are failing or an imminent threat to public health	11,800	11,800
Number of ISTS permits issued in the last 12 months for fixing failing systems	178	199

At present, there are several processes which help to address and upgrade non-complying septic systems:

- Point-of-sale certifications
- Requests from lending/mortgage institutions for sewer certification
- Requests from property owners for Building and Land Use Permits are subject to having a septic system in compliance
- Complaints involving public health and environmental hazards are investigated
- Specific requests by a Lake Association for a door-to-door survey to investigate the status of systems and upgrade where necessary
- Random discovery of problem sewers
- Voluntary requests from landowners

Currently, the first three methods accomplish their objective without the involvement of the Court System. In a realistic sense, these techniques are the most effective, the least demanding economically and perceived by the public as less threatening and/or directed at a segment of the population which is making a demand for services. The next two methods are initiated by outside sources and therefore could be perceived as threatening by a homeowner. Complaints, while often legitimate, can be provoked for outside reasons. Door-to-door surveys are labor intensive but generally produce and disseminate good information and idealistically cause a "snowball" effect. Unfortunately, limited staff resources make

an extensive and timely door-to-door survey unrealistic at this time. Random discovery and voluntary requests remain rare events. If a homeowner refuses to cooperate with an assessment and the county decides to take legal action, a dramatic increase in cost and staff time is incurred. The enforcement/judicial system requires hard physical and/or visual evidence for enforcement action. Due to the difficulty and time involved in prosecuting nonconforming sewer cases, generally the policy during door-to-door surveys is to "skip" uncooperative landowners. This allows staff to cover as much ground as possible and return to the difficult cases at a later time.

Potential alternatives, including increased legal action, are available to the County if nonconforming septic systems are considered to be a major problem. The major challenge in any method of dealing with this problem is that staff time has to be allocated to physically inspect systems. For any solution to realize its full potential, effective efficient methods to persuade (or order) the landowner to comply must be established.

B. Surface Water Quality

Assessment 1: Municipal Wastewater Treatment

Proper and safe disposal of domestic waste has always been a problem for civilized man. Population growth, primarily in concentrated urban centers, further complicates the problem of domestic waste. Plentiful, safe drinking water also becomes an extremely valuable resource and will determine how and where development can take place. Taking this into account and the fact that often people are located near surface water bodies, municipal waste water treatment facility placement becomes exceedingly important for the protection of our surface water supplies.

Major common problems associated with all domestic waste are suspended solids, biochemical oxygen demand (BOD), ammonia, organic nitrogen and phosphorous concentrations. ***Table Three*** is a list of the typical concentrations of domestic waste water.

Table 3: Characteristics of typical domestic waste water*

Parameter	Typical Value for Domestic Sewage
BOD	250mg/L
Suspended Solids	220mg/L
Phosphorus	8 mg/L
Organic and Ammonia Nitrogen	40 mg/L
pH	6.8 SU
Chemical Oxygen Demand	500 mg/L
Total Solids	720 mg/L

*Data taken from "Environmental Pollution and Control" Second Edition, Vesilind, P. Aarne and J. Jeffery Pierce, Department of Civil and Environmental Engineering, Duke University, Butterworth Publishers, 1983, pg. 85.

Current technology of domestic waste water treatment involves three levels: primary, secondary and tertiary. Primary treatment is a physical removal of solids, sediments, and larger organic particles. Secondary treatment is a biological process to lessen the BOD of the remaining organics. Tertiary treatment is a polishing process which can be physical, chemical or biological to remove the phosphates from the waste stream. ***Table Four*** lists the current removal standards for waste discharge required by the MPCA. ***Table Five*** lists the capacity permitted for Wright County's Municipal Waste facilities.

Table 4: Waste water effluent standards

Parameter	Standard for Domestic Sewage
BOD	25 mg/L
Suspended Solids	30 mg/L
Phosphorus	1 mg/L
pH	6.0 – 9.0 SU

Table 5: *Wright County municipalities and treatment capabilities*

City	Permit Amount (MGD)	Permit Amount (MG/30 days)	Discharge Volume 12-05
Albertville	0.315	9.45	14.977
Annandale	0.0186	0.558	5.975
Buffalo	3.6	108	55.53
Cokato	0.726	21.78	16.632
Delano	0.864	25.92	12.422
Howard Lake	0.369	11.07	7.546
Maple Lake	0.461	13.83	8.061
Monticello	2.36	70.8	34.319
Montrose	0.145	4.35	8.509
Otsego East	1.65	49.5	7.015
Otsego West	0.72	21.6	1.792
Rockford	0.651	19.53	10.49
South Haven	0.027	0.81	0.2771
St Michael	2.445	73.35	28.174
Clear Lake/ Clearwater	0.24	7.2	6.88

Municipal wastewater will continue to be resource concern in the years to come. It is imperative that we not only build waste handling capacity but also utilize new technologies to create waste handling efficiencies that more thoroughly treat the growing amount of wastewater.

Assessment 2: Surface Water Quality Issues

The recreational condition of a lake is generally related to the eutrophication of the lake and the invasion of exotic (not naturally occurring) species of plants and animals. Lake eutrophication is generally associated with the overloading of nutrients. The invasion of exotic plant species is influenced by the mobility of watercraft. The carp is the best known exotic fish species to invade North American lakes.

Eutrophication Of Lakes

Oligotrophic, mesotrophic, eutrophic and hypereutrophic are the terms used to describe the state of biological productivity of a lake. The productivity of a lake is a measure of the biomass produced in the lake by living organisms. “Primary Productivity” is the biomass produced by photosynthesis. “Secondary Productivity” is the biomass produced by the breakdown of the products of primary productivity in the process of respiration. An oligotrophic lake is a relatively sterile, unproductive lake producing little biomass. A eutrophic lake is an excessively fertile, productive lake. A hypereutrophic lake is extremely productive in over-all biomass but does not provide a suitable environment for game fish.

Eutrophication also refers to the aging of a lake. Oligotrophic lakes are young while eutrophic lakes are old. Cultural eutrophication is the accelerated lake aging due to human activity. Natural eutrophication is normal lake aging unaltered by human activity. The trophic status terms are sometimes incorrectly used to describe the geologic age of a lake. Different lakes will age at different rates. Even though they are the same geologic age, Lake Superior will still be an oligotrophic lake when most of the rest of Minnesota's lakes have become peat bogs and prairie marshes.

Phosphorous is generally the limiting nutrient in fresh water systems; therefore, the eutrophication of a lake is closely tied to phosphorous loading. There are other lake factors which also influence eutrophication: such as, pH (acidity), depth, temperature and water hardness. Depth seems to be the most significant basin characteristic in determining the trophic status of a lake. A deep lake can take some phosphorous loading without becoming eutrophic while a shallow lake can take very little phosphorous loading before it becomes eutrophic. It is very costly and impractical to change the depth of a lake. Efforts to change the trophic status are generally aimed at controlling phosphorous loading.

Most fisheries experts consider oligotrophic lakes be the ideal fish habitat by as they do not have the massive undesirable "blooms" of algae and support a healthy game fish population. Two commonly found algaes in Minnesota lakes are green and bluegreen algae (also called cyanobacteria). Green alga is an important part of the food chain and is the primary food source for smaller fish and zooplankton (small swimming invertebrates). It is the bluegreen algae or a cyanobacterium that is responsible for many "algae blooms." Cyanobacteria are not attached to sediments and have the ability to alter their density and move up and down through the water column to reach optimum growing depth. Some cyanobacteria are noxious and have been known to cause death in domestic animals.

An indicator of the trophic status of a lake can be the location of phytoplankton in the water column. In an oligotrophic lake, the phytoplankton is on the bottom. In a mesotrophic lake, the phytoplankton is found throughout the water column with a slightly greater concentration found around the thermocline (the depth at which there is a rapid change in the water temperature). In a eutrophic lake, the phytoplankton is concentrated in the top five meters of the lake. In a hypereutrophic lake the phytoplankton are found in the top one to one/half meter and in extreme cases can form mats thick enough for small animals to walk upon. As a lake become loaded with nutrients, the decay of organic material near the bottom increases. This increase in decomposition ultimately causes oxygen to become depleted near the bottom. When this happens the phytoplankton moves up through the water column to an oxygen rich depth. The phytoplankton still needs to move back down through the water column to pick up the necessary

nutrients. At this point, the lake has become mesotrophic with the phytoplankton spread throughout the water column.

As the phytoplankton move up in the water column light can not penetrate and photosynthesis is limited to the upper layers of the lake. This means that only respiration (which can take place in the absence of oxygen) is taking place in the deeper water. If the bottom does go anaerobic (completely without oxygen), there is a massive release of nutrients from the sediments which contributes to the algal growth. Then the phytoplankton concentrates near the surface of the lake and the trophic status shifts to eutrophic. If these conditions continue to worsen, the phytoplankton almost totally cuts off the light to deeper water. This ultimately eliminates photosynthesis and oxygen production in the deep water to the detriment of the fish populations. At this time, only anaerobic degradation by bacteria can take place at the bottom of the lake. At this point, the lake has become hypereutrophic.

If the lake's tendency to form a thermocline is weak, an event such as a massive storm that stirs the bottom sediments during an anaerobic period can release massive nutrients into the entire water column. In this situation, a lake can actually change trophic status in a relatively short time period.

Due to ice cover, Minnesota lakes may become oligotrophic-like during the winter as no primary productivity takes place. During the ice free season, Minnesota lakes start in a low productivity status and hit their peak productivity during August and September. It is important to sample lakes regularly throughout the ice free season and especially during the peak productivity season to get an accurate picture of the lake's trophic condition.

Because rough fish can survive at lower oxygen levels than most game fish, rough fish populations thrive in eutrophic lakes. Rough fish destroy the natural habitat and breeding areas of most game fish. There is little point in stocking an unmanaged, hypereutrophic lake with cold water game fish because they will die out when the cold water becomes oxygen depleted.

In Wright County, 35 lakes out of about 300 are actively testing their water quality through the Wright SWCD Lake Monitoring Program. Of those lakes 23 are not meeting MPCA's Use Standards for the Central Hardwoods Ecoregion. These Standards are as follows:

Chlorophyll A	>18	(ppb)	or	>59 (TSI)
Secchi Disk	< 1.1	(m)	or	>59 (TSI)
Total Phosphorous	>45	(ppb)	or	>59 (TSI)

Table Six summarizes a running summer average of the data from lakes which are currently failing to meet the standards of the 1972 Clean Water Act.

