

CHAPTER TWO: NFCRWD WATER PLANNING ISSUES

This chapter of the NFCRWD Overall Plan identifies the District's key water planning issues and assesses what resources are available to properly address them. The chapter is broken down into sections corresponding with the District's four main goal areas: surface and drainage water management (Section A); reducing priority pollutants (Section B); and improving stakeholder participation (Section C) and raising public awareness (also Section C).

Section A: Drainage and Surface Water Management (Goal Area 1 in Chapter Three)

Drainage Work Group

In 2005, the Minnesota Legislature directed the BWSR to conduct an “implementation assessment of public drainage system buffers and their use, maintenance, and benefits”. As part of this assessment, the BWSR convened a Work Group of stakeholders, which met several times over the two-year period, to develop recommendations on how to improve drainage management. The following are the consensus recommendations of the group:

- Clarify point of beginning for measuring required ditch buffer strips and width of required buffer strips.
- Enhance authority to establish and maintain buffers.
- Enhance ditch buffer strip compliance and enforcement.
- Enhance establishment of public drainage ditch buffers.
- The BWSR should develop and disseminate guidelines for drainage records preservation and modernization.
- The Minnesota Public Drainage Manual should be updated, in consultation with the Drainage Work Group, to reflect revisions and clarifications of Minnesota drainage law since 1991.
- The Drainage Work Group should continue to develop consensus recommendations to the Legislature, agencies, and other stakeholders for additional drainage issues and topics brought forward by its members.
- The State should create and fund a drainage assistance team to work with drainage authorities and others to better enable multi-purpose projects involving drainage infrastructure in Minnesota.

Wetlands

The Wetland Conservation provision (Swampbuster) of the 1985 Natural Food Security Act and its subsequent amendment grants the NRCS one of the primary authorities over wetlands related to agricultural lands. Swampbuster requires all agricultural producers to protect the wetlands on the farms they own or operate as a stipulation of eligibility for USDA farm program benefits. Producers are not eligible to receive these benefits if they plant an agricultural commodity on a wetland that was converted by drainage, leveling, or any other means after December 23, 1985, or convert a wetland for the purpose of, or to make agricultural commodity production possible after November 28, 1990.

The NRCS categorizes wetlands according to Swampbuster applicability. There are four categories of wetlands subject to Swampbuster restrictions and three categories of wetlands with Swampbuster exemptions. Each wetland classification includes its own unique set of regulatory requirements. The following describes each of the NRCS wetland categories:

Regulated Wetland Categories

Wetlands (W) - Areas meeting wetland criteria under natural conditions that have typically not been manipulated by altering hydrology and/or removing woody vegetation.

Farmed Wetlands (FW) - Wetlands that were drained, dredged, filled, leveled, or otherwise manipulated before December 23, 1985, for the purpose of making the production of an agricultural commodity possible, and continue to meet specific wetland criteria. Under this category drainage may be maintained but not improved.

Farmed Wetland Pasture or Hayland (FWP) - Wetlands manipulated and used for pasture or hayland, including native pasture and hayland, prior to December 23, 1985 that still meet specific wetland hydrology criteria and are not abandoned; or were in agricultural use and met FWP criteria on December 23, 1985.

Converted Wetland (CW) - Wetlands drained, dredged, filled, leveled, or otherwise manipulated for the purpose of, or to have the effect of, making possible the production of an agricultural commodity. These lands must have been W, FW, or FWP and not highly erodible prior to the conversion. They may have been converted by any activity, including the removal of woody vegetation that impaired or reduced the flow, circulation, or reach of water; provided the conversion activity was such that agricultural production on the land would not have been possible without its application.

Exempted Wetland Categories

Prior Converted Cropland (PC) - Converted wetlands where the conversion occurred prior to December 23, 1985; an agricultural commodity had been produced at least once before December 23, 1985; and as of December 23, 1985, the converted wetland met certain specific hydrologic criteria and did not support woody vegetation.

Artificial and Irrigation-Induced Wetland (AW) - Wetlands in an area that was formerly non-wetland, but now meets wetland criteria due to human activities. This definition includes wetlands created by an irrigation system on an area that was formerly non-wetland.

Non-Wetland (NW) - Land that under natural conditions does not meet wetland criteria. This definition includes wetlands which were converted to the extent that wetland criteria was not present prior to December 23, 1985, but were not cropped.

Note: Landowners need to complete a form AD-1026 (Highly Erodible Land Conservation and Wetland Certification) at the local Farm Service Agency office prior to any drainage-related project.

U.S. Army Corps of Engineers, Section 404

Section 404 of the Clean Water Act (33 U.S.C. 1344) prohibits discharge of dredged or fill material into waters of the United States without a permit from the USACE. Waters of the United States include wetlands and tributaries adjacent to navigable waters and other waters where the degradation or destruction of which could affect interstate or foreign commerce. If a project involves discharge of dredged or filled material, the Corps will evaluate the proposed activity under the Section 404 guidelines prepared by the EPA.

