Tri-County Task Force
Flood Preparation and Planning Report
(Bottineau, McHenry, Rolette Counties)

Final
December 2007

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1.0 INTRODUCTION AND BACKGROUND

1.1 Description of Watershed

A watershed is an area of land that drains to a common point. Oak Creek is a watershed that drains into Willow Creek. Willow Creek is a larger watershed that drains into the Mouse (Souris) River. The Mouse (Souris) River watershed drains into Lake Winnipeg and from there to the Hudson Bay. These areas of land are constantly changing. What changes, as well as the rate of change, is affected by both natural and man-made causes. However, since there is little we can do about natural causes, we are left to focus on those of a human nature.

It is sometimes easiest to look at a functioning watershed as a balance scale. There are many interrelated variables that affect how a watershed functions. If you change one of them, the scale will swing to one side. When looking for solutions on how to lessen the impacts of flooding, you are really looking at ways to balance that scale back out again. The idea is not that human impacts to the watershed are wrong, but that through planning and conservation practices you can lessen the negative impacts and try to find that balance. That will go a long way to protecting us from the weather's unpredictable nature.

Oak Creek watershed, located in Bottineau County and portions of Manitoba, Canada, is a subwatershed of the much larger Willow Creek watershed, Hydrologic Unit 09010004 (Figure 1). As the Task Force looked into concerns around the flooding of Oak Creek, it was discovered that there were contributing factors from other subwatersheds of Willow Creek as well. Upon further investigation it was found that very little data (hydrologic, water quality, land use and cover, etc.) existed for any of the subwatersheds, and only very general data was available for the large Willow Creek watershed (1,128,900 acres). Oak Creek flows from Lake Metigoshe in the Turtle Mountains through the town of Bottineau (pop. 2,336; 2000 Census) and confluences briefly with Willow Creek before joining the Mouse (Souris) River. The Oak Creek watershed consists of roughly 156,800 acres (with approximately 23,000 acres above the Canadian border). The data that follows is for Willow Creek watershed, of which Oak Creek watershed is a small part.

<u>Ecoregion</u>

The Willow Creek watershed is located in the Northern Glaciated Plains ecoregion which is characterized by a flat to gently rolling landscape composed of glacial till. The subhumid conditions foster a grassland transitional between the tall and shortgrass prairie. More detailed sub-ecoregions (Figure 2) within this watershed include the Turtle Mountains (46b), Glacial Lake Basins(46c), Glacial Lake Deltas(46d), and Northern Black Prairie(46g).

Turtle Mountain sub-ecoregion (46b), it consists of an undulating landscape and with numerous lakes. This region receives about 10 inches more of precipitation than the surrounding drift plains; thus it supports a forest cover of aspen, birch, burr oak, elm, and ash. The forest soils are erodible and poorly suited for cropland, though there is some clearing for pastureland.

The Glacial Lake Basin sub-ecoregion(46c) was once occupied by Lake Souris during the Pleistocene. The smooth topography of the Glacial Lake Basins, even flatter than the

surrounding drift plains, resulted from the slow buildup of water-laid sediments. The level, deep soils on the lake plains are intensively cultivated.

The Glacial Lake Delta sub-ecoregion(46d) was deposited by rivers entering glacial lake basins (e.g. Glacial Lake Souris). The heaviest sediments, mostly sand and fine gravel, formed delta fans at the river inlets. As the lake floors were exposed during the withdrawal of the glacial ice, wind re-worked the sand in some areas into dunes. In contrast to the highly productive glacial lake plains, the dunes in the delta areas have a thing vegetative cover and a high risk for wind erosion. These areas are used mainly for grazing or irrigated agriculture.

The Northern Black Prairie sub-ecoregion(46g) represents a broad phonological transition zone marking the introduction from the north of boreal influence in climate. Aspen and birch appear in wooded areas, willows grow on wetland perimeters, and rough fescue becomes evident in grassland associations. This sub-ecoregion has the shortest growing season and the lowest January temperature of any sub-ecoregion in the Dakotas. Most of the area is used for growing small grains.