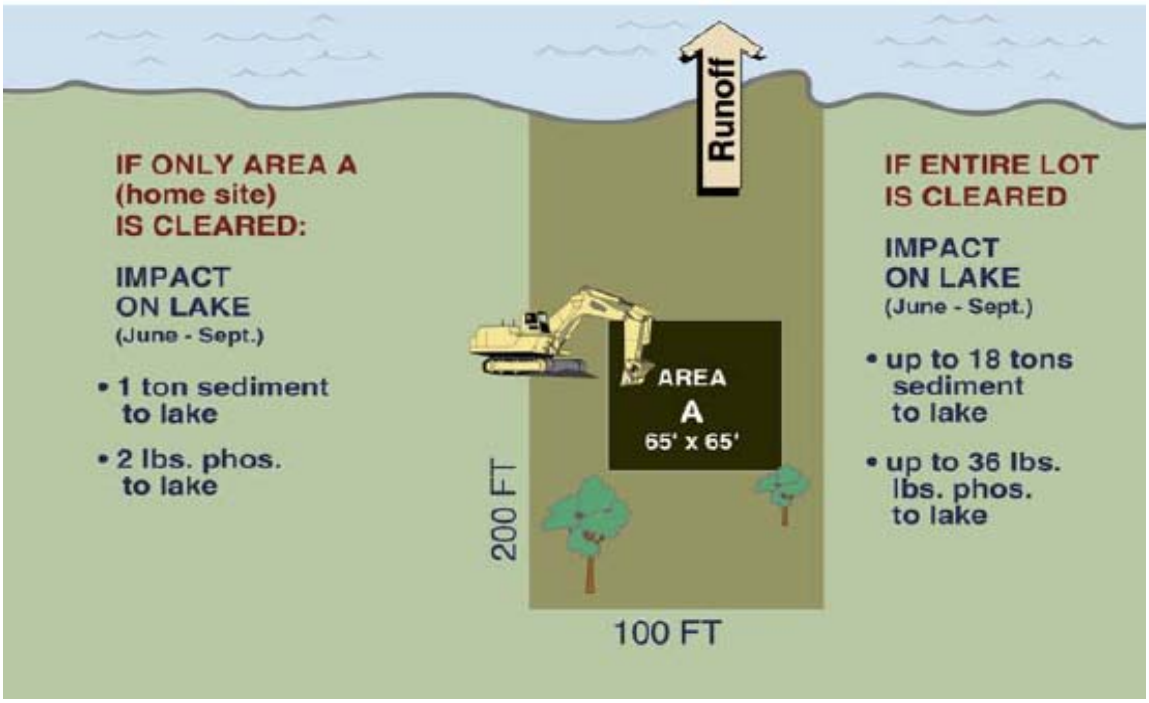
Table 6: Lake Sampling Results (Summer Average)

Lake	TP (ug/L)	ChlA (ug/L)	Secchi (M)	Notes
Little Waverly	304.6	45	0.89	
Ann	273.4	43.5	1.22	
Foster	219.4	94.2	0.53	
Fountain	180	111.6	3.57	*only 5 readings
Mink	140.9	73.4	1.45	
Albert	134.2	43.8	2.03	*only 10 readings
Camp	129.1	45.7	1.83	
Collinwood	99.1	27.5	1.72	
Howard	86.2	38.8	1.02	
Locke	84.4	33.7	1.03	
Augusta	84.2	18	3.29	*only 5 readings
Silver	79.7	47.4	1.36	*only 10 readings
Somers	78.3	34.4	2.06	
Caroline	65.6	28.6	1.55	*only 5 readings
Ramsey	63.2	27.7	1.82	
Cokato	58.7	21.5	1.61	
Granite	58.2	34.2	1.86	
Beebe	57.4	33.9	1.58	
French	52.6	26	1.42	
Waverly	49.7	22.5	2.37	
Fish	49.4	19.4	1.37	
Indian	49.3	32.4	1.46	
Deer	47.1	24.2	2.6	

Restoration Techniques

There are a number of techniques to remove nutrients from a lake. The most common method has been to dredge the bottom; however, dredging is costly and if done without specific goals and a detailed plan will have dubious results at best. Weed harvesting and the removal of rough fish are other methods of removing nutrients from a lake which have had limited success. The use of lake water to water lawns and gardens can also assist in removing some nutrients. The most sensible way to control the trophic status of a lake is to reduce its watershed phosphate loading. The best approach to reducing impacts to water quality is to reduce the footprint residents leave on the shore land itself ***(Figure Three)***. Lakeshore property owners can also reduce phosphorous inputs by not using phosphorous lawn fertilizers and by installing septic systems which comply with county code. Lakeshore owners need to collect leaves and grass clippings and dispose of them where nutrients trapped in the plant material can not return to the lake.

Figure 3



A community sewer system around a lake with many poor septic systems may have a significant positive impact on phosphate loading. Preserving riparian wetlands can have a significant impact on reducing the amount of nutrients that are allowed to enter the littoral region of the water body itself. Two temporary treatments which treat the symptoms and not the problem are as follows: aluminum sulfate which has been used to precipitate phosphates and other nutrients from the water column and oxygenating the water at depth so bottom sediments retain phosphates.
For restoration to be successful, concerned individuals must study an individual lake's problems and develop a plan of action involving several possible techniques. Not all lakes can be fully restored but the ability exists to significantly affect the quality and usability of many of our lakes.

Exotic Species

Exotic species enter new lakes through numerous methods. A highly suspected method for plant species is to be carried from lake-to-lake on boat trailers and motors. Once a new species has been introduced to a lake, it is very difficult, sometimes impossible, to remove. Currently, Eurasian water milfoil and curly leaf pondweed is being transported into many Minnesota's lakes, including many Wright County lakes. To prevent the further spread of milfoil and curly leaf, people must be very careful when transporting a boat from one lake to another. Eradication efforts have been and are actively being pursued in the infected lakes but at this point total success seems to be elusive. Preventing the rapid spread of these plants to other lakes is a reasonable objective until more effective control measures are readily available. Purple loosestrife is another exotic plant species that has invaded North America and lives along the shores of lakes and streams. Loosestrife has little value to wildlife and replaces the natural vegetation which wildlife needs to survive. The Minnesota Department of Natural Resources (DNR) is using herbicide spraying and mowing to control stands of the plant. The DNR is also considering the importation of one of several species of insects which feed exclusively on Purple Loosestrife as a means of controlling the rapidly spreading invader.

C. Development Pressure

Assessment 1: Construction Site Erosion And Sedimentation

Erosion during construction of subdivisions, planned unit developments (PUDs), commercial/industrial developments and some single family homes can have a great impact on water resources. The amount of erosion, with correspondingly high sediment delivery ratios, from construction sites can significantly affect adjacent surface waters. It is difficult, if not impossible, to quantify the amount of sediment associated with erosion during urban construction activities to the over-all sediment generation. Although this problem exists in areas under the jurisdiction of the County, this type of erosion more commonly occurs in developments located within city limits. City construction site erosion has a more significant impact due to greater density.

Policies governing construction site erosion pertaining to sites under County control are currently regulated through the Wright County Land Use Ordinances. Subdivisions and planned unit developments are controlled through regulations set forth in the subdivision ordinance. Commercial and industrial development is controlled under the procedures of a "conditional use" permit. Single family homes, additions or improvements and other site specific situations, are handled through Section 710. of the Wright County Zoning Ordinances or under the appropriate shoreland regulations. With single family homes or home improvement sites, county staff and the Soil and Water Conservation District staff determine the potential for erosion and based on this determination, the property owner may be required to develop a plan for further erosion control and the installation of “best management practices (BMPs)”.

NPDES Permitting

Aside from locally required permits and plans, the MPCA oversees construction activity to reduce the amount of sediment and pollution entering surface and groundwater both during and after construction projects. Stormwater discharges associated with construction activities are regulated through the use of National Pollutant Discharge Elimination System (NPDES) permits. These permits are issued and required by the MPCA on construction activities that disturb one acre or more of land. Both owners and operators are responsible for submitting the permit application. With this permit, the owner is required to develop a stormwater pollution prevention plan that incorporates specific best management practices (BMPs) applicable to their site. These activities may include but are not limited to: road building, landscaping clearing, grading, excavation and construction of homes, office buildings, industrial parks, landfills and airports.

MPCA is in process of implementing a Storm Water Program for urbanized areas with a population greater than 10,000. This program is designed to reduce the amount of sediment and pollution (to the maximum extent practicable) that enters surface and groundwater from storm sewer systems. Storm water discharges are also regulated through the use of National Pollutant Discharge Elimination System (NPDES) permits. NPDES permits require the owner or operator to develop a storm water pollution prevention plan that incorporates “best management practices”. An urban area may also be required to develop a Storm Water Program if it is located on sensitive waters or if it

impacts waters. Some cities on the list currently have populations less than 10,000. These cities MPCA anticipates at their populations will exceed 10,000 by the next census. Designation criteria can also be based upon potential significant water quality impacts of stormwater discharges to impacted waters.

Refer to the following website for the current MPCA NDEPS permitting rules and guidelines.

MPCA Stormwater Program rules are available at:
http://www.pca.state.mn.us/water/stormwater/index.html

Assessment 2: Urban Lane Use/Storm Water Run-Off

Urban land use has its most notable effect on stormwater run-off. With increased impermeable surface area, run-off rates are increased dramatically and water quality can be significantly degraded. This type of pollution problem is generally considered to be a "non-point" source. "Point" pollution sources (i.e. factories and power plants) can also have an effect on stormwater; however, in Wright County there are relatively few factories and the only significant power plant is the NSP nuclear power plant located in the City of Monticello. Point source pollution is addressed fairly well by federal and state agencies. Currently, non-point source pollution is not being addressed well at any level of government.