The USACE and the EPA define wetlands as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Activities in wetlands that normally require permits include, but are not limited to the list below:

- Placement of fill material
- Ditching activities when excavated materials is side cast
- Levee and dike construction
- Land clearing involving relocation of soil material
- Land leveling
- Most road construction
- Dam construction

The Corp of Engineers must consider the following Federal laws during permit review:

- National Environmental Policy Act
- Fish and Wildlife Coordination Act
- Endangered Species Act

- National Historic Preservation Act
- Federal Power Act
- Wild and Scenic Rivers Act
- National Fishing Enhancement Act of 1984

The Corps of Engineers uses four different types of review processes depending upon the nature of the work proposed:

Letter of Permission - This is used for minor non-controversial projects in navigable waters of the United States, and concerns docks and small dredging projects.

Nation Wide General Permit - This permit is a blanket authorization for activities that will have minimal environmental effects such as navigational aids, fill for minor road crossings, certain outfall structures, discharges into certain waters, bank stabilization, and fill for utility lines.

Regional General Permit - This permit authorizes certain projects in Minnesota where a DNR permit is usually required, and includes projects including larger bank stabilization projects, bridge and culvert replacements, sand blankets, dredging and rough fish barriers.

Full Public Interest Review - This is required for large projects such as new marinas or harbors in navigable waterways, large dredging projects, highway projects through wetlands or waters, fill in wetlands to convert them to upland, and large drainage projects.

Wetland Restoration/Protection Programs

Wetland Conservation Act

The Wetland Conservation Act (1992) requires persons proposing to impact a wetland by draining, excavating, or filling to first, attempt to avoid the impact; second, attempt to minimize the impact; and finally, replace any impacted area with another wetland of at least equal function and value. The Wetland Conservation Act is administered by local government units with oversight provided by the Board of Water and Soil Resources. Enforcement of the act is provided by Department of Natural Resources conservation officers and other peace officers. The primary objectives of the Wetland Conservation Act (WCA) are as follows:

1. To achieve a no net loss in the quantity, quality, and biological diversity of Minnesota's existing wetlands;

2. To increase the quantity, quality, and biological diversity of Minnesota's wetlands by restoring or enhancing diminished or drained wetlands;
3. To avoid direct or indirect impacts from activities that destroy or diminish the quantity, quality, and biological diversity of wetlands; and
4. To replace wetland values where avoidance of activity is not feasible and prudent.

Wetland Reserve Program (Perpetual/ Limited)

The Wetland Reserve Program (WRP) is a voluntary program through the USDA to restore and protect wetlands on private property. It provides an opportunity for landowners to receive financial incentives to restore or enhance wetlands on their property. Landowners can enroll in the WRP by one of the following three means:

- ***Permanent Easement*** is a conservation easement in perpetuity. USDA pays 100 percent of the restoration costs.
- ***30-Year Easement*** is an easement that expires after 30 years. USDA pays up to 75 percent of the easement value and up to 75 percent of the restoration costs.
- ***Restoration Cost-Share Agreement*** is an agreement to restore or enhance the wetland functions and values without placing an easement on the enrolled acres. USDA pays up to 75 percent of the restoration costs.

Any type of land that can be restored to a wetland at a reasonable cost is eligible for WRP, except for wetlands drained in violation of Swampbuster or land established to trees under the Conservation Reserve Program. Cost-share is available to restore:

- Wetlands cleared and/or drained for farming, pasture, or timber production;
- Upland areas around a restored wetland and;
- Drained wooded wetlands where hydrology will be restored.

The WRP program is administered by the NRCS, with assistance from local soil and water conservation districts.

Reinvest in Minnesota Reserve Program (Perpetual)

The Reinvest in Minnesota (RIM) Reserve Program, administered by local SWCDs and the BWSR, was one of the first State programs of its kind in the nation. RIM allows landowners to sell perpetual easements for riparian lands, sensitive groundwater areas, wetland restoration areas (drained wetlands), marginal cropland, and land for living snowfences. The payment rate for the program is based on 90 percent of the average market value of tillable land in the township. In

addition, RIM Reserve provides cost share funds, often 100 percent, for the establishment of appropriate conservation and wildlife habitat practices on easement lands.

Since its beginning in 1986, funding for the program has been erratic, ranging from a high of \$51 million, to a low of \$3 million. Since it began, RIM Reserve has enrolled approximately 3,927 easements, covering 126,567 acres, including 43,401 acres of wetland restoration and adjacent upland. The program has historically fostered partnerships with private organizations, including Pheasants Forever, Ducks Unlimited, and the Minnesota Waterfowl Association, as well as other government agencies, including the USFWS and the Minnesota DNR.

U.S. Fish and Wildlife Service Easements (Perpetual)

The USFWS manages land enrolled in two types of conservation easement programs in the County: the Farmer's Home Administration (FmHA) Program and Wetland Easement Program. Under the first program, when a landowner defaults on an FmHA loan, and that property contains wetlands, those wetlands receive protection. Protection may come in the form of a perpetual conservation easement or fee title transfer to a Federal or State fish and wildlife agency for management.

The Wetland Easement Program provides landowners an opportunity to permanently protect existing wetlands through a perpetual easement. Wetlands that are enrolled in this program cannot be drained, filled, leveled, or burned. Landowners retain both hunting and mineral rights and can graze or hay wetland when they naturally dry up.