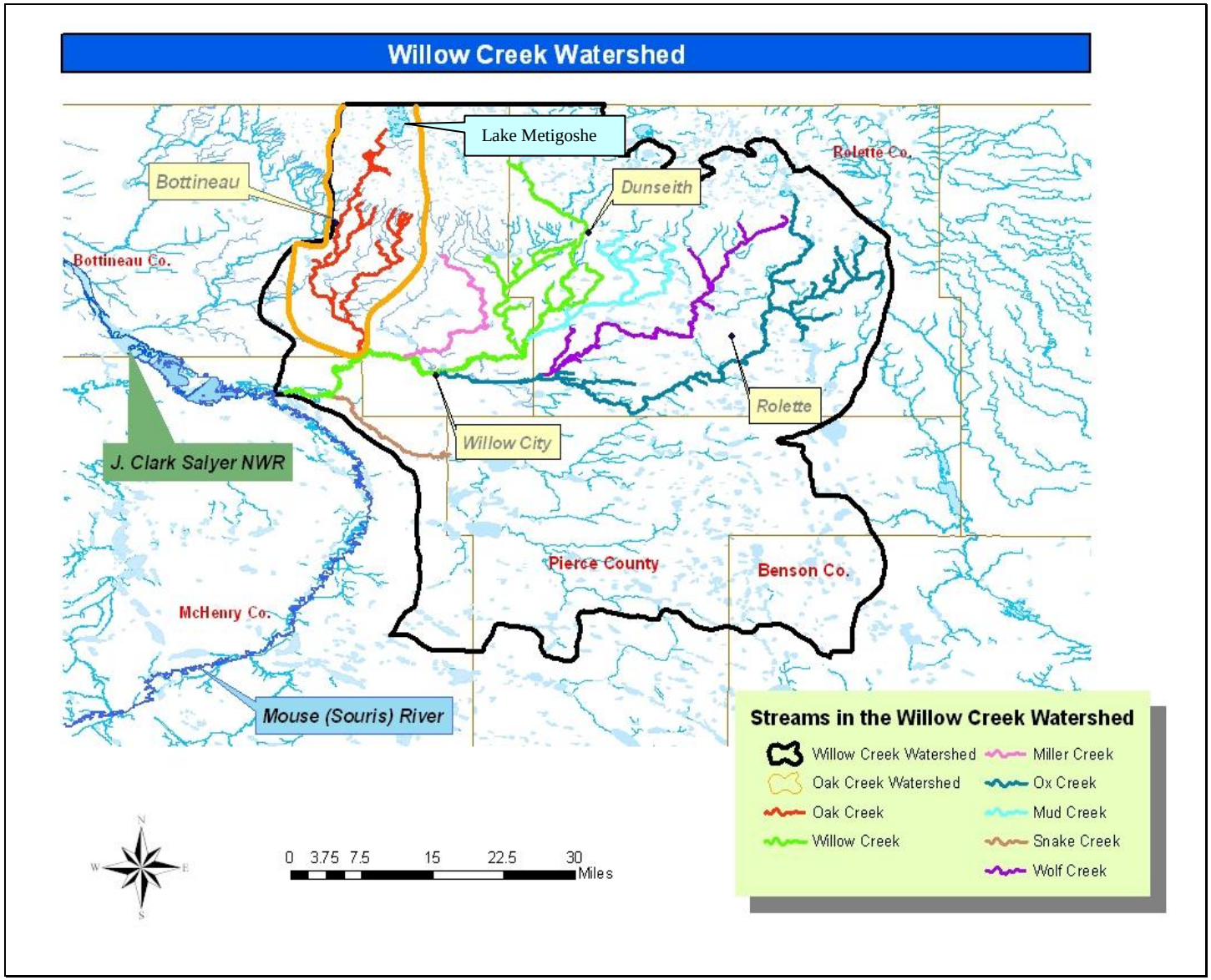


Figure 1. Willow Creek Watershed Showing Oak Creek Subwatershed (estimated).

