

CHAPTER ONE: WATERSHED DISTRICT PROFILE

This chapter of the NFCRWD Overall Plan provides a physical and population profile of the Watershed District. Sections include information on the District's boundary, the North Fork Crow River Watershed, subwatersheds, and population projections.

Section A: Watershed and District Location

The North Fork Crow River Watershed District is located at the beginning of the North Fork of the Crow River northwest of Grove Lake in Pope County and ends where the Middle Fork and the North Fork come together southeast of the City of Manannah.

The headwaters of the North Fork Crow River (NFCR) are at Grove Lake in Pope County. The river flows relatively straight until it reaches northeast of Brooten, where it then begins to meander until it reaches the outlet of Lake Koronis. The average slope at the NFCR above Paynesville is approximately 5.1 feet per mile or 0.10% and from Paynesville to Manannah, the slope is approximately 3.2 feet per mile or 0.06%. The Watershed has a maximum elevation of 1,380 feet above mean sea level in Raymond Township, Stearns County, and a minimum elevation of 1,130 near Manannah.

The North Fork Crow River Watershed District is located in Pope, Stearns, Kandiyohi, and Meeker Counties in Central Minnesota. It is approximately 65 miles northwest of the Twin Cities and 30 miles southwest of St. Cloud. The location of NFCRWD, the political boundary, municipalities and major highways are displayed in Map One.

The North Fork Crow River flows southeasterly from Grove Lake of Pope County through a large portion of Stearns County, then into a small section of Kandiyohi County and then through Rice, Mud and Koronis Lakes. The District's boundary ends in Meeker County just southeast of the City of Manannah. A few other lakes, namely Tamarack, George, and Pirz Lakes are located within the NFCRWD but do not directly drain into the North Fork Crow River. The North Fork Crow River continues to flow outside the District, merging with the Middle Fork. The Middle Fork then merges with the South Fork, which turns into the Crow River near Rockford (a couple miles north of Deleno). The Crow River enters the Mississippi River near Albertville by the Minneapolis/St. Paul metropolitan area

The district has a total natural drainage area of approximately 348 square miles and encompasses over 48 miles of the North Fork Crow River (NFCR). However, the political or legal boundaries of the watershed district include only 304 square miles. The district includes 14 lakes having a total surface area of 10.4 square miles. The three major lakes with public access are Grove Lake, Lake Koronis and Rice Lake. Lake Koronis is the largest lake with a surface area over five square miles. The municipalities of Paynesville, Brooten, Regal, Elrosa, and the unincorporated

communities of Manannah, Padua, Georgeville, Hawick, and Grove Lake are located within the legal boundaries of this Watershed District. The Watershed District's area is distributed between each of the counties as follows:

Stearns County - 223.4 square miles (64%)

Pope County - 51.3 square miles (15%)

Kandiyohi County - 41.2 square miles (12%)

Meeker County – 32.2 square miles (9%)