Restorable Wetlands Inventory

In October 2000, a Restorable Wetlands Working Group was formed to create a Restorable Wetland Inventory (RWI) for the glaciated tallgrass Prairie Pothole Region of Minnesota and Iowa. This group represents a unique partnership between several governmental agencies and private conservation groups including the U.S. Fish & Wildlife Service, the Natural Resource Conservation Service, the U.S. Army Corps of Engineers, the Board of Water and Soil Resources, the Department of Natural Resources, the Minnesota Pollution Control Agency, the Minnesota Department of Transportation, Ducks Unlimited, Red River Basin Institute, Pheasants Forever, and the Nature Conservancy. The collective goal of this group is to develop inventories that can be used to prioritize areas for wetland restoration.

Several data sources were used in the wetland delineation process including National Aerial Photography Program (1:40,000 scale) color infrared photographs acquired in 1991 and 1992, USGS 7.5 min topographic quadrangle maps, National Wetlands Inventory (NWI) maps, county soil survey maps, and USDA Farm Service Agency compliance slides acquired in 1993 (immediately after a period of intense precipitation). Specific photointerpretation protocols included:

1. All drained depressional wetlands, regardless of size, were delineated.

2. NWI wetlands were delineated if the original delineation did not include the entire historic wetland area.
3. Wetlands identified on NWI maps which did not exhibit wetland characteristics (i.e. hydrology, hydrophytes, etc) on new (1992) CIR photography were delineated even if no evidence of drainage was apparent.
4. Wetlands not delineated on NWI maps, and in cropland, were delineated.
5. Wetlands not delineated on NWI maps, and in grassland, were not delineated, unless evidence of drainage was observed on the aerial photo.
6. Wetlands not delineated on NWI maps, and in trees, were not delineated.

For more information on the Restorable Wetlands Inventory, contact the U.S. Fish and Wildlife service or visit the following website:

www.fws.gov/midwest/HAPET/RestorableWetlands.htm

**Section B:
Reducing Priority Pollutants
(Goal Area 2 in Chapter Three)**

Total Maximum Daily Loads (TMDLs)

A TMDL, or Total Maximum Daily Load, is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. When a water body cannot sustain a number of identified pollutants, it is placed on the Minnesota Pollution Control Agencies TMDL 303(d) List of Impaired Waters (the MPCA is responsible for creating and maintaining the 303(d) list of Impaired Waters). Table 1A lists the Impaired Waters found in the NFCRWD for 2010 (also refer to the Impaired Waters Map).

**Table 1A:
MPCA 2010 TMDL List of Impaired
Waters for the NFCRWD**

Water Body	Affected Use	Pollutant/Stressor
Rice Lake	Aquatic Consumption & Recreation	Mercury Excessive Nutrients (Eutrophic Lake)
Grove, Koronis, and Mud Lakes	Aquatic Consumption	Mercury
North Fork Crow River	Aquatic Consumption	Mercury
North Fork Crow River (Lake Koronis to Middle Fork)	Aquatic Life	Aquatic Macroinvertebrate Bioassessments

For each impaired water identified, a “TMDL Study” is developed. The study determines the amounts of pollutants entering the water body and sets reductions for each source that will result in meeting water quality standards. From the TMDL Study, an Implementation Plan is created to clean-up the impaired water. The MPCA has oversight in both TMDL study and implementation plan development.

**Map 2A:
District's Impaired Waters
11" by 17" foldout
front**

**Map 2A:
District's Impaired Waters
11" by 17" foldout
back**

The Rice Lake TMDL Study

Rice Lake was added to the impaired waters list in 2008 due to excess nutrients. The designated use primarily impaired is Aquatic Recreation. Being listed as impaired triggered a total maximum daily load study (TMDL) which was to begin in 2011. Due to pressure from the Rice Lake Associate and the NFCRWD, MPCA reschedule the study for a 2009 start. The MPCA has contracted with NFCRWD who has retained the services of Wenck and Associates to complete the study. The goal of a TMDL is to determine the sources of nutrient loading into the lake and give them each a reduction allocation. Monitoring on four sites within the lake with assistance from lake association volunteers, and three sites on streams began in June, 2009 and will continue through October, 2010. Several stakeholder meetings will be held throughout the process. A final report and an implementation plan for nutrient reduction are expected in June, 2011.

The Statewide Mercury TMDL Plan

Numerous Lakes and Rivers throughout Minnesota are on the TMDL List of Impaired Waters for high levels of Mercury. As a result, the Minnesota Pollution Control Agency conducted a Statewide TMDL Study for Mercury, titled “The Statewide Mercury TMDL Plan.” According to the plan, there is a strong connection between the Minnesota Department of Health Fish Consumption Advisory (FCA) and MPCA’s impairment determination. When the FCA limitation is more restrictive than one meal per week, the water body is impaired.

The long-term goal of the mercury TMDL is for the fish to meet water quality standards; the approach for Minnesota’s share is mass reductions from state mercury sources. This mercury TMDL establishes that there needs to be a 93% reduction in state emissions from 1990 for the state to meet its share. Water point sources will be required to stay below one percent of the total load to the state and all but the smallest dischargers will be required to develop mercury minimization plans. Air sources of mercury will have a 93% emission reduction goal from 1990 levels. Air sources will be divided into three sectors: products, energy, and mining.