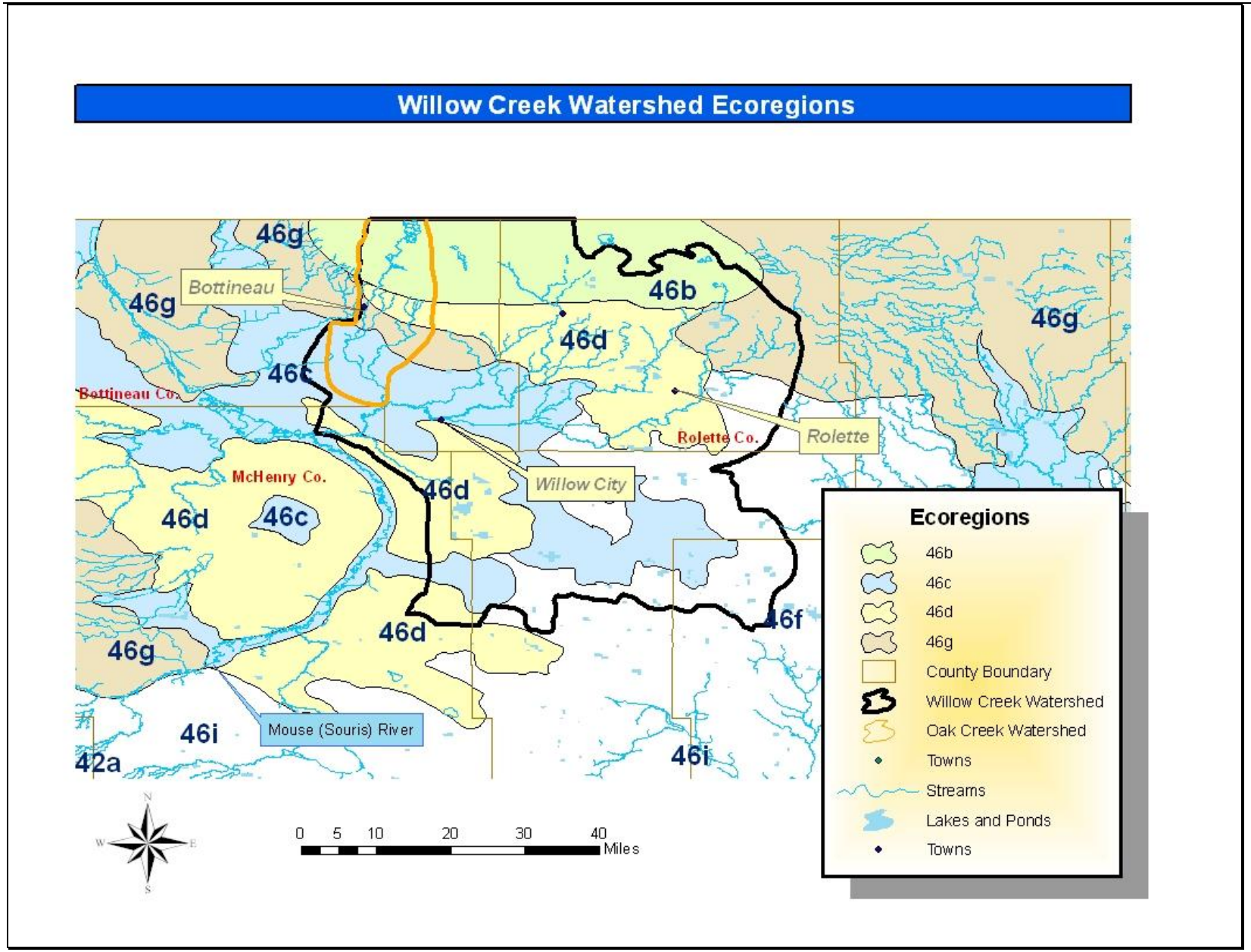


Figure 2. Willow Creek Ecoregions

1.2 Topography

Topography in the watershed includes platforms of hummocky, rolling terrain above the surrounding drift plains where the stream network is lacking and there are a high concentration of large lakes and wetlands (Turtle Mountain sub-ecoregion); very level glacial lake floors (Glacial Lake Basin sub-ecoregion); flat sheets of sand and gravel or rolling sand dunes and a paucity of stream channels (Glacial Lake Delta sub-ecoregion); and generally flat with occasional "washboard" undulations and a high concentration of temporary and seasonal wetlands (Northern Black Prairie sub-ecoregion). Soils in the watershed consist mostly of mollisols with some entisolds. Common soil series found in the watershed are numerous but include Bottineau, Buse, Hegne, Fargo, Bearden, Hecla , Ulen, Arvilla, Barnes, Svea, Hamerly, and Parnell. The elevation in the Oak Creek watershed ranges from approximately 1500 to 2400 above msl.