When land is developed, the hydrology (natural cycle of water) is disrupted and altered. Land clearing removes the vegetation that intercepts, slows and returns rainfall to the air through evaporation and transpiration. Grading flattens hilly terrain and fills in natural depressions that would slow and provide temporary storage for rainfall. Topsoil and sponge-like layers of humus are scraped and removed. Subsoil is compacted. Rainfall that once seeped into the ground now runs along the soil's surface. The addition of buildings, roadways, parking lots and other surfaces that are impervious to rainfall, further reduce infiltration and increase runoff. Depending on the magnitude of changes to the land surface, the total runoff volume can increase dramatically. These changes not only increase the total volume of runoff, but also accelerate the rate at which runoff flows across the land. This effect is further influenced by drainage systems: such as, gutters, storm sewers and lined channels which are designed to quickly carry runoff to rivers and streams. Development and impervious surfaces also reduce the amount of water that infiltrates into the soil and groundwater; thus, reducing the amount of water that can recharge aquifers and feed stream flow during periods of dry weather. Finally, development and urbanization affect not only the quantity of storm water run-off, but also its quality. Development increases both the concentration and types of pollutants carried by runoff. As it runs over rooftops and lawns, parking lots and industrial sites, storm water picks up and transports a variety of contaminants and pollutants to downstream water bodies. The loss of original topsoil and vegetation removes a valuable filtering mechanism for storm water runoff. The cumulative impact of development and urban activities, and the resultant changes to both storm water quantity and quality in the entire land area that drains to a stream, river, lake or wetland, determines the conditions of the water body. Urban, and to some extent suburban development, within a watershed has a

number of direct impacts on downstream waters and waterways. These impacts include:

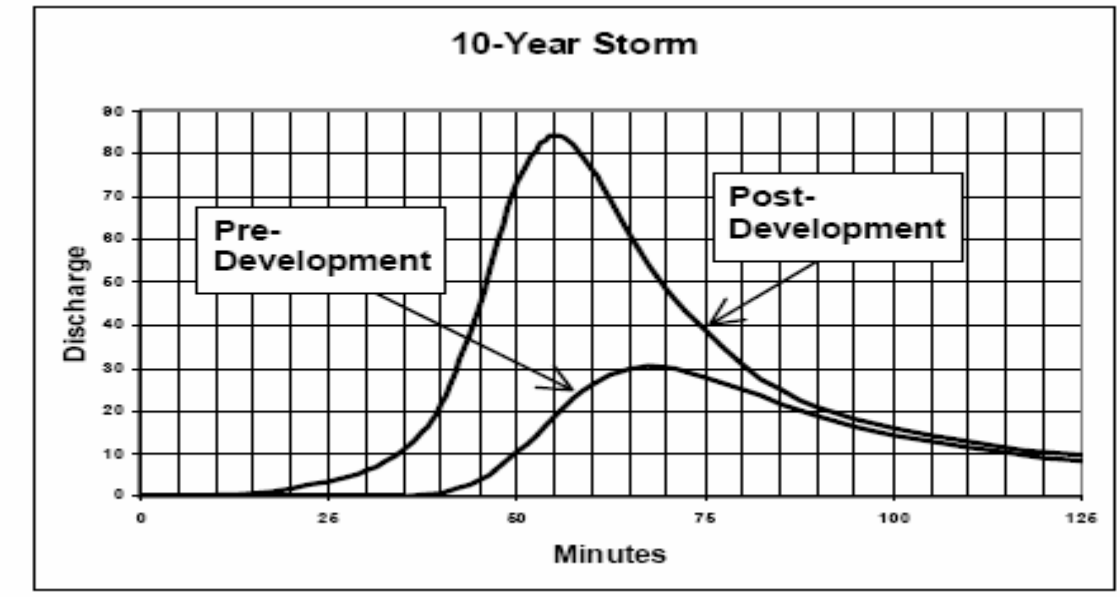
- Changes to stream flow
- Changes to stream geometry
- Degradation of aquatic habitat
- Water quality impacts

The remainder of this section will discuss these impacts and why effective storm water management is required to address and mitigate them to keep Wright County's water resources from being further degraded.

Changes to Stream Flow

Urban development alters the hydrology of watersheds and streams by disrupting the natural water cycle ***(Figure Four)***.

Figure 4



This results in:

- Greater Runoff Velocities – Impervious surfaces and compacted soils, as well as improvements to the drainage system; such as, storm drains, pipes and ditches, increase the speed at which rainfall runs off land surfaces within a watershed
- Increased Flooding – Increased runoff volumes and peaks also increase the frequency, duration and severity of out-of-bank flooding.
- Increased Frequency of Bankfull and Near Bankfull Events – Increased run-off volumes and peak flows increase the frequency and duration of smaller bankfull and near bankfull events which are the primary channel forming events.

- Increased Peak Runoff Discharges – Increased peak discharges for a developed

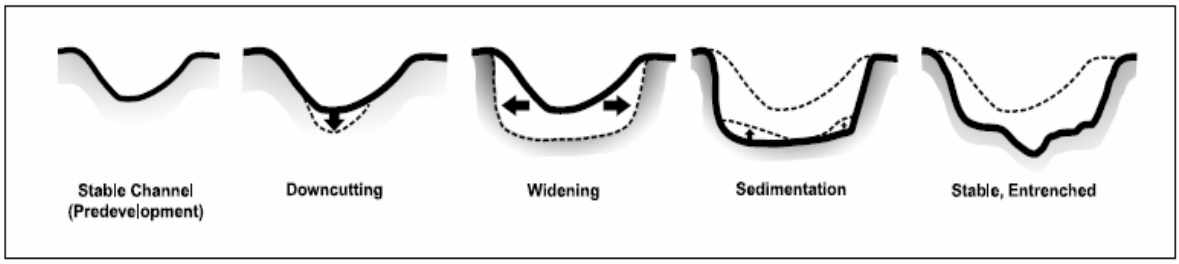
watershed can be two to five times higher than those for an undisturbed watershed.

- Increased Runoff Volumes – Land surface changes can dramatically increase the total volume of runoff generated in a developed watershed.
- Lower Dry Weather Flows (Base flow) – Reduced infiltration of storm water runoff causes streams to have less base flow during dry weather periods and reduces the amount of rainfall recharging groundwater aquifers.
- Timing – As runoff velocities increase, it takes less time for water to run off the land and reach a stream or other water body.

Changes to Stream Geometry

The changes in the rates and amounts of run-off from developed watersheds directly affect the morphology, or physical shape and character, of the county's streams and rivers ***(Figure Five)***.

Figure 5



Some of the impacts due to urban development include:

- Changes in the Channel Bed Due to Sedimentation – Due to channel erosion and other sources upstream, sediments are deposited in the stream as sandbars and other features covering the channel bed (substrate) with shifting deposits of mud, silt or sand.
- Increase in the Floodplain Elevation – To accommodate the higher peak flow rate, a stream's floodplain elevation typically increases following development in a watershed due to higher peak flows. This problem is compounded by building and filling in floodplain areas which cause flood heights to rise even further. Property and structures that had not previously been subject to flooding may now be at risk.
- Loss of Riparian Tree Canopy – As stream banks are gradually undercut and slump into the channel, the trees that had protected the banks are exposed at the roots. This leaves them more likely to be uprooted during major storms further weakening bank structure.
- Stream Downcutting – Another way that streams accommodate higher flows is by downcutting their streambed. This causes instability in the stream profile, or elevation along a stream's flow path, which increases velocity and triggers further channel erosion both upstream and downstream.

- Stream Widening and Bank Erosion – Stream channels widen to accommodate and

convey the increased run-off and higher stream flows from developed areas. More frequent small and moderate runoff events undercut and scour the lower parts of the stream bank causing the steeper banks to slump and collapse during larger storms. Higher flow velocities further increase stream bank erosion rates. A stream can widen many times its original size due to post-development run-off.

Degradation to Aquatic Habitat

Along with changes in stream hydrology and morphology, development in a watershed diminishes the habitat value of streams. Impacts on habitat include:

- Decline in Abundance and Biodiversity – When there is a reduction in various habitats and habitat quality, both the number and the variety, or diversity, of organisms (wetland plants, fish, macro invertebrates, etc.) is also reduced. Sensitive fish species and other life forms disappear and are replaced by those organisms that are better adapted to the poorer conditions. The diversity and composition of the benthic (streambed) community have frequently been used to evaluate the quality of urban streams. Aquatic insects are a useful environmental indicator as they form the base of the stream food chain.
- Degradation of Habitat Structure – Higher and faster flows due to development can scour channels and wash away entire biological communities. Streambank erosion and the loss of riparian vegetation reduce habitat for many fish species and other aquatic life while sediment deposits can smother bottom-dwelling organisms and aquatic habitat.
- Increased Stream Temperature – Runoff from warm impervious areas, storage in impoundments, loss of riparian vegetation and shallow channels can all cause an increase in temperature in urban streams. Increased temperatures can reduce dissolved oxygen levels and disrupt the food chain. Certain aquatic species can only survive within a narrow temperature range.
- Loss of Pool-Riffle Structure – Streams draining undeveloped watersheds often contain pools of deeper, more slowly flowing water that alternate with “riffles” or shoals of shallower, faster flowing water. These pools and riffles provide valuable habitat for fish and aquatic insects. As a result of the increased flows and sediment loads from urban watersheds, the pools and riffles disappear and are replaced with more uniform, and often shallower, streambeds that provide less varied aquatic habitat.
- Reduce Baseflows - Reduced baseflows, due to increased impervious cover in a watershed and the loss of rainfall infiltration into the soil and water table, adversely affect in-stream habitats, especially during periods of drought.

Fish and other aquatic organisms are impacted not only by the habitat changes brought on by increased storm water run-off quantity but are often also adversely affected by water quality changes due to development and resultant land use activities in a watershed.