For more information regarding the Statewide Mercury Plan or TMDLs in general, contact the MPCA or visit the following website:

<http://www.pca.state.mn.us/water/tmdl/>

Feedlots

The Feedlot Map shows the location of digitized feedlot locations throughout the District (Pope County does not have their feedlot inventory digitized; however, the known feedlot locations are included in the Map). The Minnesota Pollution Control Agency (MPCA) regulates the collection, transportation, storage, processing, and disposal of animal manure and other livestock byproducts. The Feedlot Program outlines rules and provides assistance to counties and the livestock industry. For the most part, the rules focus on waste management, including the design, location, construction, and management of feedlots.

According to the MPCA, there are two primary concerns about feedlots and protecting water quality. The first is to simply ensure that manure doesn't run into our lakes, streams, and waterways. The second is ensuring that nutrient-rich manure is applied properly to cropland at a rate, time, and method that prevents it from entering our water resources, including groundwater.

All four counties administer the State's Feedlot Program for feedlots under 1,000 animal units. In addition, the District has used State Revolving Loan Funds to assist with developing manure management plans. The District has also partnered with local SWCDs on several feedlot upgrades. For more information on the State's Feedlot Program, contact the MPCA or visit the following website:

www.pca.state.mn.us/hot/feedlots.html

AFO/CAFO Definition

AFO/CAFO are terms used in the USA to designate and define an animal feeding operation (AFO) from a confined animal feeding operation (CAFO), the distinction being of considerable importance in terms of regulatory input by the federal Environmental Protection Agency (EPA) and State Departments of Ecology. The distinction and definition is complicated but a CAFO is defined as a facility with more than 1000 animal units confined on a site for more than 45 days. Any sized AFO that discharges manure or wastewater into a natural or man-made ditch, stream or other waterway is defined as a CAFO. Animal equivalents for 1000 Animal Units are: beef - 1000 head; dairy - 700 head; swine - 2500 pigs weighing more than 55 lbs; poultry - 125,000 broilers or 82,000 laying hens or pullets.

Septic Systems

Subsurface Sewage Treatment Systems (SSTS) are commonly known as septic systems (previously referred to and ISTS for Individual Sewage Treatment Systems). They are used for the treatment and disposal of wastewater from individual homes, clusters of homes, isolated communities, industries, or institutional facilities. When properly functioning, SSTSs are an effective means of treating wastewater. However, if improperly designed, installed, or maintained, SSTSs have the potential to adversely impact surface and groundwater resources.

**Map 2B:
Feedlot Locations
11” by 17” foldout
front**

**Map 2B:
Feedlot Locations
11” by 17” foldout
back**

Human waste contains high concentrations of microorganisms and many chemicals including nitrogen, phosphorus, salts, and trace elements. These pollutants are a public health concern and can degrade the environment.

Over the last few years, the District has been heavily involved with administering State Revolving Fund (SRF) loans. These loans utilize Clean Water Partnership funds from the Minnesota Pollution Control Agency for a number of different projects, including septic system upgrades, feedlot management, and shoreline restorations. The District provided over \$1.9 million in SRF funding to numerous projects that would not have been possible without the low interest loans.

In addition to the SRF loans, the Watershed District has been involved with funding septic inspections since they were petitioned by District's residents in 2005. To accomplish this, the District hired the Stearns County Environmental Services Department conduct the inspections throughout the District (by signing a Joint Powers Agreement). As a result of the project, 32 systems were upgraded in 2007 and 2008 using the District's SRF loans (totaling \$265,940).

State's Role in SSTS

The Minnesota Pollution Control Agency (MPCA) regulates septic systems statewide. Similar to feedlots, however, each county has the opportunity to enforce local regulations and designate a septic inspector. The goal of the MPCA SSTS program is to protect the public health and the environment by adequate treatment and dispersal of sewage from dwellings or other establishments not serviced by a publicly-owned treatment facility.

The first State law addressing failing ISTSs, known as the ISTS Act, went into effect in 1994. This legislation has since been codified as Minn. Rule Chapter 7080. Chapter 7080 requires that all new construction and replacement of ISTSs meet minimum statewide standards. It also systematically addresses the adequacy of existing systems through upgrading of failing systems before construction of an additional bedroom. The following are the State's objectives in regulating sewage systems through Chapter 7080.

- Keep inadequately treated sewage away from human contact to prevent disease
- Reduce levels of pathogenic bacteria and viruses discharged to the environment
- Reasonably and cost-effectively prevent groundwater contamination
- Develop clear direction for design, construction and maintenance of sewage treatment facilities
- Strive for cost effective methods of sewage treatment to maintain or improve property values
- Encourage personal responsibility for treating sewage

For more information on the State's SSTS, contact the MPCA or visit the following website:

www.pca.state.mn.us/programs/ists/index.html

Stormwater Management

Stormwater is the water that flows over the land after a rain event or snowmelt. It carries with it pollutants such as sediment, phosphorus, coliform bacteria, oils, toxins, and debris. It also increases the temperature of water bodies it enters. When natural areas are developed the amount of impervious land surface increases and in turn the volume and velocity of stormwater does as well. This polluted stormwater discharges into streams and lakes usually unfiltered. It is important to minimize the amount, velocity, and temperature of this water before it reaches other surface water.