1.3 Landuse/Landcover

Landuse in the Willow Creek watershed is primarily agricultural (Figures 3 and 4) Landuse around Lake Metigoshe consists of both seasonal and year-round dwellings, resorts, and public use areas. The town of Bottineau is located approximately 13 miles downstream of Lake Metigoshe and is the primary urban area. The majority of crops grown include small grains and lentils, with pasture and hayland also being abundant. There is also a small timber industry established. Also located in the Oak Creek watershed are two sewage treatment lagoons, two golf courses, and a small airport.

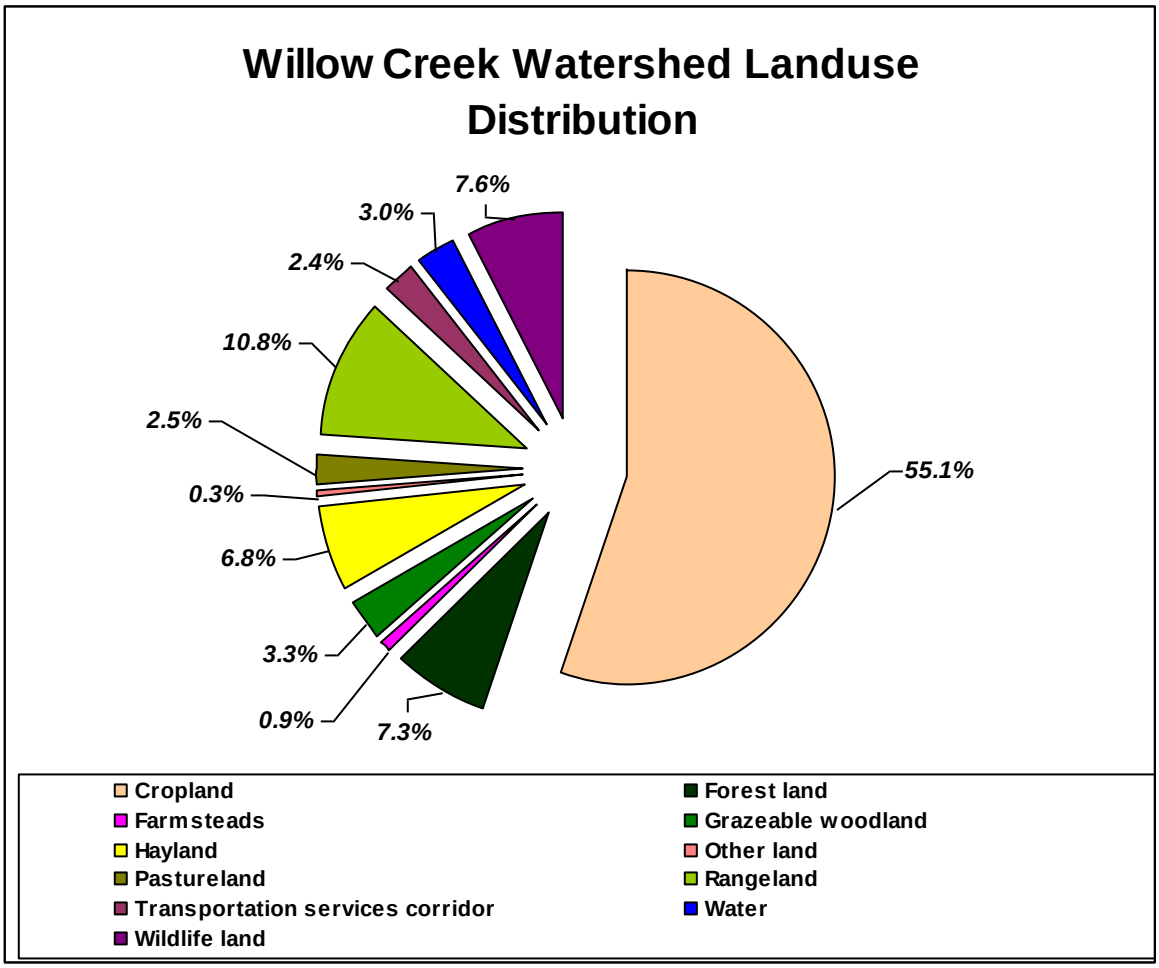


Figure 3. Distribution of Landuse in Willow Creek Watershed (1992 data).