Water Quality Impacts

Non-point source pollution, which is the primary cause of polluted storm water run-off and water quality impairment, comes from many diffuse or scattered sources—many of which are the result of human activities within a watershed. Development concentrates and increases the amount of these non-point source pollutants. As storm water run-off moves across the land surface, it picks up and carries away both natural and human-made pollutants depositing them into streams, rivers, lakes, wetlands and underground aquifers. Non-point source pollution is the leading source of water quality degradation across the state. Water quality degradation in urbanizing watersheds accelerates when development begins. Erosion from construction sites and other disturbed areas contribute large amounts of sediment to streams. As construction and development proceed, impervious surfaces replace the natural land cover and pollutants from human activities begin to accumulate on these surfaces. During storm events, these pollutants are washed off into the streams. Storm water also causes discharges from sewer overflows and leaching from septic tanks. There are a number of other causes of non-point source pollution in urban areas that are not specifically related to wet weather events including leaking sewer pipes, sanitary sewage spills and illicit discharge of commercial/industrial wastewater and wash waters to storm drains. Due to the magnitude of the problem, it is important to understand the nature and sources of urban storm water pollution. ***Table Seven*** summarizes the major storm water pollutants and their effects -

Table 7: Summary of Urban Storm water Pollutants

Pollutant	Effect
Sediments - Suspended Solids, Dissolved Solids, Turbidity	Stream turbidity, Habitat changes, Recreation/aesthetic loss Contaminant transport, Filling of lakes and reservoirs
Nutrients - Nitrate, Nitrite, Ammonia, Organic Nitrogen, Phosphate, Total Phosphorus	Algae blooms, Eutrophication, Ammonia and nitrate toxicity Recreation/aesthetic loss
Microbes - Total and Fecal Coliforms, Fecal Streptococci	Ear/Intestinal infections, Recreation/aesthetic loss
Organic Matter - Vegetation, Sewage, Other Oxygen Demanding Materials	Dissolved oxygen depletion, Odors Fish kills
Thermal Pollution	Dissolved oxygen depletion, Habitat changes
Trash and Debris	Recreation/aesthetic loss

Some of the most frequently occurring pollution impacts and their sources for urban streams are:

- Higher Water Temperatures – As run-off flows over impervious surfaces; such as, asphalt and concrete, it increases the temperature of this water before it reaches a stream or pond and when it enters the water that temperature will increase also. Water temperatures are further increased by shallow ponds and impoundments along a watercourse and/or fewer trees to shade the water. Since warm water can hold less dissolved oxygen than cold water, this “thermal pollution” further reduces

oxygen levels in already depleted urban streams. Temperature changes can severely disrupt certain aquatic species which can survive only within a narrow temperature range.

- Hydrocarbons – Oils, greases and gasoline contain a wide array of hydrocarbon compounds some of which have shown to be carcinogenic, tumorigenic and mutagenic in certain species of fish. In large quantities, oil can impact drinking water supplies and affect the recreational use of waters. Primarily due to engine leakage from vehicles, oils and other hydrocarbons are washed off roads and parking lots. Other sources include the improper disposal of motor oil in storm drains and streams, spills at fueling stations and restaurant grease traps.
- Microbial Contamination – The level of bacteria, viruses and other microbes found in urban storm water run-off often exceeds public health standards for water contact recreation (i.e. swimming and wading). Microbes can also increase the cost of treating drinking water. The main sources of these contaminants are sewer overflows, septic tanks, pet waste and urban wildlife (pigeons, waterfowl, squirrels, raccoons, etc.)
- Nutrient Enrichment – Run-off from urban watersheds contains increased nutrients such as nitrogen or phosphorus compounds. Increased nutrient levels are a problem as they promote weed and algae growth in lakes and streams. Algae blooms block sunlight from reaching submerged vascular plants (macrophytes) and deplete oxygen in bottom waters. In addition, nitrification of ammonia by microorganisms can consume dissolved oxygen, while nitrates can contaminate groundwater supplies. Sources of nutrients in the urban environment include run-off of fertilizers and vegetative litter, animal wastes, sewer overflows/leaks, septic tank seepage, detergents and the dry and wet fallout of materials in the atmosphere.
- Reduced Oxygen in Streams – The decomposition process of organic matter uses up dissolved oxygen (DO) in the water which is essential to fish and other aquatic life. As organic matter is carried into receiving water by storm water, dissolved oxygen levels can be rapidly depleted. If the DO deficit is severe enough, fish kills may occur and stream life can weaken and die. In addition, oxygen depletion can affect the release of toxic chemicals and nutrients from sediments deposited in a waterway. All forms of organic matter in urban storm water run-off (leaves, grass clippings, pet waste etc.) contribute to the problem. In addition, there are a number of non-storm water discharges of organic matter to surface waters (examples: sanitary sewer leakage, septic tank leaching).
- Sedimentation – Eroded soils are a common component of urban storm water and are a pollutant in their own right. Excessive sediment can be detrimental to aquatic life by interfering with photosynthesis, respiration, growth and reproduction. Sediment particles transport other pollutants that are attached to their surfaces including nutrients, trace metals and hydrocarbons. High turbidity due to sediment increases the cost of treating drinking water and reduces the value of surface waters for industrial and recreational use. Sediment also fills ditches and small streams and clogs storm sewers and pipes, causing flooding and property damage. Sedimentation can reduce the capacity and interfere with the habitat of wetlands, streams and lakes. Erosion from construction sites, exposed soils, street run-off and streambank erosion are the primary sources of sediment in

urban run-off.

- Toxic Materials – Besides oils and greases, urban storm water runoff can contain a wide variety of other toxicants and compounds including heavy metals; such as, lead, zinc, copper, cadmium and organic pollutants (pesticides, PCBs, phenols, etc). These contaminants are of concern because they are toxic to aquatic organisms, can bioaccumulate in the food chain and impair drinking water sources and human health. Many of these toxicants accumulate in the sediments of streams and lakes. Sources of these contaminants include industrial and commercial sites, urban surfaces (examples: rooftops and painted areas), vehicles and other machinery, improperly disposed household chemicals, landfills, hazardous waste sites and atmospheric deposition.
- Trash and Debris – Considerable quantities of trash and other debris are washed through storm drain systems and into streams, lakes and wetlands. The primary impact is the creation of an aesthetic "eyesore" in waterways and/or a reduction in recreational value. In smaller streams, debris can cause blockage of the channel which can result in localized flooding and erosion.

Storm Water Hotspots

Storm water hotspots are areas of the urban landscape that often produce higher concentrations of certain pollutants (such as hydrocarbons or heavy metals), than are normally found in urban run-off. These areas merit special management and the use of specific pollution prevention activities and/or structural storm water controls. Examples of storm water hotspots include:

- Auto recycling facilities
- Construction sites
- Gas/fueling stations
- Industrial rooftops
- Industrial sites
- Landfills
- Loading and transfer areas
- Outdoor material storage areas
- Vehicle maintenance areas
- Vehicle washing/steam cleaning

D. Agricultural Issues

Assessment 1 Agricultural Soil Erosion

Type And Degree Of Erosion

There are varying types and degrees of soil erosion which occur in Wright County. The type and degree is based on weather, soil type, topography and land use or vegetative cover. In every situation all of these components need to be examined to determine if erosion is a problem and how it can be corrected or minimized.

Erosion occurs due to the forces of wind and water. Water erosion can occur as sheet and rill erosion, ephemeral (gully) erosion or streambank erosion. In Wright County, more tons of soil is lost due to water erosion than wind erosion. According to the 1982 National Resource Inventory (NRI) for Wright County, the average annual soil loss on cropland due to water is 4.7 tons per acre while the average soil loss due to wind is 1.5 tons per acre. It must be recognized that much of the land base has little erosion so that to attain a 4.7 ton per acre loss average means some areas must have significant soil erosion. Predictions of 40 to 50 tons per acre annual soil loss are not uncommon. Noteworthy is the fact that ephemeral and streambank erosion are not part of the calculation in determining average annual soil loss due to water erosion.

Climate

The effect of the climatic factor cannot be easily differentiated within the political boundaries of Wright County. Within the State of Minnesota, the climatic factor is easily distinguishable by the amount and intensity of rainfall and/or wind.

Soil Erodibility

The susceptibility of individual soils to wind and water erosion can be quantified. In general, sandy soils (such as those located in the northwest outwash plains of Wright County) are more prone to wind erosion; however, water erosion is widespread throughout the county occurring on virtually any type of soil with rolling topography.

Slope

The length and degree of slope is another component related primarily to water erosion. Wright County has flat to undulating topography; therefore, the degree of water erosion varies accordingly. The areas of the county with longer and steeper slopes; such as, western Wright County around the cities of South Haven and French Lake, have a greater probability of water erosion.

Land Cover

An additional factor that effects the degree of both wind and water erosion is the type and degree of cover on the land. The amount of wind or water which comes in direct contact with the soil is proportional to the amount of erosion which can occur. Therefore, agricultural land that is in permanent grass is less susceptible to erosion than land that is row cropped because wind and water is less likely to detach soil

particles.

Erosion And Land Use

As shown above, erosion is related to current land use; agriculture which constitutes over half the land area plays an important role in establishing soil loss averages for Wright County. The National Resources Inventory (NRI) conducted by the Natural Resources Conservation Service indicates that about 31 percent of all rural land or 46 percent of cropland is eroding over "T" in Wright County. The NRI, updated by the NRCS every five years, is and will continue to be a useful tool in establishing resource trends in Wright County. Cropland erosion results from normal tillage and planting operations which leave the soil exposed. Pastureland erosion can be significant due to overgrazing. Erosion problems are compounded when land is used beyond its inherent capability, or adequate erosion control measures are not applied. This is increasingly evident with the transition form the crop rotations supporting livestock to crop rotations supporting commodity type agriculture. This more intensive form of agriculture is removing alfalfa and small grains from the crop rotation, as well as the soil building manure amendments, which all contribute to healthier soil and less erosion.

Erosion Prediction And Effects

The effect of erosion is compounded by the volume of soil which is lost, the soil's composition, the soil's use and utility and where the soil is deposited after erosion occurs. The amount of erosion which occurs can be estimated by using the second version of the Revised Universal Soil Loss Equation (RUSLE2) for water erosion and the Wind Erosion Equation (WEQ). Both equations incorporate all of the factors itemized under type and degree of erosion to predict the amount of erosion occurring on a parcel of land. These equations only predict the on-site effects of wind and water erosion, they do not assess off-site damages.

The equation results are then correlated to the rate at which the soil regenerates itself. This value is referred to as its tolerance or "T" value. Wright County's "T" value for individual soils ranges between 2 and 5 tons per acre, per year; therefore, any soil in Wright County eroding at a rate above 5 tons per acre is eroding above its natural ability to regenerate itself.

Off-site effects of erosion are not commonly recognized. Usually, off-site sedimentation damage costs are more expensive than on-site damage. On-site erosion damage is the expense of an individual land user and can be obscured by chemical inputs; while off-site costs in the form of sediment are usually born by society. The deposition of sediment is a critical component of nonpoint source pollution and has severe consequences to the water resources of Wright County.