Prior to development, stormwater represents only a small component of the annual water balance. However, as development increases, natural surfaces are replaced with impervious surfaces including roads, driveways, parking lots, compacted turf, and rooftops. The impact of low urbanization on a typical annual water budget is shown in Figure 1A. Notice that runoff increases substantially from the natural (0.3%) to developed (30%) state. In addition, development results in a decrease in groundwater infiltration and an increase in evaporation-transpiration.

Figure 1A:
The Effects of Development on the Annual Water Budget



Source: University of Washington

Stormwater Impacts

According to the Center for Watershed Protection (www.cwp.org), when the level of impervious coverage in a watershed increases to between 10 and 30%, several stormwater-related impacts are realized. These consequences include changes to stream flow, changes to stream geomorphology, aquatic habitat impacts, and water quality impacts. The following provides a detailed description of each of these impacts, as derived from the 2005 Minnesota Stormwater Manual.

Changes to Stream Flow:

- **Increased Runoff Volumes** - Land surface changes can dramatically increase the total volume of runoff generated in a developed watershed through compaction of soils and introduction of impervious surfaces.
- **Increased Peak Runoff Discharges** - Rainfall quickly runs off impervious surfaces instead of being released gradually as in more natural landscapes. Increased peak discharges for a developed watershed can be two to five times higher than those for an undisturbed watershed. Control programs that may address runoff rates do not fully address many of the problems associated with stormwater runoff.
- **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.
- **Shorter Times of Concentration** - As runoff velocities increase, it takes less time for water to run off the land and reach a stream or other waterbody.
- **Increased Frequency of Bank-full and Near Bank-full Events** - Increased runoff volumes and peak flows increase the frequency and duration of smaller bank-full and near bank-full events, which are the primary channel forming events.
- **Increased Flooding** - Increased runoff volumes and peaks also increase the frequency, duration and severity of out-of-bank flooding.
- **Lower Dry Weather Flows (Baseflow)** - Reduced infiltration of stormwater runoff could cause streams to have less baseflow through shallow ground water inflow during dry weather periods and reduces the amount of rainfall recharging ground water aquifers.

Changes to Stream Geomorphology:

- **Stream Widening and Bank Erosion** - Stream channels widen to accommodate and convey the increased runoff and higher stream flows from developed areas. More frequent small and moderate runoff events undercut and scour the lower parts of the streambank, causing the steeper banks to slump and collapse during larger storms.
- **Higher Flow Velocities** - Increased streambank erosion rates can cause a stream to widen many times its original size due to post-development runoff.
- **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.

- **Loss of Riparian Canopy** - As streambanks are gradually undercut and slump into the channel, the vegetation (trees, shrubs, herbaceous plants) that had protected the banks are exposed at the roots. This leaves them more likely to be uprooted or eroded during major storms, further weakening bank structure.
- **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, or substrate, with shifting deposits of mud, silt and 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.

Aquatic Habitat Impacts:

- **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.
- **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.
- **Reduced Baseflows** - Reduced baseflows possibly due to increased impervious cover in a watershed and the loss of rainfall infiltration into the soil and water table adversely affect instream habitats, especially during periods of drought.
- **Increased Stream Temperature** - Runoff from warm impervious areas (e.g.. streets and parking lots), 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, such as trout, can only survive within a narrow temperature range.
- **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 (e.g.. wetland plants, fish, and macroinvertebrates) are also reduced. Sensitive 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, or 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. Fish and other aquatic organisms are impacted not only by the habitat changes brought on by increased stormwater runoff 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:

- **Increased Total Dissolved Solids** - Suspended solids include inorganic (sediment, sand) and organic (vegetative and animal waste) particulates. Among the problems that suspended solids cause in receiving waters are turbidity (cloudiness), increased water temperature, destruction of the aquatic habitat (burying, alteration of bottom material), transport of adsorbed contaminants, clogging of drainage systems, and direct impact on aquatic organisms (altered respiration, reduced light penetration). Sources of particulates include streambed and streambank erosion, runoff from construction sites, vegetative debris, and litter.
- **Increased Nitrogen and Phosphorus** - High concentrations of these nutrients can result in algal blooms and excessive aquatic plant growth. Of the two, phosphorus is usually the limiting nutrient that controls the growth of algae in lakes. As phosphorus loading increases, the potential for algal blooms and accelerated lake eutrophication also increases. Sources of these nutrients include organic matter and fertilizers applied improperly or in excessive amounts.
- **Decreased Dissolved Oxygen** - As aerobic microorganisms decompose organic matter, dissolved oxygen is consumed. Following a rainfall event, runoff can deposit large quantities of oxygen-demanding substances, including animal waste and street litter, in lakes or streams. A “pulse” of high oxygen demand may then occur which depletes dissolved oxygen supplies, especially in shallow, slow-moving waters. Oxygen depletion is a common cause of fish kills.
- **Increased Chloride** - In Minnesota, a tremendous amount of salt is used each year to melt ice from roads, parking lots, and sidewalks. Because it is extremely soluble, almost all salt applied ends up in surface or ground water (Pitt et al., 1994a). If the concentration of chloride becomes too high, it can be toxic to many freshwater organisms. Normal application of de-icing salt to roads is unlikely to create toxic conditions. However, there have been many documented cases of surface and ground water contamination caused by runoff from inadequately protected stockpiles of salt and sand-salt mixtures.
- **Increased Pathogens** - High levels of bacteria and viruses are commonly found in stormwater runoff. While not all of these pathogens pose a threat to human health, several do, including E. coli and hepatitis A. Sources of pathogens include sanitary sewer leaks, animal waste, and discarded infected material.