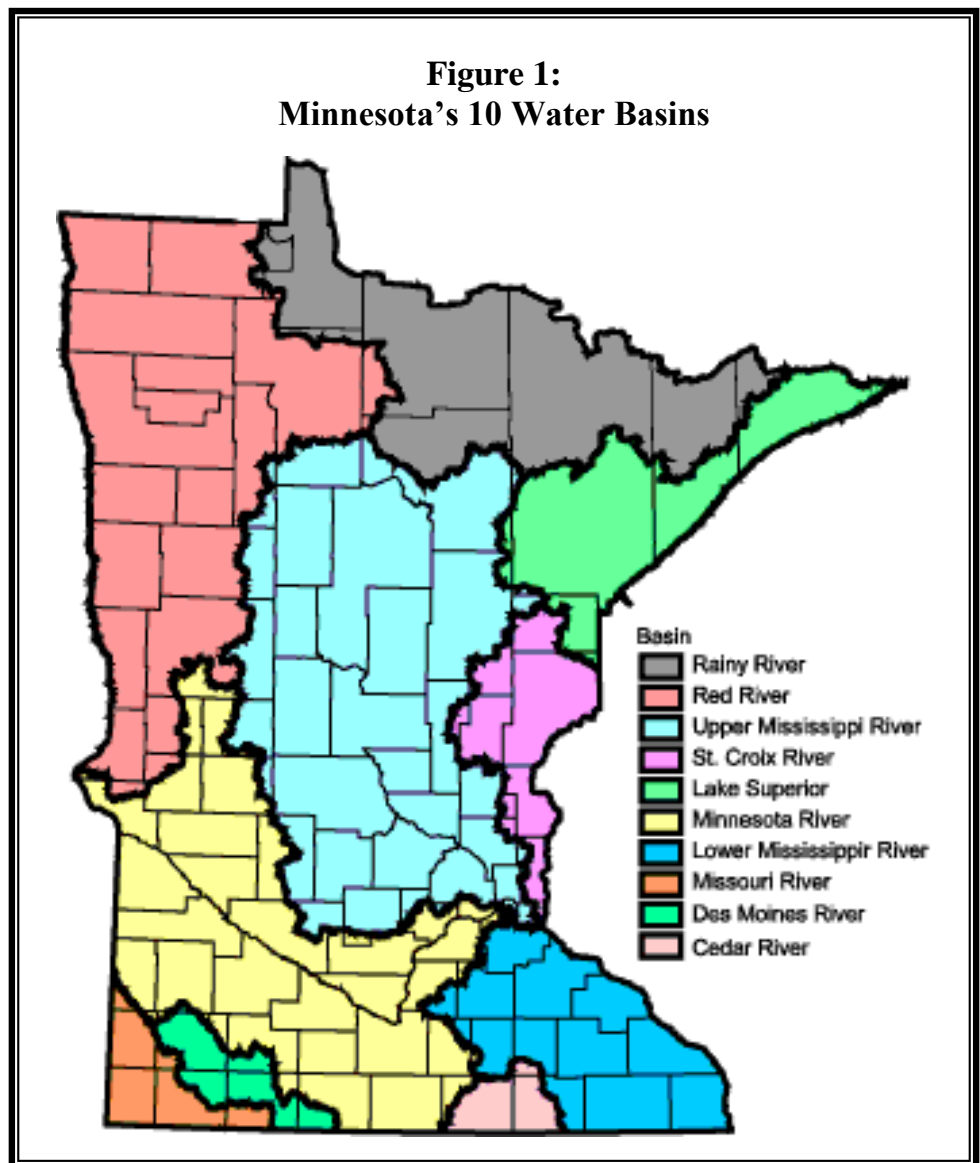
Total District – 348.1 square miles (100%)

Watersheds and Major Basins

The North Fork Crow River Watershed District is an administrative legal boundary, originally determined at the time the District was formed. As a result, the District's legal description mostly follows land survey boundaries, with delineation done on quarter-quarter section lines. The North Fork Crow River Watershed (not District), however, is not a political boundary, but rather a physical description of where water drains on a larger scale.

Figure 1 displays Minnesota's 10 major water basins. A basin (or drainage basin) is the area of land drained by a river or lake and its tributaries. Each drainage basin is made up of smaller units

Continued on page 5...



**Map 1A:
Watershed District
With Subwatersheds
11" by 17" foldout**

**Map 1A:
Watershed District
With Subwatersheds
(back)**

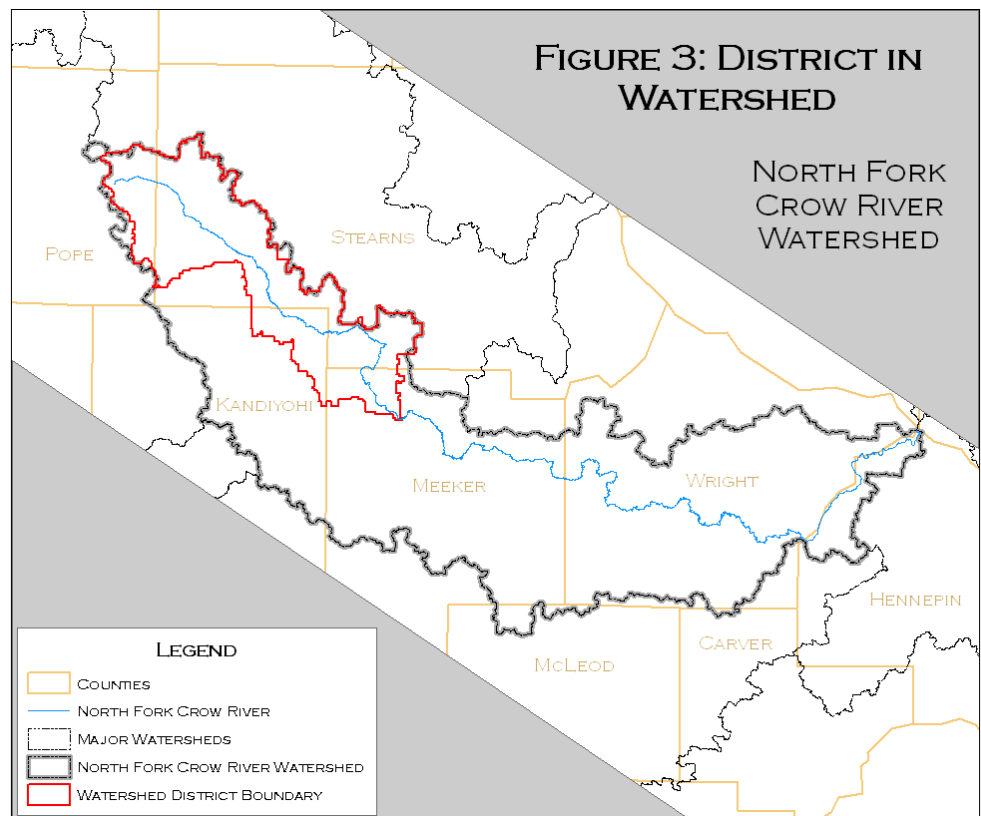
called watersheds, which correspond to the drainage of a tributary or lake system. Figure 2 displays Minnesota’s 81 major watersheds according to the Minnesota Department of Natural Resources (Figure 2 is labeled to 84, but numbers 6, 45, and 64 are missing). The North Fork Crow River Watershed is part of the Upper Mississippi River Water Basin. Notice in Figure 2 that the North Fork Crow River Watershed is labeled as number 18, which corresponds with the Minnesota Common Stream and Watershed Number System (MN DNR, 1981).