Another resource used to quantify erosion problems in 40 acres parcels are "high priority erosion" and "sedimentation" maps. These maps were developed by Minnesota's State Planning Agency and have been revised by the Wright SWCD to better correlate the maps' initial results with known discrepancies. High priority erosion areas are defined as: "erosion from wind and/or water occurring on class I-IV soil in excess of 2T tons per acre per year or any soil erosion occurring within 300 feet of any stream or 1000 feet of a MDNR designated protected water/wetland, eroding in excess of T tons per acre per year." High priority sedimentation areas are defined as "all land within 300 feet of a stream or 1000 feet of a lake where the erosion rate exceeds 3 tons per acre per year and areas where the SWCD can show that sediment delivery from the uplands of a watershed outletting to these waters exceeds 2 tons per acre per year. The lake or stream must be classified by the DNR as a "protected water". These maps can assist in

determining areas which should be focused on for maximum erosion control benefit.

A nonpoint source (NPS) pollution map, developed by the Minnesota Pollution Control Agency (MPCA), provides general information regarding erosion. Sedimentation, as a result of erosion, is a major contributor to nonpoint source pollution. This map ranks each minor watershed in Wright County by its potential for "NPS" pollution. Watersheds are ranked by a percentile value - the higher the percent, the greater the potential for "NPS" pollution. In Wright County, about one-quarter (1/4) of the land ranks in the upper 20 percent of the state which means there is a inherent ability for severe "NPS" pollution. This information has not been fully utilized but is an important factor, along with the high priority maps, in determining where correction efforts need to be concentrated.

Existing Program Which Address Erosion

For many years, people have tried to solve problems associated with erosion. This effort has usually been lead by governmental agencies: the Natural Resources Conservation Service (NRCS) on the Federal level, the Board of Water and Soil Resources (BWSR), (formerly the Soil and Water Conservation Board) on the State level and the Soil and Water Conservation District (SWCD) on the local level. As the issues and needs related to erosion have become more complex, other agencies have also become involved.

Informational and educational programs try to enhance individuals' ability to recognize a problem and implement a solution. Erosion education starts at a young age in Wright County. Many youth educational endeavors are sponsored by different Wright County agencies including the Wright Soil and Water Conservation District, Planning and Zoning Office, Wright County Parks Department and the Minnesota Extension Service. Activities may include but are not limited to: educational field days, poster and essay contests and presentations to schools, 4-H groups, Scouts and other youth groups within Wright County. Other presentations are made by various agencies to adult organizations such as townships, sportsmens groups, agricultural groups etc. Most of the programs are developed at the federal or state level and administered at the local level.

Federal incentive based programs which address erosion include provisions which originated under the 1985 farm bill such as conservation compliance and the Conservation Reserve Program (CRP). Other federal programs include: Environmental Quality Incentives Program (EQIP) and the Wetland Reserve Program (WRP).

Conservation Compliance and Sodbuster

Within conservation compliance, there are requirements that address soil erosion. These are highly erodible land (HEL) determinations and sodbuster. HEL determinations have been compiled on approximately 5,000 tracts of Wright County land. Half of the tracts have had on-site inspections and contain HEL fields. A tract of land determined by the Farm Service Agency (FSA) is land under single ownership and may contain one or more fields. To remain eligible for United States Department of Agriculture (USDA) benefits (price support payments, cost-share, federal crop insurance, federal loans, etc.) operators of HEL fields need to maintain their conservation plan. The sodbuster program requires that all new HEL land being brought into crop production must have a conservation plan in place immediately that gets soil loss down to "T" in order for that land user to maintain eligibility for USDA programs.

Under conservation compliance, the level of protection was not down to "T" so additional work was needed. The conservation compliance program has been very effective in getting landusers to develop conservation plans; however, the anticipated reduction of

soil erosion has not been achieved. The current federal farm programs focus strictly on crop production thus forming an economic driving force which understandably forms the majority of our current farming practices. This sometimes creates a dichotomy in which conservation more often losses out. If the economic balance could be shifted by federal, state or local incentives to make conservation farming the clear economically attractive option, a significant reduction in erosion and sedimentation in Wright County would be the result. Currently, there are incentives for the land user to participate in USDA programs; however, these programs are predominantly voluntary and unfortunately predominantly not utilized to the extent they should be. That being the case, the following are the existing programs currently available to our agricultural producers:

Conservation Reserve Program (CRP) and Wetland Reserve Program (WRP)

The Federal CRP program is designed to take highly erodible land out of crop production for a 10-15 year period. The resulting soil loss rate is typically well under "T." The land user is paid an annual rental fee to maintain a conservation cover on the land for this period of time. CRP has been, and will continue to be, an effective conservation practice in that it reduces erosion and creates needed habitat. The Federal WRP is similar to the CRP program except it addresses wetland protection and waterfowl habitat in addition to erodible land. As of 2006, there are 8,613 acres enrolled in the CRP and WRP set-aside programs in Wright County.

Environmental Quality Incentive Program (EQIP)

The EQIP program is intended to provide cost-share funds to landusers to reduce erosion, prevent pollution and improve environmental health on their land. These cost-share dollars can be used for practices; such as, erosion control structures, conservation cover, strip cropping, and windbreaks. The cost-share rate is up to 50 percent of the cost to complete the practice. EQIP motivates landowners, who have erosion problems on their farmland but can't afford to do something on their own, by providing federal cost-share dollars to help correct the problem. EQIP was designed to address all erosion on a tract and to operate in priority areas. The program has since been revised to assist on a project-by-project basis. This change has increased the attractiveness of the program however it is still dependent on the landowner's willingness to embrace changes to their operations which remains a major stumbling block.

Farmland Preservation Policy Act (FPPA)

The FPPA goal is to maintain prime and unique farmland as farmland by curtailing development. In theory, this is a worthy goal but from experience Wright County areas determined to be prime and unique farmland under the FPPA tends to be developed regardless. This could be a vital program, if utilized to the intent of the act, but mounting urban sprawl continues to occur in Wright County.

Reinvest in Minnesota Program (RIM)

The State's RIM program has similar goals as the federal CRP program except that easements are perpetual in duration. Conservation cover on RIM acres, analogous to CRP, provides extraordinary erosion control cover during the length of the easement. Wetland restorations and flood plains have been high priorities for RIM in recent years. Perpetual easements provide lasting erosion control benefits as well as other significant natural resource benefits. Wright County has approximately 876.5 acres enrolled in the RIM program.

State Cost Share Program

The State Cost-Share Program has similar goals and characteristics as EQUIP except that cost-sharing is up to 75% of the project and the funds are also available to non-farmland users but the majority of State Cost-Share dollars continue to be used for farmland erosion control projects. Approximately $19,000 of State Cost-Share dollars are annually allocated to the Wright SWCD for these projects and available to Wright County land users.

Agricultural Preserves Program

The Ag Preserves program is designed to maintain rural land in agriculture without development infringement. The incentive to the landowner is a $1.50 per acre tax break, deferred assessments and some protection from condemnation proceedings. In Wright County, landowners in this Program agree to not develop the enrolled land for eight years after cancellation and to develop and implement a conservation compliance plan on HEL land. This program does much to maintain agricultural land but it may be more efficient if it was directed toward preserving prime and unique farmland under development pressure. Currently, 11,500 acres are enrolled in the Wright County Ag Preserves program.

There is little direct regulation in Wright County to control soil erosion. The closest that regulatory action comes in addressing soil erosion are the recent requirements by the Planning and Zoning Office which requires erosion and sediment control plans to be developed before approval of certain plats. Further regulation may be required in the future to obtain a significant reduction in this problem.

Assessment 2 Feedlots

After nearly five years of meetings, responding to citizens' comments and making revisions and improvements, the Wright County feedlot rules became effective on October 23, 2000. The rules (Minn. R. 7001.0020, 7002.0210 to 7002.0280, and Minn. R. ch. 7020) govern the **storage, transportation, and utilization** of manure. The revision updated regulations that were 20 years old. In general, the feedlot rules apply to all aspects of livestock production including the location, construction, operation and management of feedlots, manure handling facilities and land application of manure.

MPCA Feedlot Rules are available on the MPCA website at:
http://www.revisor.leg.state.mn.us/arule/7020/

According to the Minnesota Pollution Control Agency (MPCA), an animal feedlot is any lot or open building with the intention of confined feeding, breeding, raising, or holding of animals. This includes confinement areas where manure may accumulate or the concentration of animals is such that vegetative cover cannot be maintained. Dairy, hog, beef lots and barns, poultry ranges, horse paddocks and fur farms are considered feedlots. Pastures used for grazing and where a vegetative cover is maintained are not considered animal feedlots.

Agreements between the Wright County Board and the MPCA allows Wright County to be delegated to carry out the feedlot program for feedlots and manure storage areas with less than 1,000 animal units. Delegated Wright County Feedlot Officers have the following duties:

- Administer the registration program
- Distribute and review permit applications
- Issue construction short-form and interim permits
- Inspect feedlots and manure storage areas according to delegation agreement
- Review and process complaints
- Provide assistance to owners in completing permit applications and registration forms
- Maintain records on permit actions, inspections and complaints. Per Minnesota state law, all information regarding the complainant must be kept confidential
- Maintain a record of notifications from owners claiming the ambient air standards exemption
- Submit an annual report to the MPCA by April 1 of each year

Owners must register for a permit if they have an animal feedlot or manure storage area with 50 or more animal units or 10 or more animal units if in shoreland (less than 300 feet from a stream or river, less than 1,000 feet from a lake). Registration data must be updated at least once in every four-year period after January 1, 2002. The MPCA or delegated County Official will notify owners that they must re-register at least 90 days before their current registration expires. Also, the county will send the owner a receipt within 30 days of receiving the registration information from the owner.

Exemptions:

- Owners of livestock facilities located on county fairgrounds are not required to register
- Owners of pasture or grazing operations that have buildings or lots with a capacity of less than 50 animal units, or less than 10 animal units in shoreland areas are not required to register
- Owners of pasture or grazing operations that do not have buildings or open lots are not required to register

A feedlot owner registers one of three following ways:

1. Fill out the following information on an MPCA registration form and return to the MPCA or, in a delegated county, the delegated county feedlot officer. The form will require the following information:
   - Date form was completed
   - Name and address of all owners
   - Facility location (township, county, section and quarter section)
   - Permit or certificate number, if one has been issued in the past and is known
   - Types of animal holding areas (pastures, confinement barns, open lots)
   - Maximum number and types of animal to be housed at the facility
   - Identification of surface waters within 1,000 feet of facility
   - Presence and type of manure storage areas
   - Distance from animal holding area or manure storage areas to a well
   - Name of person completing form
2. Fill out a permit application (if required to obtain a permit).
3. If the owner is listed on a current (as of October 1, 1997) Level II or Level III inventory that also contains the information above and the inventory has been submitted to the MPCA, this will serve as fulfilling the initial registration

requirement. It is the owner's responsibility to ensure that his or her registration information has been forwarded to the MPCA.