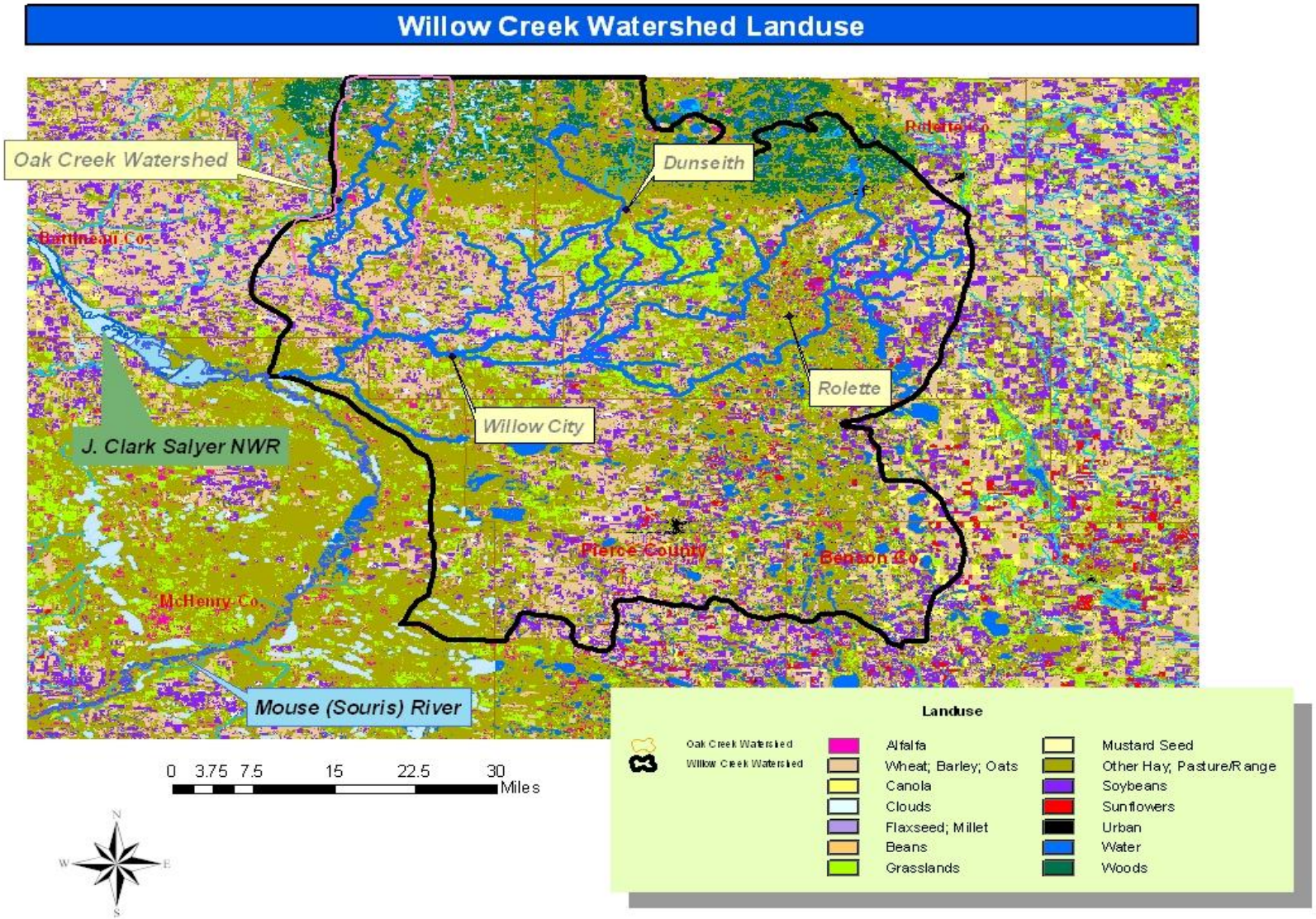


Figure 4. Landuse in the Willow Creek Watershed (2003 data).