Minor Watersheds or “Subwatersheds”

According to the Minnesota DNR, the North Fork Crow River Watershed is further divided into 87 smaller areas called minor watersheds, commonly referred to as “subwatersheds”. According to the United States Geological Survey (USGS), the watershed contains 118 subwatersheds. Regardless of the correct number, subwatersheds refer to areas that normally contain a lake (or ‘lakeshed’), drainage system, or smaller water feature, such as a stream or series of wetlands. Table 1A displays a list of the subwatersheds, and shows the difference between the DNR and USGS numbering system. Appendix B contains subwatershed maps printed from the USGS database.

North Fork Crow River Watershed

The complete North Fork Crow River Watershed drains approximately 1,478 square miles, compared to the Watershed District’s 348 square miles. The Watershed contains 559 lakes covering 61,941 acres, and an additional 17,330 acres of wetlands. In 2000, the Watershed’s population was approximately 99,476 people. Appendix B contains a number Watershed maps and corresponding data.



**Table 1A:
North Fork Crow River
Watershed District Minor or Subwatersheds**

ID Number	U.S.G.S Database	'Common Name'	Area (Sq. Mi.)
18001	1800100	NFCR above JD #1	14.64
18002	1800200	Sedan Brook	29.01
18003	1800300	JD #1	14.61
18004	1800400	Skunk River	33.33
18025	1802500	Tributary to Lake Koronis	6.88
18026	1802600	Lake Koronis	19.48
18027	1802700	Tributary to Lake Koronis	10.25
18036	1803600	Tributary to NFCR	15.58
18037	1803700	NFCR above 1803600	0.17
	1803701		16.55
18042	1804200	Tributary (CD #5) to NFCR	9.67
18043	1804300	NFCR to Rice Lake	4.93
	1804301		0.47
	1804302		0.41
	1804303		14.02
	1804304		0.49
18055	1805500	NFCR above MFCR	8.00
	1805501	NFCR above 1805600	4.19
18056	1805600	Ditch to NFCR	6.98
18064	1806400	Rice Lake	16.08
18065	1806500	Tributary to NFCR	6.09
18066	1806600	NFCR above 1806500	16.50
	1806601		2.17
18067	1806700	Tributary to NFCR	8.89
18068	1806800	NFCR above Skunk River	10.13
	1806801	NRCR above CD #7	0.50
18069	1806900	CD #7	8.37
18070	1807000	CD #7	9.93
18071	1807100	NFCR above CD #7	3.16
	1807101	NFCR above Sedan Brook	1.94
	1807102	NFCR above CD #32	4.56
18072	1807200	CD #32	18.05
18085	1808500	Grove Lake	14.46
Total			330.49

**Figure 2:
Water Basins &
Watersheds of Minnesota
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Front**

**Figure 2:
Major Water Basins &
Watersheds of Minnesota
Back**

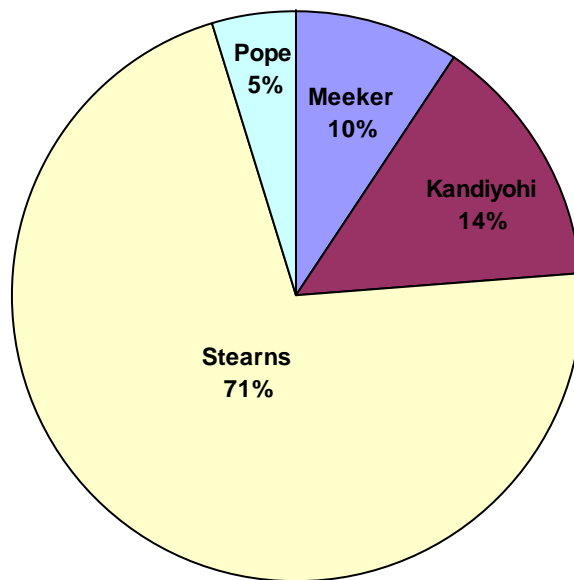
**Section B:
Population Profile of the Watershed District**