Manure Applications in Special Protection Areas

Added protective measures are required for application of manure in special protection areas. These areas include land within 300 feet of lakes, streams, intermittent streams (excluding grassed waterways), public waters wetlands (typically, over 10 acres in rural areas) and drainage ditches without berms. Requirements vary depending on whether or not there is a permanent vegetated buffer along the water or waterway.

Option 1**:** For Land Without a Perennial Vegetative Buffer in Special Protection Areas

- Manure applications within 25 feet of the water or waterway are prohibited
- Manure applied between 25 and 300 feet of the water or waterway must be incorporated immediately (within 24 hours of application)
- The rate and frequency of application of manure must be at a level that will not allow phosphorus to build up over any six-year period if the soil already exceeds the crop needs for phosphorus (21 ppm Bray P1 or 16 ppm Olsen soil tests)
- No winter applications onto land in a special protection area

Option 2: For Land with Perennial Vegetative Buffer in Special Protection Areas

- Minimum buffer widths:
  - 100 feet for lakes and streams
  - 50 feet for wetlands (more than 10 acres), intermittent streams, and unbermed ditches
- No manure applications onto the buffers
- No winter application of manure within a special protection area.

Manure Applications Near Open Tile Intakes

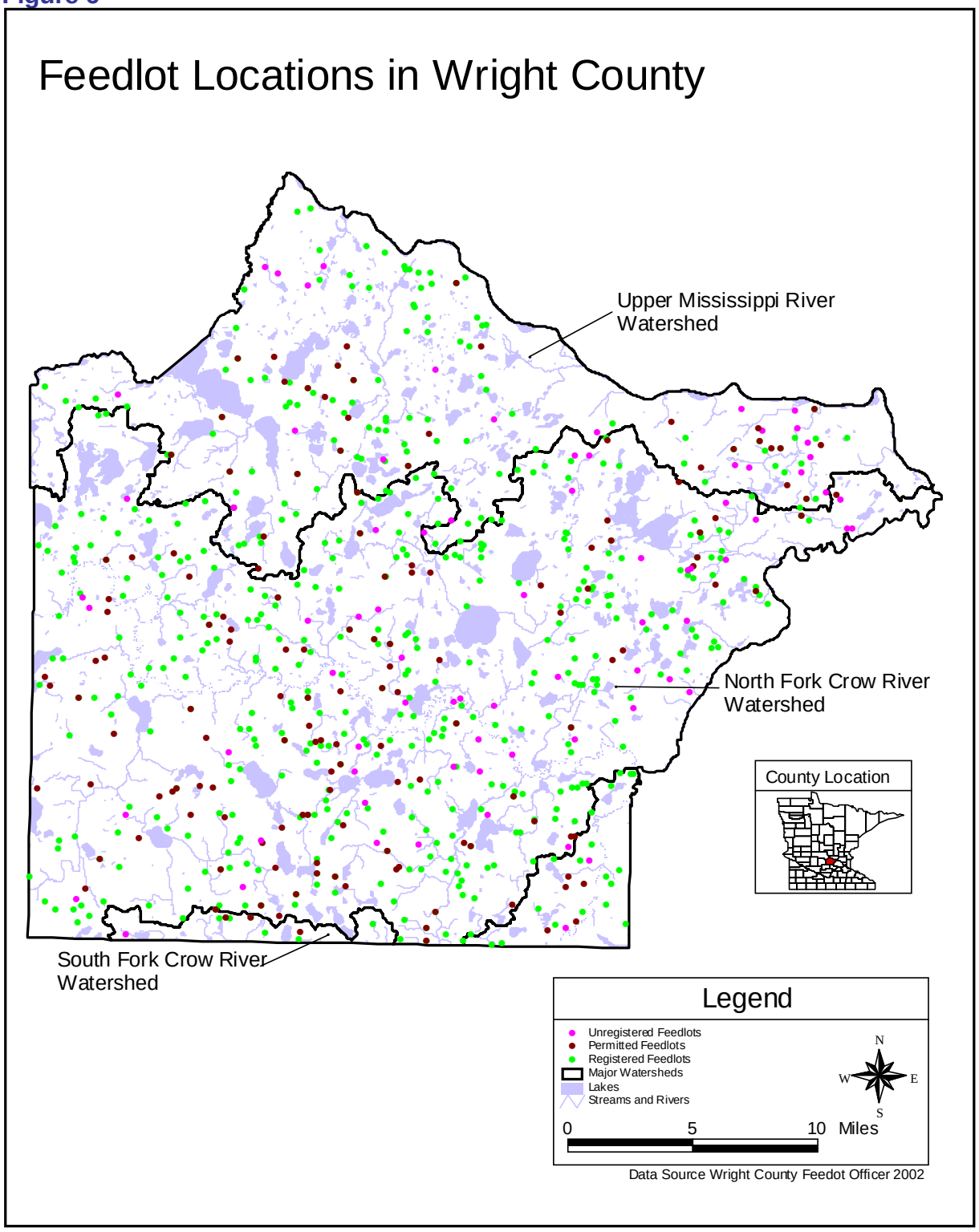
Liquid manure must be injected or immediately incorporated when applied within 300 feet of an open tile intake. Solid manure must be immediately incorporated when applied within 300 feet of an open tile intake after October 1, 2005.

Refer to the following website for the current county feedlot ordinance for more specific rules and guidelines.

Wright County Feedlot Ordinance rules are available at on the Wright County website at: http://www.co.wright.mn.us/department/pandz/ordinances.asp

As of January 1, 2002, there were approximately 600 registered feedlots with at least ten animal units in Wright County. The Wright County Feedlot Officer has completed an inventory of the feedlots in Wright County and is in the process of reviewing and permitting them. (Figure 6) The priority feedlots (those within shoreland areas) are being completed first and the remaining lots will be completed accordingly.

Figure 6

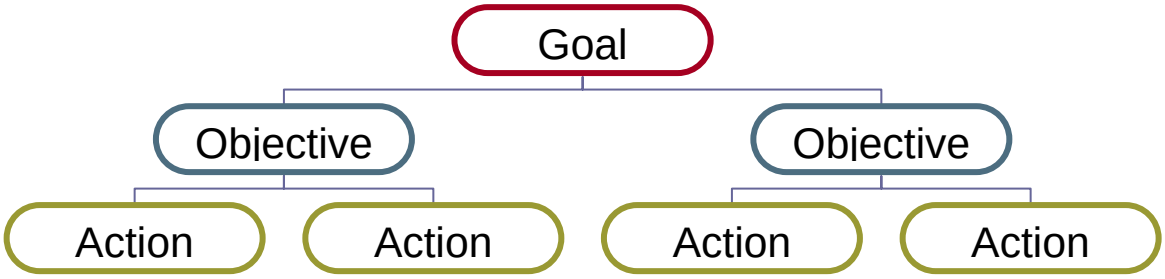

Feedlot Locations in Wright County
Upper Mississippi River Watershed
North Fork Crow River Watershed
South Fork Crow River Watershed
County Location
Legend
Unregistered Feedlots
Permitted Feedlots
Registered Feedlots
Major Watersheds
Lakes
Streams and Rivers
N
W
E
S
0
5
10 Miles
Data Source Wright County Feedot Officer 2002

III. GOALS - OBJECTIVES - ACTIONS

The Wright County Water Management Task Force distributed a county-wide survey and hosted a public input meeting to determine citizen concerns. This input resulted in the Priority Concerns Document and the development of the following priority issues *(not listed in any specific order of importance)*:

I. Groundwater Quality and Quantity
II. Surface Water Issues
III. Development Pressure
IV. Agricultural Land Uses

The development of the goals and objectives within this chapter define the broad topics that county residents raised during the public input phase and wished to have addressed to protect their water resources. Action items describe activities that the county will implement, with assistance from the appropriate state and federal agencies, to achieve these goals and objectives. Goals are meant to be achievable within a reasonable amount of time and may have one or more objectives.



The goals, objectives and action items listed will provide focus for the daily activities of Wright County's Soil and Water Conservation District (SWCD), Planning and Zoning Department, Water Management Taskforce and State and Federal governmental agencies. This document will also guide the budgeting process for the Wright SWCD and County Departments involved with water issues.

PRIORITY ISSUE I: GROUNDWATER QUALITY AND QUANTITY

Goal: Provide high quality groundwater supplies to the citizens of Wright County.

Objective A: Increase available background information of Wright County's groundwater through monitoring, analysis, outside data sources and better information distribution.

Action Items:

1. Cooperate with Wright County cities, USGS, MN Health Department and other agencies in developing and implementing wellhead protection plans so that 75% of Wright County's public wells have plans in place by 2009. As necessary, public water suppliers will be assisted.

   Timeline: 2006 - 2009
   Agency (Who): Water Plan Manager, Cities, USGS, MN Dept. of Health
   Cost: Staff Time

2. Provide information on the District's website by 2007 regarding how and where to get wells tested, types of tests available, maximum allowable limits for groundwater and drinking water contaminants and who to contact if a well approaches or exceeds these limits.

   Timeline: 2006 - 2007
   Agency (Who): Water Plan Manager, SWCD
   Cost: Staff Time

3. Conduct focused annual well testing for nitrates in designated, at risk wellhead protection areas (WPA), so that every susceptible WPA is tested every three (3) years.

   Timeline: 2007, ongoing
   Agency (Who): SWCD, Water Plan Manager, Cities, MN Dept. Health
   Cost: $5,000 & Staff Time

4. Continue and expand the Water Table Depth Monitoring Program to include at least one (1) well per township by 2009.

   Timeline: 2006, ongoing
   Agency (Who): SWCD, DNR
   Cost: $2,500 & Staff Time

5. Secure funding for a County Geologic Index by 2008.

   Timeline: 2008
   Agency (Who): SWCD, Water Plan Manager, USGS
   Cost: $50,000

PRIORITY ISSUE I: GROUNDWATER QUALITY AND QUANTITY

Goal: Provide high quality groundwater supplies to the citizens of Wright County.