1.4 Climate and Precipitation

Willow Creek watershed consists of a sub-humid climate characterized by warm summers with frequent hot weather and occasional cool days. Winters are very cold, influenced by arctic air surging over the area. For the Willow Creek watershed the mean annual precipitation ranges from 17 to 21 inches. Frost free days (mean annual) range from 95 to 120 and the mean January min/max temperature is -10/10(^{o}F), while the mean July min/max is 53/80 (^{o}F). See Tables 1 and 2 for a list of selected towns and their average precipitation and temperature. Table 2 can then be compared to Figures 5 and 6 showing the 2005 rainfall amounts.

Table 1. Normal Temperatures at Selected Towns (1971 – 2000).

Location	Maximum (^{o}F)	Mean (^{o}F)	Minimum (^{o}F)
Bottineau	49.3	37.7	26.0
Lake Metigoshe State Park	50.9	38..4	25.9
Upham	51.3	38.3	25.3
Rolla	46.4	36.7	27.0
Willow City	49.4	37.5	25.5

Table 2. Precipitation Normals for Selected Towns (1971 – 2000).

Location	Normal Precipitation (in.)
Bottineau	18.45
Lake Metigoshe State Park	20.88
Upham	17.79
Rolla	18.58
Willow City	17.17

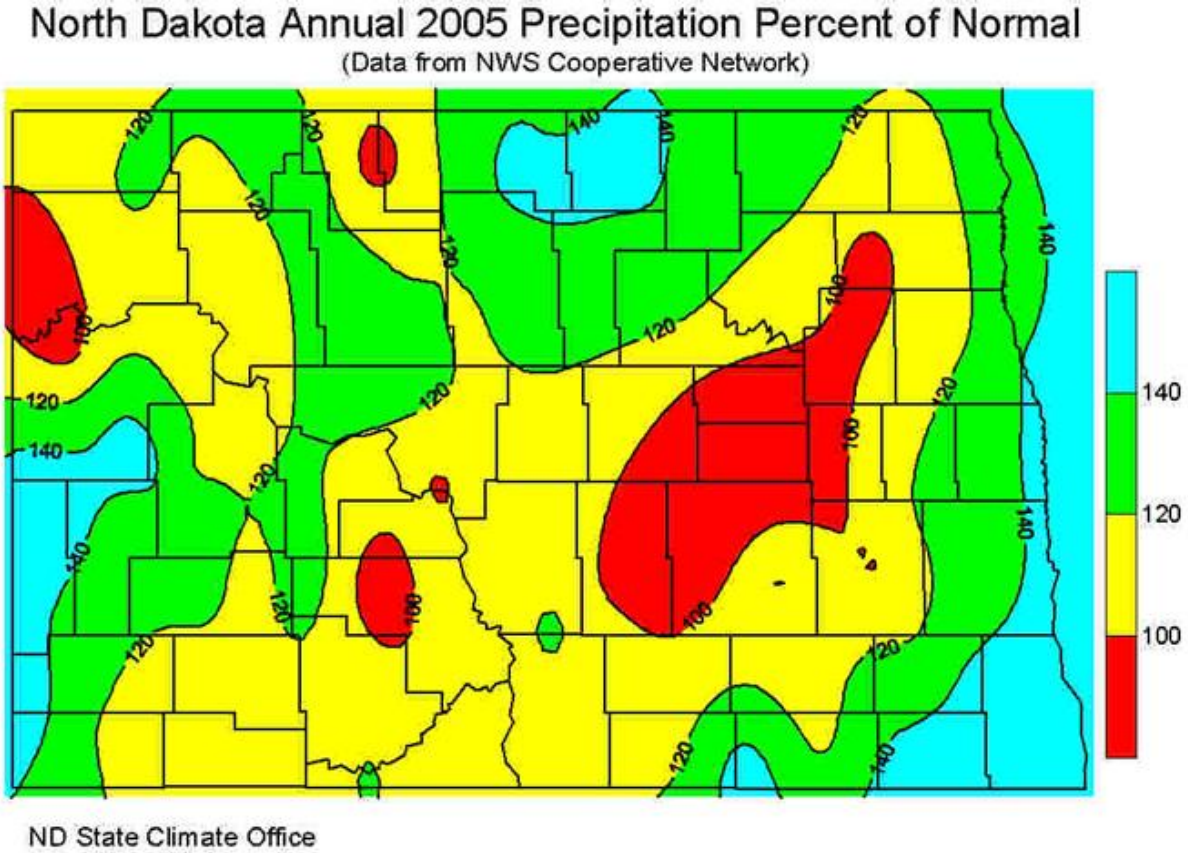


Figure 5. 2005 Precipitation (percent of normal).