The North Fork Crow River Watershed District consists of four cities and nineteen townships located in Kandiyohi, Meeker, Pope, and Stearns Counties. The State Demographer annually produces population estimates for all cities, townships, and counties in Minnesota. The most recent report published for 2007 estimates the Watershed District having approximately 13,504 residents. Table 1B shows how this total was reached, along with the percentage of District residents by county. Table 1C provides population data for each city and township from 1980 to 2007. Notice the Watershed District has grown by 527 since 1980. Table 1D provides population estimates based upon historic gain/losses.

**Table 1B:
North Fork Crow River Watershed District
2007 Population and Percentage by County**

Location	2007	Percent
Kandiyohi County	1,941	14%
Meeker County	1,288	10%
Pope County	633	5%
Stearns County	9,642	71%
2007 Total	13,504	100%

**Figure 1A:
North Fork Crow River Watershed District
2007 Population Percentage by County**



**Table 1C:
North Fork Crow River Watershed District
Population by Cities and Townships**

Location	1980	1990	2000	2007*	+ / -
<i>Kandiyohi County</i>					
Burbank Township**	405	427	510	537	132
Irving Township**	699	571	787	777	78
Regal City	70	51	40	38	-32
Roseville Township**	541	485	570	589	48
<i>Kandiyohi County Subtotal</i>	1,715	1,534	1,907	1,941	226
<i>Meeker County</i>					
Manannah Township**	628	611	610	644	16
Union Grove Township**	616	612	625	644	28
<i>Meeker County Subtotal</i>	1,244	1,123	1,235	1,288	44
<i>Pope County</i>					
Bangor Township**	234	232	217	222	-12
Grove Lake Township**	314	247	268	260	-54
Lake Johanna Township**	189	176	151	151	-38
<i>Pope County Subtotal</i>	737	655	636	633	-104
<i>Stearns County</i>					
Brooten City	647	589	649	619	-28
Crow Lake Township**	444	390	345	366	-78
Crow River Township**	417	387	352	382	-35
Eden Lake Township**	1,227	1,230	1,526	1,577	350
Elrosa City	214	205	166	170	-44
Getty Township**	463	420	405	434	-29
Lake George Township**	479	388	371	391	-88
Lake Henry Township**	453	349	330	366	-87
North Fork Township	304	289	253	284	-20
Paynesville Township**	1,167	1,307	1,376	1,526	359
Paynesville City	2,140	2,275	2,267	2,273	133
Raymond Township**	308	239	255	296	-12
Spring Hill Township**	499	438	438	470	-29
Zion Township**	519	443	388	488	-31
<i>Stearns County Subtotal</i>	9,281	8,949	9,121	9,642	361
Watershed District Total	12,977	12,361	12,919	13,504	+ 527

* State Demographer Estimates. ** Township is only partially located within the District.

**Table 1D:
North Fork Crow River Watershed District
Population Projections by Cities and Townships**

Location	2007*	2010	2015	2020	+ / -
<i>Kandiyohi County</i>					
Burbank Township**	537	603	636	669	132
Irving Township**	777	816	835.5	855	78
Regal City	38	22	14	6	-32
Roseville Township**	589	613	625	637	48
<i>Kandiyohi County Subtotal</i>	1,941	2,054	2,111	2167	226
<i>Meeker County</i>					
Manannah Township**	644	652	656	660	16
Union Grove Township**	644	658	665	672	28
<i>Meeker County Subtotal</i>	1,288	1,310	1,321	1,332	44
<i>Pope County</i>					
Bangor Township**	222	216	213	210	-12
Grove Lake Township**	260	233	220	206	-54
Lake Johanna Township**	151	132	123	113	-38
<i>Pope County Subtotal</i>	633	581	555	529	-104
<i>Stearns County</i>					
Brooten City	619	605	598	591	-28
Crow Lake Township**	366	327	308	288	-78
Crow River Township**	382	365	356	347	-35
Eden Lake Township**	1,577	1,752	1,840	1,927	350
Elrosa City	170	148	137	126	-44
Getty Township**	434	420	412	405	-29
Lake George Township**	391	347	325	303	-88
Lake Henry Township**	366	323	301	279	-87
North Fork Township	284	274	269	264	-20
Paynesville Township**	1,526	1,701	1,795	1,885	359
Paynesville City	2,273	2,340	2,373	2,406	133
Raymond Township**	296	290	287	284	-12
Spring Hill Township**	470	456	448	441	-29
Zion Township**	488	473	465	457	-31
<i>Stearns County Subtotal</i>	9,642	9,823	9,913	10,003	361
Watershed District Total	13,504	13,475	13,461	13,446	-58

* State Demographer Estimates. ** Township is only partially located within the District.