Objective A: Increase available background information of Wright County's groundwater through monitoring, analysis, outside data sources and better information distribution thru updated District website.

Action Items (Continued):

6. Secure funding for an Abandoned Well Loan Program by 2008 to reduce the potential for groundwater contamination.

   Timeline: 2008
   Agency (Who): SWCD, MN Dept. of Health, Water Plan Manager, P&Z
   Cost: $10,000

PRIORITY ISSUE I: GROUNDWATER QUALITY AND QUANTITY

Goal: Provide high quality groundwater supplies to the citizens of Wright County.

Objective B: Work to prevent failure of ISTS and related sewage pollution in Wright County.

Action Items:

1. Continue the State Revolving Low Interest Loan Program through the Wright SWCD for failing septic systems prioritizing and targeting sensitive areas; such as, a high water table, wellhead protection areas and/or excessively sandy or heavy soils.

   Timeline: **On-going**
   Agency (Who): **BWSR, SWCD**
   Cost: **Staff Time**

2. Continue point-of-sale septic inspections.

   Timeline: **On-going**
   Agency (Who): **P&Z**
   Cost: **Staff Time**

3. Initiate a door-to-door septic review program for lakeshore properties to ensure all lakeshore properties have compliant septic systems.

   Timeline: **2007, On-going**
   Agency (Who): **P&Z**
   Cost: **Staff Time**

4. Implement a three year mandatory septic tank pumping program overlaying the entire county.

   Timeline: **2007, On-going**
   Agency (Who): **P&Z, cities**
   Cost: **Staff Time**

5. Adopt a County policy encouraging sound planning of new residential developments which utilize public waste water treatment facilities.

   Timeline: **2007**
   Agency (Who): **P&Z, cities**
   Cost: **Staff Time**

PRIORITY ISSUE II: SURFACE WATER ISSUES

Goal: Position Wright County to maximize local control and funding of TMDLs.

Objective A: Identify and prioritize all the impaired river systems and General Development and Recreation Lakes of Wright County.

Action Items:

1. Continue and expand the County's Citizen Lake Monitoring Program by one (1) new lake per year until all GD and RD lakes are monitoring.

   Timeline: On-going
   Agency (Who): Water Plan Manager, Lake Associations, MPCA
   Cost: Staff & Volunteer Time

2. Continue and expand Wright County's T-tube basin monitoring program to include rivers, inlets to lakes and streams for all three river basins.

   Timeline: On-going
   Agency (Who): Water Plan Manager, Lake Associations, CRWD, CROW
   Cost: $500 & Staff & Volunteer Time,

3. Improve the local ability to monitor and evaluate surface water quality by pursuing funds to install a water quality monitoring station on County Ditch 10 by 2007.

   Timeline: 2006
   Agency (Who): Water Plan Manager, SWCD, MPCA, CROW
   Cost: $30,000 & Staff Time

4. Develop a coordinated approach for federal, state and local governments to collect and disseminate the data necessary to make informed water management decisions by 2008.

   Timeline: 2007, On-going
   Agency (Who): MPCA, SWCD, Water Plan Manager, EPA, MDH, CROW CRWD
   Cost: Staff Time

5. Compare the County's current Shoreland Rules with the Alternative Shoreland Management Standards, developed by the Clean Water Initiative, to identify any items that would better serve Wright County.

   Timeline: 2007
   Agency (Who): Water Plan Manager P&Z
   Cost: Staff Time

PRIORITY ISSUE II: SURFACE WATER ISSUES

Goal: Position Wright County to maximize local control and funding of TMDLs.

Objective B: Expedite the TMDL process for all of the 303d listed waters in Wright County.

Action Items:

1. Assist lake associations with the development of Lake Management Plans, utilizing the Initiative Foundation's "Healthy Lakes and Rivers Program". Host regional workshops biannually so that twelve (12) new lakes have plans completed by 2010.

   Timeline: **2006, On-going**
   Agency (Who): **Water Plan Manager, CROW, CRWD, Lake Associations, MN Waters**
   Cost: **$1,000 & Staff Time**

2. Support and help foster the organization of a countywide Coalition of Lake Associations (COLA) and/or a countywide Lake and River Alliance (LARA) and attend all meetings to keep these groups informed.

   Timeline: **2006, On-going**
   Agency (Who): **Water Plan Manager, Lake Associations, CROW, CRWD, MN Waters**
   Cost: **Staff Time**

3. Establish funding sources for the implementation of diagnostic studies and remediation plans for impaired water bodies. Consider 103.B levy authority to implement programs or projects and to leverage grant dollars when available.

   Timeline: **2007, On-going**
   Agency (Who): **Water Plan Manager, SWCD**
   Cost: **$500 & Staff Time**

4. Build local capacity to do lake and river modeling to allow in-house analysis of data.

   Timeline: **2007, ongoing**
   Agency (Who): **Water Plan Manager, SWCD, MPCA**
   Cost: **$50,000 & Staff Time**

5. Provide MPCA with a prioritized list of impaired waters in need of TMDL studies and also needing MPCA available staff time and funding by 2008 and update as needed.

   Timeline: **2006, On-going**
   Agency (Who): **Water Plan Manager, MPCA**
   Cost: **Staff Time**

Priority Issue III: Development Pressure

Goal: Develop regulations, education, and incentives to ensure orderly development with minimal impacts to Wright County's natural resources.

Objective A: Guide new development with comprehensive planning, accessible information and consideration for natural resources.

Action Items:

1. Coordinate the rewrite of the Water Management Plan with the formation of the revised Land Use Plan for the Northeast Quadrant of the county.

   Timeline: 2006-2007
   Agency (Who): P&Z, Cities, SWCD, Water Plan Manager
   Cost: $50,000 & Staff Time

2. Continue to oversee that all Wright County development follows the County Land Use plan so that a regional approach can be taken to address growing environmental resource concerns.

   Timeline: On-going
   Agency (Who): SWCD, P&Z
   Cost: Staff Time

3. Adopt a county ordinance by 2007 to limit construction site erosion and sedimentation.

   Timeline: 2006
   Agency (Who): SWCD, Water Plan Manager, P&Z
   Cost: $5,000 & Staff Time

4. Adopt a county ordinance by 2007 to limit the rate and volume of storm water run-off.

   Timeline: 2006
   Agency (Who): SWCD, Water Plan Manager, P&Z
   Cost: $5,000 & Staff Time

5. Following the county's implementation of the erosion and storm water ordinances, all incorporated areas of the county will adopt these ordinances standards within 180 days.

   Timeline: 2006
   Agency (Who): SWCD, Water Plan Manager, Cities
   Cost: Staff Time

Priority Issue III: Development Pressure

Goal: Develop regulations, education and incentives to ensure orderly development with minimal impacts to Wright County's natural resources.

Objective A: Guide new development with comprehensive planning, accessible information, and consideration for natural resources.

Action Items (Continued):

6. Implement a review process for all land alteration projects which fall under the County Erosion and Storm Water Ordinance.

   Timeline: 2006
   Agency (Who): SWCD, Water Plan Manager, P&Z, Cities
   Cost: Staff Time

7. Implement a program where all RGUs inventory their storm water facilities and oversee the facilities maintenance starting in 2008.

   Timeline: 2006, On-going
   Agency (Who): SWCD, Water Plan Manager, P&Z, Cities, Townships
   Cost: $15,000 & Staff Time

8. Establish a system to work with developers to ensure that natural resource considerations can be addressed at an early phase of planning by 2007.

   Timeline: 2006, On-going
   Agency (Who): SWCD, Water Plan Manager, P&Z
   Cost: $500 & Staff Time

Priority Issue III: Development Pressure

Goal: Develop regulations, education and incentives to ensure orderly development with minimal impacts to Wright County's natural resources.

Objective B: Influence existing developments and landowners to use practices which reduce and/or mitigate negative human impact on natural resources.

Action Items:

1. Provide education and incentives to lake, river riparian and wetland owners to retain or restore existing native vegetation and/or plant emergent vegetation and other soft practices to reduce shoreline erosion.

   Timeline: 2007, On-going
   Agency (Who): SWCD, Water Plan Manager, Lake Associations, DNR
   Cost: $1500 & Staff Time

2. Inventory existing emergent vegetation on all General Development and Recreational Development Lakes with a lake management plan. Starting first with DNR prioritized water bodies. Then inventorying two (2) new lakes per year.

   Timeline: 2007, On-going
   Agency (Who): Lake Associations, Water Plan Manager, DNR
   Cost: Staff Time & Volunteer Time

3. Implement a rainwater garden program to offer further incentives to landowners to off-set the runoff from impervious areas in highly sensitive areas.

   Timeline: 2007, On-going
   Agency (Who): SWCD, Water Plan Manager
   Cost: $10,000 & Staff Time

4. Explore funding options to inventory all wetlands (drained, degraded, non-impacted), which are located in prioritized watersheds so that all high value wetlands are identified and restored and/or protected.

   Timeline: 2006, On-going
   Agency (Who): Water Plan Manager, SWCD
   Cost: Staff Time

Priority Issue IV: Agricultural Land Uses

Goal: To achieve countywide use of environmentally conscious practices by agriculture producers to protect and enhance Wright County's natural resources.

Objective A: Influence the agricultural operators to use practices which reduce and/or mitigate negative human impact on natural resources.

Action Items:

1. Conduct one (1) educational seminar concerning erosion problems and solutions per year.

   Timeline: 2007, On-going
   Agency (Who): SWCD, NRCS MDA Extension
   Cost: $500 & Staff Time

2. Lobby to bring the Federal Conservation Security Program into a Wright County watershed by 2009.

   Timeline: 2006-2008
   Agency (Who): SWCD, Sportsmen's Groups, Lake Associations, Farming Groups, Water Plan Manager, CROW, CRWD
   Cost: Staff Time & Volunteer Time

3. Utilize cost share programs (state and local) for high priority erosion control projects.

   Timeline: On-going
   Agency (Who): SWCD NRCS
   Cost: $1,250,000 & Staff Time

4. Promote BMPs and provide incentives such as the Continuous Conservation Reserve Program for buffers in agricultural areas to obtain a 30% reduction of phosphorous loads to all surface waters by 2010.