Minnesota Stormwater Program

The Stormwater Program is a comprehensive program that is administered by the MPCA, with oversight from the EPA. The program is based upon the Federal Clean Water Act requirements for addressing polluted stormwater runoff. A 1987 amendment to the Federal Clean Water Act required implementation of a two-phase comprehensive national program to address stormwater runoff. Since the early 1990s, Phase I regulated large construction sites, 10 categories of industrial facilities, and major metropolitan MS4s, including the Cities of Minneapolis and St. Paul.

On March 10, 2003, the program broadened to include smaller construction sites, municipally owned or operated industrial activity, and many more municipalities. Phase II is designed to further reduce adverse impacts to water quality and puts controls on runoff that have the greatest likelihood of causing continued environmental degradation.

Stormwater regulations are part of the National Pollutant Discharge Elimination System (NPDES) permit program. The EPA delegated permitting authority for Minnesota's NPDES program to the MPCA in 1974. The MPCA issues combined State Disposal System (SDS) and NPDES stormwater permits. There are three general permit types: construction, industrial, and municipal. An overview of the requirements of each permit type is provided below.

Construction Permits

Under Phase I, operators of large construction activity, resulting in the disturbance of five or more acres of land, were required to obtain general permit coverage. Some activities requiring permit included clearing, grading, excavating, road building, construction of houses and office buildings, landfills, airports, feedlots, and industrial or commercial buildings.

Phase II was expanded to include small construction activity that results in the disturbance of equal to or greater than one acre and less than five acres. Like the Phase I program, owners and operators of small construction sites need to obtain permit coverage and implement practices to minimize pollutant runoff from construction sites.

Industrial Permits

Under Phase I, facilities with Standard Industrial Classification codes in 10 categories were regulated. They were identified as either mandatory (issued a permit with no exceptions) or discretionary facilities (may or may not be issued a permit). Some discretionary facilities whose industrial materials or activities were not exposed to stormwater were not required to obtain permit coverage.

Under Phase II, the mandatory and discretionary classifications were deleted and facilities with no materials or activities exposed to stormwater were not required to obtain permit coverage. No new categories of industrial activity were added to the program. However, since March 10, 2003

many small municipalities (populations of less than 100,000) that had previously been exempted had to obtain permit coverage for their industrial activity.

Municipal Permits

Under Phase I, Minneapolis and St. Paul obtained individual permits and designed and implemented stormwater programs. Revised stormwater rules require cities to obtain permit coverage by Feb. 15, 2007, if their population exceeded 10,000 or 5,000 if they were located within ½ mile of an outstanding value resource water or impaired water.

Common Compliance Problems

The following provide a listing of compliance problems are commonly found at small construction sites, as derived from the MPCA Stormwater Construction Inspection Guide.

1. No Temporary or Permanent Cover. Continuous positive slopes with exposed soil and within 200 linear feet of a surface water must have temporary erosion protection or permanent cover year round. The timing of cover application depends on the steepness of the slope and when the slope was last worked. Ask the contractor when particular exposed slopes were last worked to help you determine if there is compliance.
2. No Sediment Controls On-site. The permit requires established sediment control practices (e.g., sediment traps/ basins, down-gradient silt fences or sediment barriers, check dams, etc.) on down-gradient perimeters before up-gradient land disturbing activities begin.
3. No Sediment Control for Temporary Stock Piles. Temporary stockpiles must have silt fence or other effective sediment controls, and cannot be placed in surface waters (or curb and gutter systems).
4. No Inlet Protection. All storm drain inlets that receive a discharge from the construction site must be protected before construction begins, and must be maintained until the site is stabilized.
5. No Best Management Practices (BMPs) to Minimize Vehicle Tracking on to the Road. Vehicle exits must use BMPs such as stone pads, concrete, or steel wash racks, or equivalent systems to prevent vehicle tracking of sediment.
6. Sediment on the Road. If BMPs are not adequately keeping sediment off the street, then the permit requires tracked sediment to be removed (e.g., street sweeping).
7. Improper Solid Waste or Hazardous Materials Management. Solid waste must be disposed of properly, and hazardous materials (including oil, gasoline, and paint) must be properly stored (which includes secondary containment).

8. Dewatering at the Construction Site. Typically dewatering occurs where building footings are being constructed. Have measure been taken to ensure that the pumped discharge is not causing erosion? Is the discharge turbid and if so is it treated before discharging from the site? Has ditching been used to dewater and if so is that water resulting in the discharge of sediment and causing water quality impairments?

*For more information on stormwater management, please contact the MPCA
or visi the following website:*

www.pca.state.mn.us/water/stormwater

**Section C:
Improving Stakeholder Participation and
Raising Public Awareness
(Goal Areas 3 & 4 in Chapter Three)**

Water plans have traditionally focused on providing education on a number of key water-related issues. NFCRWD is committed to continuing this tradition, by focusing their educational efforts on the County's priority water-planning issues. In addition, a number of the miscellaneous issues, such as the importance of protecting groundwater, will be considered in the County's educational efforts. This priority issue will also be a way for the County to cooperate with a number of the key water-planning stakeholders.