Section C: Topography, Geology, and Soils

Topography

The North Fork Crow River (NFCR) has its source at Grove Lake in Pope County. The River flows in a relatively straight manner to a point northeast of Brooten, where it starts to meander. The average slope at the NFCR above Paynesville is approximately 5.1 feet per mile (or 0.1%). From Paynesville to Manannah in Meeker County, the slope is approximately 3.2 feet per mile (or 0.06%). The Watershed has a maximum elevation of 1,380 feet above mean sea level in Raymond Township (Stearns County), and a minimum elevation of 1,130 feet near Manannah.

The general topography of the District near Brooten is flat with marshy lands mixed throughout the western half of the District. The eastern half of the District is characterized by rolling hills and steeper banks next to waterways. Stearns County is mostly an undulating plain, where the surface drainage pattern is young, shallow and closed depressions are common with outwash plains nearly level. Large areas of the glacial till plain in the western part of the county are nearly level with the northeast part of Stearns County having large outcrops of granite.

The northern half of Kandiyohi County is part of the Alexandria Moraine Complex. A large outwash plain adjoins the terminal moraine in the north-central part of the county. The southern half of the county is a till plain formed during the advance of the Des Moines Lobe. The drainage network in the county began to form as the glacial ice melted about 10,000 years ago. County ditches, field ditches and tile lines in the southern part of the county have augmented the natural drainage network.

Geology

Geologic characteristics of the North Fork Crow River Watershed District consist of surficial deposits and a lower bedrock formation. The surficial deposits resulted from the most recent Pleistocene ice advance including the Des Moines Lobe, which crossed the region northwest to southeast and the Wadena Lobe which deposited material in an earlier advance from the north and forms the subsurface deposits of the District.

The District lies in three geomorphic regions: (1) The Osakis Till Plain, (2) The Belgrade-Glenwood Outwash, and (3) The Alexandria Moraine Complex. The Osakis Till Plain extends from Paynesville throughout the area on the northeast side of the NFCR. The Belgrade-Glenwood Outwash Plain is located southwest of the NFCR and an Alexandria Moraine Complex lies in a narrow strip along the southeastern edge of the District. Metamorphic and igneous rocks form the lowermost geologic unit in Meeker County. The rocks are mainly granites, gneisses and schists of Precambrian age. Meeker County lies in an area where several glaciers advanced and retreated during the great ice age. The ice age began about 2 million years ago and ended about 10,000 years ago. As the ice melted, sediment carried on and in the ice was deposited as moraines, outwash plains, stream terraces and lake plains.

Soils

Following is a brief description of the characteristics of the specific soil types as found in the District and defined by the U.S. Dept. of Agriculture in each of County's soil surveys. ***Appendix B contains a number of maps with soils information.***

Clarion-Canisteo-Nicollet Association: This association consists generally of well drained, gently sloping soils, but there are some small, level, moderately well drained and poorly drained areas and very poorly drained depression areas and some small, steep sloping areas. About 65% of this association is subject to erosion and can be controlled by use of strip cropping, contour farming and crop residue management.

Estherville-Muck Association: This association consists mainly of excessively drained level soils. About 80% of this association is subject to drought and soil blowing. Strip cropping, field shelterbelts, crop residue management and minimum tillage can control wind erosion.

Estherville-Hawick Association: The soils making up this association are on broad, nearly to level and undulating outwash plains and stream terraces. Soils are suited to use as pasture and as windbreaks. They are suited for building site development, but there is a hazard of pollution to underground water supplies and nearby lakes and streams if septic tank absorption fields or other sanitary facilities are placed in areas of this association.

Regal-Osakis Association: The soils making up this association are on nearly level outwash and stream terraces dissected by many drainage ways. The soils are well suited to use as pasture they have fair to poor suitability for windbreaks because of the seasonal high water table. They also have fair to poor suitability for building site development because of the seasonal high water table. There is a hazard of ground water pollution if sanitary facilities are placed on these soils.

Koronis-Marcellon Association: Soils making up this association are on nearly level and gently sloping ground moraines that have rolling and moderately steep slopes. Controlling erosion, removing excess water from the wet soils and maintaining tilth and fertility are the main concerns in management. The soils have good to fair suitability for pasture and woodland. Wetness, frost action and low strength are the main limitations if these soils are used for building site development.

Normania-Flom Association: Soils making up this association are on nearly level to undulating ground moraines that have broad convex rises on knolls. The soils are well suited to use as pasture, but they have fair to poor suitability for windbreaks and environmental plantings because of the seasonal high water table. They have fair to poor suitability for building site development because of wetness, frost action, low strength and the moderate shrink-swell potential.