   Timeline: On-going
   Agency (Who): SWCD, NRCS, FSA
   Cost: $2,500,000 & Staff Time

5. Establish funding for a permanent part-time filter specialist to promote the local Buffer Strip Incentive Program.

   Timeline: 2007, On-going
   Agency (Who): SWCD, Lake Associations, Sportsmen's Groups, CROW, CRWD
   Cost: $15,000 & Staff Time

Priority Issue IV: Agricultural Land Uses

Goal: To achieve countywide use of environmentally conscious practices by agriculture producers to protect and enhance Wright County's natural resources.

Objective A: Influence the agricultural operators to use practices which reduce and/or mitigate negative human impact on natural resources.

Action Items (Continued):

6. Explore tax incentives/disincentives for erosion control in impaired areas.

   Timeline: 2006 - 2007
   Agency (Who): Water Plan Manager
   Cost: Staff Time

7. Explore tax incentives/disincentives for the restoration of shore land areas back to native conditions.

   Timeline: 2006 - 2007
   Agency (Who): Water Plan Manager
   Cost: Staff Time

Priority Issue IV: Agricultural Land Uses

Goal: To achieve countywide use of environmentally conscious practices by agriculture producers to protect and enhance Wright County's natural resources.

Objective B: Continue the County's partnership with the MPCA to ensure all county feedlots are in compliance with 7020 rules.

Action Items:

1. Educate feedlot operators regarding the economic value of good manure management through an annual manure management forum.

   Timeline: 2007, On-going
   Agency (Who): P&Z, SWCD
   Cost: $500.00 & Staff Time

2. Following MPCA's guidelines, continue Wright County's feedlot permitting program including the required periodic inspections.

   Timeline: On-going
   Agency (Who): MPCA, P&Z
   Cost: Staff Time

IV. Implementation Schedule

NOTE: for a complete description of each strategy, refer to the Wright CLWMP, Section III

Wright County Implementation Schedule									
			Responsible	2006	2007	2008	2009	2010	Watershed
Priority 1 - Ground Water Quality									All
Objective A - Increase available background information of Wright County's groundwater through monitoring, analysis, outside data sources, and better information distribution.									
Actions	1	Cooperate with agencies in the implementation of WHPA's	WPM MDH Cities USGS	X	X	X	X		All
	2	Provide online info. regarding well water testing, standards, and contacts	WPM SWCD	X					All
	3	Private well water testing program focusing on nitrates in WHPA's	WPM SWCD Cities MDH		X	X	X	X	All
	4	Continue and expand water table monitoring program	SWCD DNR	X	X	X	X	X	All
	5	Develop a County Geologic Index	P&Z SWCD WPM USGS			X $50,000			All
	6	Fund well sealing loan program	SWCD WPM			X $10,000	X	X	All
Objective B - Work to prevent failure of ISTS and related sewage pollution in Wright County.									
Actions	1	Continue low interest loan program for failing septic systems	SWCD BWSR	X	X	X	X	X	All
	2	Continue point-of-sale inspection program	P&Z	X	X	X	X	X	All
	3	Implement a door-to-door septic inspection program for lake homes	P&Z		X	X	X	X	All
	4	Implement a mandatory 3 year septic tank pumping program	P&Z Cities		X	X	X	X	All
	5	Adopt a county policy encouraging the use of municipal sewage facilities	P&Z Cities		X				All
			Annual Total Cost:	0	0	$60,000	0	0	

NOTE: for a complete description of each strategy, refer to the Wright CLWMP, Section III

Wright County Implementation Schedule									
			Responsible	2006	2007	2008	2009	2010	Watershed
Priority 2 – Surface Water Issues									All
Objective A - Identify and prioritize all the impaired river systems and General Development and Recreation Lakes of Wright County.									
Actions	1	Continue and expand Lake Monitoring Program by one new lake per year	WPM MPCA Lake Assoc.	X	X	X	X	X	All
	2	Continue and expand "T"-tube monitoring program	WPM MPCA CRWD CROW	X $100	X $100	X $100	X $100	X $100	All
	3	Monitor and evaluate water quality on County Ditch 10	WPM SWCD CROW MPCA	X $20,000	X $2,000	X $2,000	X $2,000	X $4,000	S.F. Crow
	4	Coordinate all agencies water testing and data collecting efforts	WPM SWCD CROW CRWD MDH MPCA		X	X	X	X	All
	5	Review and revise Shore Land Rules with DNR Alternative Rules to better serve Wright County	WPM P&Z Lake Assoc.		X				All
Objective B - Expedite the TMDL process for all of the 303d listed waters in Wright County.									
Actions	1	Host HLRP workshops	WPM Lake Assoc.	X $200	X $200	X $200	X $200	X $200	All
	2	Support the formation of COLA's and/or LARA's and attend all meetings	WPM Lake Assoc.	X	X	X	X	X	All
	3	Establish funding source for assessments and the implementation of remediation plan	WPM SWCD		X $500				All
	4	Build local capacity to do watershed modeling "in house"	WPM SWCD		X $50,000	X $50,000	X $50,000	X $50,000	All
	5	Prioritize impaired waters in need of TMDL studies	WPM MPCA	X	X	X	X	X	All
			Annual Total Cost:	$20,300	$52,800	$52,300	$52,300	$52,300	

NOTE: for a complete description of each strategy, refer to the Wright CLWMP, Section III

Wright County Implementation Schedule									
			Responsible	2006	2007	2008	2009	2010	Watershed
Priority 3 - Development Pressure									All
Objective A - Guide new development with comprehensive planning, accessible information, and consideration for natural resources.									
Actions	1	Coordinate the rewrite of the Land Use Plan for the NE Quadrant	P&Z SWCD WPM Cities	X $25,000	X $25,000				All
	2	Continue to oversee that all development follows Land Management Plan	P&Z SWCD Cities	X	X	X	X	X	All
	3	Adopt a county ordinance to limit erosion and sedimentation from construction	SWCD WPM P&Z	X $5,000					All
	4	Adopt a county ordinance to limit the rate and volume of stormwater run-off	SWCD WPM P&Z	X $5,000					All
	5	Incorporated areas of county adopt ordinance standards	SWCD Cities	X					All
	6	Implement a review process for all project that meet ordinance thresholds	P&Z SWCD Cities	X	X	X	X	X	
	7	Inventory stormwater facilities and oversee maintenance schedule	P&Z SWCD Twps Cities	X $15,000	X $15,000	X $15,000	X $15,000	X $15,000	
	8	Work with developers in the early phases of planning	P&Z SWCD WPM		X $500	X	X	X	All
Objective B - Influence existing developments and landowners use practices which reduce and/or mitigate negative human impact on natural resources.									
Actions	1	Provide education and incentive to riparian landowners to restore native vegetation	SWCD WPM Lake Assoc DNR		X $1,500	X	X	X	All
	2	Inventory existing veg. on all GD and RD lakes with a lake management plan	WPM DNR Lake Assoc.		X	X	X	X	All
	3	Implement a rainwater garden program	SWCD WPM		X $4,000	X $2,000	X $2,000	X $2,000	All
	4	Explore funding to inventory all wetlands in prioritized watersheds	WPM SWCD	X	X	X	X	X	All
			Annual Total Cost:	$50,000	$40,500	$17,000	$17,000	$17,000	

NOTE: for a complete description of each strategy, refer to the Wright CLWMP, Section III

Wright County Implementation Schedule									
			Responsible	2006	2007	2008	2009	2010	Watershed
Priority 4 - Agricultural Land Uses									All
Objective A - Influence the agricultural operators to use practices which reduce and/or mitigate negative human impact on natural resources.									
Actions	1	Conduct 1 educational seminar concerning soil erosion issues and solutions per year	SWCD NRCS MDA Extension		X $200	X $100	X $100	X $100	All
	2	Lobby to bring the Federal CSP to a watershed of Wright County	SWCD CROW CRWD Lake Assoc. Sportsman's Groups Farming Groups		X	X			All
	3	Utilize cost share programs for high priority erosion control projects	SWCD NRCS	X $250,000	X $250,000	X $250,000	X $250,000	X $250,000	All
	4	Promote BMPs and provide incentives for buffers in ag areas	SWCD NRCS FSA	X $500,000	X $500,000	X $500,000	X $500,000	X $500,000	All
	5	Establish funding for a permanent part-time buffer specialist	SWCD CROW CRWD Lake Assoc. Sportsman's Groups	X $15,000	X $15,000	X $15,000	X $15,000	X $15,000	All
	6	Explore tax incentives/disincentives for erosion control in impaired watersheds	WPM	X	X				
	7	Explore tax incentives/disincentives to restore shore land area to native conditions	WPM	X	X				All
Objective B - Continue the County's partnership with the MPCA to ensure all county feedlots are in compliance with 7020 rules.									
Actions	1	Conduct an annual manure management forum	P&Z SWCD MDA		X $200	X $100	X $100	X $100	All
	2	Continue feedlot permitting program	P&Z SWCD MPCA	X	X	X	X	X	All
			Annual Total Cost:	$765,000	$765,400	$765,200	$765,200	$765,200	

NOTE: for a complete description of each strategy, refer to the Wright CLWMP, Section III					
Wright County Implementation Schedule				**Ongoing Activities**	
Programs	Cooperators	Staff/ Cooperator Match	Funding	Grant Source	Watershed
Ag BMP Loan Program	SWCD	$3,500	$50,000	MN Dept. of Ag	All
CRP	FSA	$3,500	$250,000	USDA	All
Equip	NRCS	$10,500	$65,380	USDA	All
Feedlot Inspector	P&Z	$60,000	$41,225	MPCA	All
ISTS Administration	P&Z	$120,000	$1,500	BWSR Base Grant	All
Lake Water Monitoring Program	SWCD	$3,840	$6,510	SWCD/Private	All
Local Buffer Program	SWCD	$6,240	$955	SWCD/Local	All
Groundwater Well Testing	SWCD	$1,560	---	SWCD	All
Local Cost Share Program	SWCD	$2,000	$1,800	SWCD	All
Local Water Management Plan	SWCD	$10,657	$32,938	BWSR Base Grant	All
Local Wetland Program	SWCD	$6,000	$3,000	Private	All
Plat Reviews	SWCD	$49,920	---	SWCD	All
RIM	SWCD	$5,300	$3,900	BWSR	All
Shore Land Management	P&Z	$10,640	$10,640	BWSR Base Grant	All
State Cost Share Program	SWCD	$17,000	$25,565	BWSR Base Grant	All
WCA	SWCD	$48,323	$48,323	BWSR Base Grant	All
Annual Total Cost:		**$358,920**	**$541,786**		