There are numerous entities involved in providing public education on the State's vast water resources and how best to protect them. The following include a summary:

Soil and Water Conservation Districts (SWCD)

Soil and Water Conservation Districts (SWCDs) are established under M.S. Chapter 103C. The purpose of an SWCD is to promote programs and policies that conserve the soil and water resources within its boundary. They generally work in conjunction with the Natural Resources Conservation Service (NRCS). Priority concerns for the District include water and wind erosion. As a result, they are frequently involved with the implementation of practices that reduce or prevent erosion, sedimentation, siltation, and agricultural-related pollution. Districts frequently act as local sponsors for many types of water management projects, including grassed waterways, drainage ditches, flood retarding dams, on-farm terracing, erosion control structures, and other water-related projects. They also are actively involved in the administration of the Wetland Conservation Act (WCA) and various educational programs that promote soil and water conservation.

All four counties in the NFCRWD have active SWCDs. For more information on SWCD activities in the NFCRWD, please contact the following:

Kandiyohi County SWCD: www.co.kandiyohi.mn.us/swcd
Meeker County SWCD: www.co.meeker.mn.us
Pope County SWCD: www.popeswcd.org
Stearns County SWCD: www.stearnscountyswcd.net

State Agencies

Minnesota Board of Water and Soil Resources (BWSR)

In 1986, the Minnesota State Legislature established the Minnesota Board of Water and Soil Resources (BWSR), thus consolidating the functions of the Minnesota Soil and Water

Conservation Board, Minnesota Water Resources Board, and Southern Minnesota Rivers Basin Council. BWSR's duties include oversight of programs and funding of the State's SWCDs, formation and guidance of watershed districts, directing and assisting counties in developing their Comprehensive Local Water Plans, and implementation of the Minnesota Wetland Conservation Act (WCA). BWSR is the State agency that is responsible for reviewing and approving water management plans.

For more information on BWSR activities in the NFCRWD, please contact the following:

Minnesota Board of Water and Soil Resources: www.bwsr.state.mn.us

Minnesota Department of Agriculture (MDA)

The Minnesota Department of Agriculture (MDA) is responsible for ensuring the safety of agricultural related products in the State. The agency is involved in several water resource management activities and programs. The Agricultural Best Management Practices Loan Program provides low interest financing to farmers, agriculture supply businesses, and rural landowners to encourage agriculture best management practices that prevent or mitigate nonpoint source pollution. The MDA also offers a program to homeowners to monitor nitrates in their drinking water, as well as assists in a program to collect and dispose of agricultural pesticide containers.

For more information on MDA activities in the NFCRWD, please contact the following:

Minnesota Department of Agriculture: www.mda.state.mn.us

Minnesota Department of Health (MDH)

The Minnesota Department of Health (MDH) is the State's lead public health agency and works with governmental and other organizations to protect the health of communities. The MDH has permit and regulatory authority for the construction of wells and for monitoring public water supply facilities, as required by the Safe Drinking Water Act (SDWA). These facilities include water wells, surface water intakes, water treatment and water distribution for public use. Currently, through source water protection requirements of the SDWA, the MDH is assisting public water suppliers in developing Wellhead Protection Plans. In addition, the MDH is also involved in the Upper Mississippi River Source Water Protection Project; the cities of St. Cloud, St. Paul, and Minneapolis draw their drinking water from the Mississippi River.

For more information on MDH activities in the NFCRWD, please contact the following:

Minnesota Department of Health: www.health.state.mn.us

Minnesota Department of Natural Resources (DNR)

The Minnesota Department of Natural Resources (DNR) has both regulatory and enforcement authority over natural resource programs of the State. The principal divisions of the DNR include Ecological Services, Enforcement, Fisheries, Forestry, Lands and Minerals, Parks and Recreation, Trails and Waterways, Waters and Wildlife. The DNR has permit authority over watershed district projects that impact Protected Waters of the State. The DNR is also actively involved in helping local units of government administer floodplain management ordinances and standards.

For more information on DNR activities in the NFCRWD, please contact the following:

Minnesota Department of Natural Resources: www.dnr.state.mn.us

Minnesota Department of Transportation (MnDOT)

The Minnesota Department of Transportation (MnDOT) is responsible for the administration of Federal and State highway systems. Since many highway systems cross natural and artificial waterways, there is frequent interaction between the County and MnDOT. County projects that intersect regulated highways require approval by MnDOT. Conversely, MnDOT activities that have the potential to impact waters often require a County permit.

For more information on MnDOT activities in the NFCRWD, please contact the following:

Minnesota Department of Transportation: www.dot.state.mn.us

Minnesota Environmental Quality Board (EQB)

The Minnesota Environmental Quality Board (EQB) has final authority on permits involving a wide range of construction activity throughout the State. The EQB is comprised of the commissioners of State agencies, the chairmen of State boards, and five citizens members. The EQB is responsible for the oversight of Environmental Assessments Worksheets (EAWs) and Environmental Impact Statements (EISs) that are written for specific project proposals.