Roliss-Flom Association: Soils making up this association are on nearly level ground moraines. Maintaining tilth and fertility are also concerns. The soils are well suited to use as pasture, but they are poorly suited for windbreaks and environmental plantings because of the seasonal high water table. They are poorly suited to building site development because of wetness, low strength for supporting foundations, frost action and the moderate shrink-swell potential.

Koronis-Hawick-Sunburg Association: This association is found on ground moraines characterized by scattered pockets of collapsed outwash and many areas of water or organic soils in small basins. Land in this area is used as woodland or pasture and soils of are unsuited for cultivated crops because of the slope or drought. The soils of this association are well suited for recreational and wildlife habitat use and are well suited for the development of paths and trails. Soils of this association are poorly suited to building site development and sanitary facilities because of the slope and the coarse textured underlying material.

Wadenill-Sunburg-Delft Association: Soils occupy gently undulation to hilly regions, which are well to poorly drained. The main management concerns are controlling erosion on the sloping soils and improving the drainage of wet soils. The undrained marshes provide excellent wildlife habitat.

Wadenill-Swedegrove-Muskego Association: Soils making up this association are on moraines. The position of the moraine is backslopes and summits, rims of depressions, and large depressions.

Koronis-Forestcity-Houghton Association: Soils making up this association are on moraines. The position of the moraines is on backslopes and summits, foot slopes and narrow drainage ways, and large depressions.

Koronis-Houghton-Forestcity Association: Soils making up this association are on moraines. The position of the moraines is on backslopes and summits, large depressions, and foot slopes and narrow drainage ways.

Kanaranzi-Estherville-Biscay Association: Soils making up this association are on outwash plains and terraces. The position of the outwash plains and terraces are on slight rises, backslopes, flats and drainage ways.

Fieldon-Litchfield-Dassel Association: Soils making up this association are on outwash plains, terraces, and deltas. The position of the outwash plains, terraces, and deltas are on rims of depressions, flats, and shallow depressions.

Cohoctah-Muskego-Estherville Association: Soils making up this association are on flood plains and terraces. The position of the flood plains and terraces are on flats, depressions, and backslopes, and summits.

**Map 1B:
Watershed District
Soils
11" by 17" foldout**

**Map 1B:
Watershed District
Soils
11" by 17" foldout
Back**

Section D: Surface Water Resources

Lakes

Grove Lake, Rice Lake and Lake Koronis are the three major recreational lakes in the District that are valuable natural resources of the District providing recreation of various kinds, habitat for fish and wildlife and aesthetic values for the people living near these lakes. In addition, Mud and Pirz Lakes are profiled.

Grove Lake

Grove Lake, located in eastern Pope County is the headwaters of the North Fork Crow River. Grove Lake is an important recreational and fishing lake for residents of Pope, Stearns and other nearby counties. The Grove Lake has a total area of about 420 acres, a maximum depth of about 31 feet and one public access located on the southeast corner of the lake and a Township Park on the northeast side of the lake. Water levels in Grove Lake are controlled by a dam at the outlet.

Rice Lake

Rice Lake encompasses about 1,640 acres and has a maximum depth of about 40 feet. The Minnesota DNR operates two public access areas on Rice Lake. One is located on the southwestern shoreline; the second is located on the northwestern shoreline. Two resorts are located on the Lake: Fischer's Resort and the Morning Star Resort, both operating on a seasonal basis. No public parks are located on Rice Lake. Popular uses of Rice Lake include fishing, swimming, boating, sailing and water skiing.

Lake Koronis

Lake Koronis has a surface area of approximately 3,471 acres with a maximum depth of 132 feet. There are three public accesses on Lake Koronis: One is located on the east side of the lake on Highway 55, one located at the Lake Koronis Regional Park on the south shoreline and Veterans Park on the NE. There are two more accesses existing on the lake but they limited parking facilities. Contour lines on lake maps are visible to indicate the depth of the lake and various roadways surrounding the lake. Lake Koronis has two public parks: Lake Koronis Regional Park, which encompasses 62 acres, and the Veterans Park, located on the NE shoreline. Both have swimming beaches. In addition, there is a recreational trail around much of the lake. Two resorts are located on the lake. The lake level is controlled by a dam.

Mud Lake

Mud Lake is a narrow, long and shallow lake connecting Rice Lake to Lake Koronis. Mud Lake is approximately 146 acres of open water (315 acres with adjacent wetlands), and is about 1.63 miles long and 860 feet wide. The lowland area of Mud Lake is approximately 315 acres its length is about 2.75 miles with a width of about 2,310 feet. Its average depth varies between 3 to 7 feet. The normal water elevation of Rice Lake is about 1,123 feet and at Lake Koronis is about 1,122 feet. The inlet of Mud Lake (or the outlet of Rice Lake) is only 460 feet from the Rice Lake inlet and the Mud Lake outlet (or the Lake Koronis inlet) is about 7,260 feet and 9,900 feet of shoreline distance from the Lake Koronis outlet.

Pirz Lake

Pirz Lake is situated in Eden Lake Township in Stearns County with its north border just off of County Road 123 and its Southwestern outlet running under 244th Street. Pirz Lake is 67 acres of water surface with a perimeter of 2.2 miles and a total length of just under a mile. At its widest point during spring, it does not exceed 1,000 ft. in width. Its bottom topography resembles the keel of a sailing ship with its deepest point at the dagger board of 42 ft. and rapidly rising both toward the stern and the bow. The northern end of the lake is less than 5 ft. deep for about 100 to 125 ft. The southern end of the lake has a depth of about 0 to 5 ft. for about 25 to 30 ft. The perimeter of the lake is primarily sedimentary with no known rock formation at any level. Lilly pad and coontail formations are evident around the perimeter of the lake.

North Fork Crow River

The North Fork Crow River has its headwaters in Pope County near Grove Lake and travels approximately 48 miles before it reaches Rice and Koronis Lakes in Stearns County. This is the portion included in the North Fork Crow River Watershed District. From Lake Koronis, the River flows an additional 125 miles until it joins the Mississippi River at Dayton. The North Fork is small, shallow and fairly clean from the Lake Koronis Spillway to Kingston. The river deepens and widens downstream from Kingston, meandering in a floodplain that is sometimes more than a mile wide. The river is even broader and deeper as the North and South forks join near Rockford, thereafter turning into the Crow River.

The North Fork was once flanked by the "big woods," a thick forest of maple, basswood, elm and other hardwoods. The River is now bordered by agriculture, prairie and hardwood vegetation. The Crow River was named by the Ojibwa Native Americans for the bird they called the "marauder of newly planted corn." Considered a sacred hunting ground by the Indians, the forest later attracted white trappers. Today there is still abundant fish and wildlife in the river corridor. Portions of the North Fork of the Crow River have been designated as a "wild and scenic river." This primarily refers to the River's free-flowing characteristic and above average water quality. As a result of the designation, portions of the river have some limited development regulations.

Although the District contains approximately 48 miles of the North Fork Crow River, the District also includes a number of natural streams and ditches that enter into the River from its headwaters to Rice Lake. Table 1E shows the District actually encompasses approximately 360 total miles of stream networks (including both natural streams and drainage ditches).

**Table 1E: North Fork Crow River
Watershed District Stream Network
above Rice Lake (Stearns County)**

	Miles	Number of Reaches
Natural Streams	240.86	527
Drainage Ditches	119.96	158
Total Stream Network	360.82	685

Drainage Ditches

The NFCRWD has drainage authority for the ditch systems listed below located within the boundaries of the Watershed District. Map 1B shows the location of each drainage system within the District.

Judicial Ditch 1 (Pope/Stearns Counties JD1)

This system was constructed from 1907-1910 and turned over to the WD in 1992. The length is 42 miles and the system accepts drainage from an area of 25,000 acres. In 1999, a redetermination of benefits was completed, and major repairs were begun in 2000.

Judicial Ditch 2 (Kandiyohi/Stearns Counties JD-2)

This 10,710 foot drainage system was constructed in 1909 and turned over to the WD in 1996. Repairs were completed on JD-2 south of Highway 55 in 1997

County Ditch 3 (Stearns County CD-3)

One of the oldest systems in the WD, CD-3 was constructed in 1899 and turned over to the WD in 2000. The total length of the system is 7,000 feet. Repairs were requested in 2001, but after a meeting to discuss the project costs, the landowners did not want to incur the expense at that time.

County Ditch 4 (Meeker County CD-4)

The CD-4 drainage system was constructed in 1918 and turned over to the WD from Meeker County in 2003. Maintenance on this system was done in 2007. In 2010 an informational meeting will be held on the possible re-determination of benefits for this system. A redetermination of benefits would bring in acres from the JD-11 tile system which outlets into CD-4 and are currently not accessed.

County Ditch 5 (Stearns County CD-5)

The WD was given control of this system in 1995. Stearns County Ditch 5 was constructed in 1907 and has a total length of 48,430 feet. CD-5 had a redetermination of benefits completed in 1996. Areas needing repair were determined, with repairs starting in 1999 and completed in 2000.

County Ditch 7 and 7A (Stearns County CD-7)

Construction of this 33,580 foot system was done in 1901 with an improvement in the early 1980's and the system was turned over to the WD in 1998. Repairs were done in 1998-2000.