For more information on EQB activities in the NFCRWD, please contact the following:

Minnesota Environmental Quality Board: www.eqb.state.mn.us

Minnesota Geological Survey (MGS)

The Minnesota Geological Survey (MGS) is a unit of the Newton Horace Winchell School of Earth Sciences in the University of Minnesota. The MGS is the University outreach center for the science and technology of earth resources in Minnesota. The MGS conducts basic and applied earth science research, conveys that information to the public through publications and service activities, and promotes earth science education.

For more information on MGS activities in the NFCRWD, please contact the following:

Minnesota Geological Survey: www.geo.umn.edu/mgs

Minnesota Pollution Control Agency (MPCA)

The Minnesota Pollution Control Agency (MPCA) has both the regulatory and enforcement authority to protect the surface and ground waters of the State from pollution. Because many projects involve water quality considerations, the MPCA becomes an active participant in the watershed management activities. In March of 2003, the MPCA began implementation of the new Stormwater Phase II regulations. In addition, MPCA is also involved with other local governmental units, such as municipalities, in the construction and operation of wastewater treatment plants and the control of nonpoint source pollution. As previously discussed, the MPCA also takes the lead on listing 303 (d) impaired waters and oversees the corresponding TMDL study and implementation plan development.

For more information on MPCA activities in the NFCRWD, please contact the following:

Minnesota Pollution Control Agency: www.pca.state.mn.us

Federal Agencies

U.S. Army Corps of Engineers (USACE)

The U.S. Army Corps of Engineers (USACE) can potentially have permit and regulatory authority over projects in the County. Generally, areas of permit jurisdiction include the placement of fill or dredged material in wetlands and alterations or impacts to navigable waters. In addition, the USACE has been actively involved in project planning and construction.

For more information on USACE activities in the NFCRWD, please contact the following:

U.S. Army Corps of Engineers: www.usace.army.mil/Pages/default.aspx

U.S. Department of Agriculture (USDA)

There are two agencies in the U.S. Department of Agriculture (USDA) that the County commonly interacts with: the Natural Resources Conservation Service (NRCS) and the Farm Service Agency (FSA). The NRCS provides technical and financial assistance and engineering design services to the landowners. The NRCS's involvement in USDA program participation significantly benefits the County's water resources. The FSA participates in sponsoring and funding projects related to water and soil conservation.

For more information on USDA activities in the NFCRWD, please contact the following:

U.S. Department of Agriculture: www.usda.gov

U.S. Geological Survey (USGS)

The U.S. Geological Survey (USGS) is principally a data-gathering agency. Of particular interest to the County is the data collected by the agency related to water resources. Data collected by the USGS includes stream flow discharge, ground water levels, and water quality.

For more information on USGS activities in the NFCRWD, please contact the following:

U.S. Geological Survey: www.usgs.gov

U.S. Environmental Protection Agency (EPA)

The U.S. Environmental Protection Agency (EPA) is involved in the protection of the nation's air, soil, and water resources. Of particular interest, the EPA has had an expanding role in construction project activities of the MFCRWD. The agency has overview authority of the Stormwater Phase II regulations, as well as Section 404 permits issued by the USACE. EPA also has the right to review the USACE permit decisions.

For more information on EPA activities in the NFCRWD, please contact the following:

U.S. Environmental Protection Agency: www.epa.gov

U.S. Fish and Wildlife Service (USFWS)

The U.S. Fish and Wildlife Service (USFWS) is a key player in wildlife and wetland management in the nation. Among its many functions, the USFWS enforces Federal wildlife laws, protects endangered species, manages migratory birds, restores nationally significant fisheries, and conserves and restores wildlife habitat, especially wetlands. The USFWS has been involved in several wetland restoration projects in the watershed.

For more information on USFWS activities in the NFCRWD, please contact the following:

U.S. Fish and Wildlife Service: www.fws.gov

Special Interest Groups

Lake Associations

A lake association is an organized group of people who have a common interest in a specific lake. Lake associations serve as an organized voice of their members to township and county government and are often a watchdog for enforcement of local ordinances. Associations may also monitor lake conditions, develop management plans, educate shoreland property owners about individual and collective actions to protect a lake, and provide volunteers to assist in lake and watershed projects. They may also work with the DNR to improve fish habitat or fish stocking, get permits for aquatic plant removal, maintain lake accesses, or implement lakeshore stabilization projects.

Presently there are four lake associations in the District. These include Rice Lake, Lake Koronis, Pirz, and Grove Lake Associations. In 2003, the Rice and Koronis Lake Associations cooperated on developing an overall Lakeshed Management Plan. Many of the implementation steps identified in the Lakeshed Plan are compatible with the Goals, Objectives, and Policy Guidelines found in Chapter Three of this Watershed Plan. These lake associations have recently received a grant to update their plan. In addition, Pirz Lake also has published a lake management plan. For more information on the lake associations, visit the following websites:

Grove Lake: www.grovelakeassociation.com

Koronis Lake: www.lakekoronis.com/lake.html

Pirz Lake: <http://www.minnesotawaters.org/index.php?uberKey=1319>

Rice Lake: www.ricelakestearnsco.org/index.htm