County Ditch 8 (Stearns County CD-8)

This 8,700 foot system was turned over to the WD in 2000. CD-8 acts as the outlet of CD-32. There are some questions as to how the benefits of CD-8 and CD-32 are combined. There has been no recent activity on this system.

County Ditch 21 (Stearns County CD-21)

After repairs in 1985, this system was turned over to the WD in 1996. The system was originally constructed in 1905 and has a length of 11,800 feet. CD-21 had a redetermination of benefits in 1999. Repairs to the system were made in 2000.

**Map 1C:
Watershed District
Drainage Map
11" by 17" foldout
Front**

**Map 1C:
Watershed District
Drainage Map
11" by 17" foldout
Front**

County Ditch 29 (Stearns County CD29)

CD-29 was originally constructed in 1906, with a total length of 36,960 feet. CD-29 was improved from 1985 to 1988. Before the system was turned over to the WD, a water holding structure was installed by Stearns County in the sub-main of CD-37 which flows into ditch 29, as part of a wetland mitigation project with the Army Corps. The part of the sub-main from the holding structure to CD-29 is now included in the benefited acres of CD-29. In 2000, the system was turned over to the WD.

County Ditch 32 (Stearns County CD-32)

CD-32 was constructed in 1911 with a length of 40,210 feet. It has both tile and open ditch. An improvement was done in 1985 by Stearns County. CD-32 was turned over to the WD in 1998. Maintenance was done on the system in 1999 and 2000. In 1999 a sheet pile structure was installed at the outlet of Banker's Lake to retain water levels in the wetland.

County Ditch 36 (Stearns County CD-36)

The system was originally built in 1916 and is 11, 280 feet in length. At the hearing, when this ditch was turned over to the WD in 1998, landowners made it clear that they did not want to spend money on repairs.

County Ditch 37 (Stearns County CD-37)

Originally constructed in 1916, this 36,960 foot system was turned over to the WD in 1995. A redetermination of benefits was started by Stearns County in the 1980's but never completed. Repairs were conducted on the system from 1998-2000. A portion of this project was requested on the western end of the system by the city of Brooten due to the high water table in the area and reoccurring basement wetness.

County Ditch 38 (Stearns County CD-38)

This 14,560 foot tiled system was built in 1916. It was turned over to the WD in 1995 and repaired in 1996-1997.

County Ditch 40 (Meeker County CD-40)

This system was constructed in 1915 and was turned over to the District on April 8, 2003. It is being looked at for a possible redetermination of benefits

County Ditch 43 (Meeker County CD-43)

This system was constructed in 1915. This system was turned over to the WD in 2003. A redetermination of benefits of this system is being considered.

Wetlands

For regulatory purposes under the Clean Water Act, the term wetlands means those areas that are inundated or saturated by surface or ground water 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. Wetlands generally include swamps, marshes, bogs and similar areas.

A significant number of wetlands and storage ponds exist in the District and the majority of these wetlands are directly connected to the groundwater and the major aquifers in the area. Contaminated storm runoff reaching these wetlands could ultimately contaminate the groundwater resources of the region. Agricultural and urban runoff will have a significant impact on the potential degradation of these resources. The Wetlands Map shows the location of the District's wetlands according to the National Wetlands Inventory.

District Water Quality Monitoring

The North Fork Crow River Watershed District has maintained a water quality monitoring program since the formation of the District. Various sites on drainage ditches, tributaries and the North Fork Crow River have been monitored for flow and water quality. Testing parameters may include, but are not limited to, transparency, dissolved oxygen, pH, temperature, conductivity, total phosphorus, nitrogen, and suspended solids. Stream data has been used to assess the water quality of each stream. This has allowed the district to formulate a list of priority areas for targeted Best Management Practices. In the future, a sub-watershed approach to managing the resource will be utilized.

Monitoring sites have also been established on Grove, Koronis, Pirz and Rice Lakes. The District's 2009 Lake Monitoring Report for these lakes appears in Appendix D. Parameters tested at these sites include, but are not limited to, transparency, dissolved oxygen, pH, conductivity, Chlorophyll A, phosphorus, nitrogen, and suspended solids. All monitoring data collected each year is submitted to the Minnesota Pollution Control Agency and is available in their online database www.epa.gov/storet.

The NFCRWD also collects precipitation data from a network of citizens who read district provided rain gauges on a daily basis. The Minnesota Pollution Control Agency maintains continuous flow monitoring stations from time to time on the North Fork Crow River. Additional monitoring within the district by the MPCA, lake associations, and other organizations or agencies may take place. The monitoring program is periodically reviewed.

**Map 1D:
National Wetlands Inventory
11” by 17” foldout (front)**

**Map 1D:
National Wetlands Inventory
11" by 17" foldout (back)**