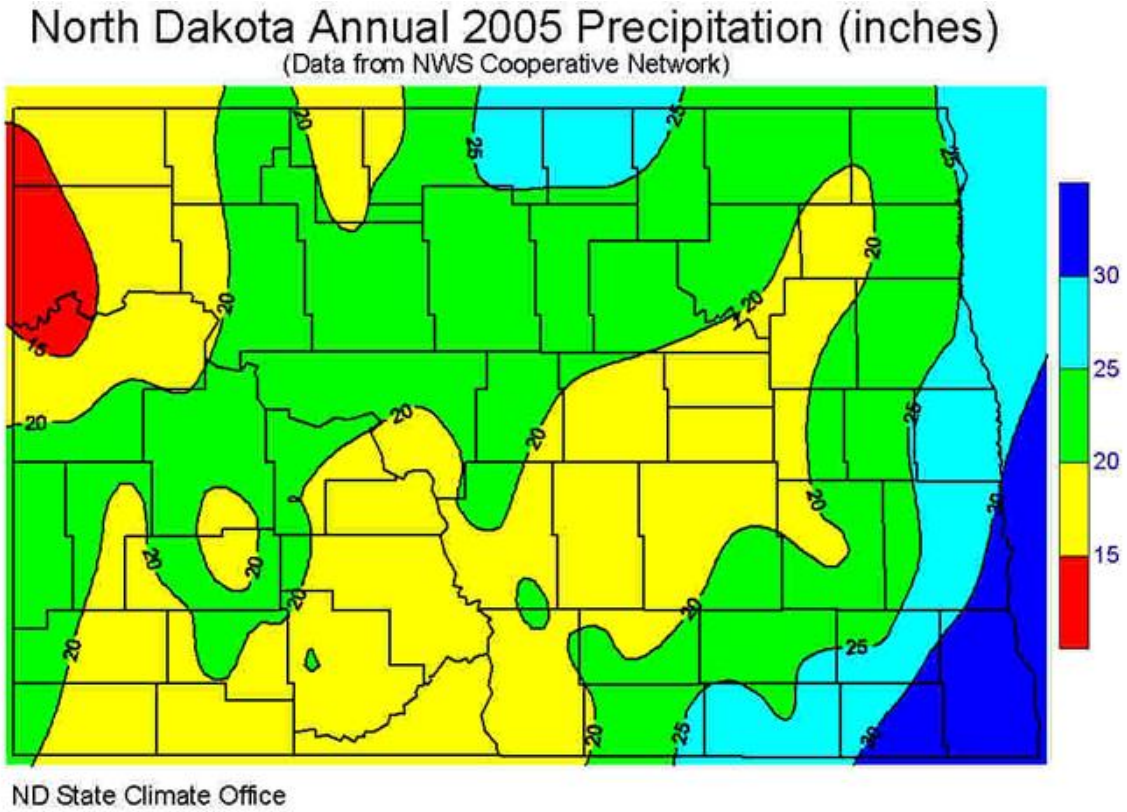


Figure 6. 2005 Annual Rainfall (inches)

1.5 Description of Weather Events Leading to Flood

Spring rains were extremely plentiful over most of northern North Dakota and southern Manitoba (Table 3, and Figures 7- 10). While the heaviest rains did fall in the Bottineau county area, the rest of the area was not spared. All of the subwatersheds of Willow Creek experienced flooding so that by the time the water from Oak Creek reached the confluence with Willow Creek, there was no place for it to go but over bank; flooding was noted all along Oak Creek.

Table 3 . Monthly Rainfall Totals for Selected Sites, 2005.

Site Location	May (in.)	June (in.)	July (in.)	August (in.)	September (in.)	Total (for 5 mo.)
Bottineau	2.46	12.11	2.76	0.64	1.17	19.14
Berthold	3.89	8.55	1.03	0.67	0.44	14.58
Minot	3.26	10.05	1.85	1.25	0.26	16.67
Mohall	1.79	5.96	1.09	1.00	0.47	10.31
Rolla	3.40	5.84	4.04	2.64	1.13	17.05

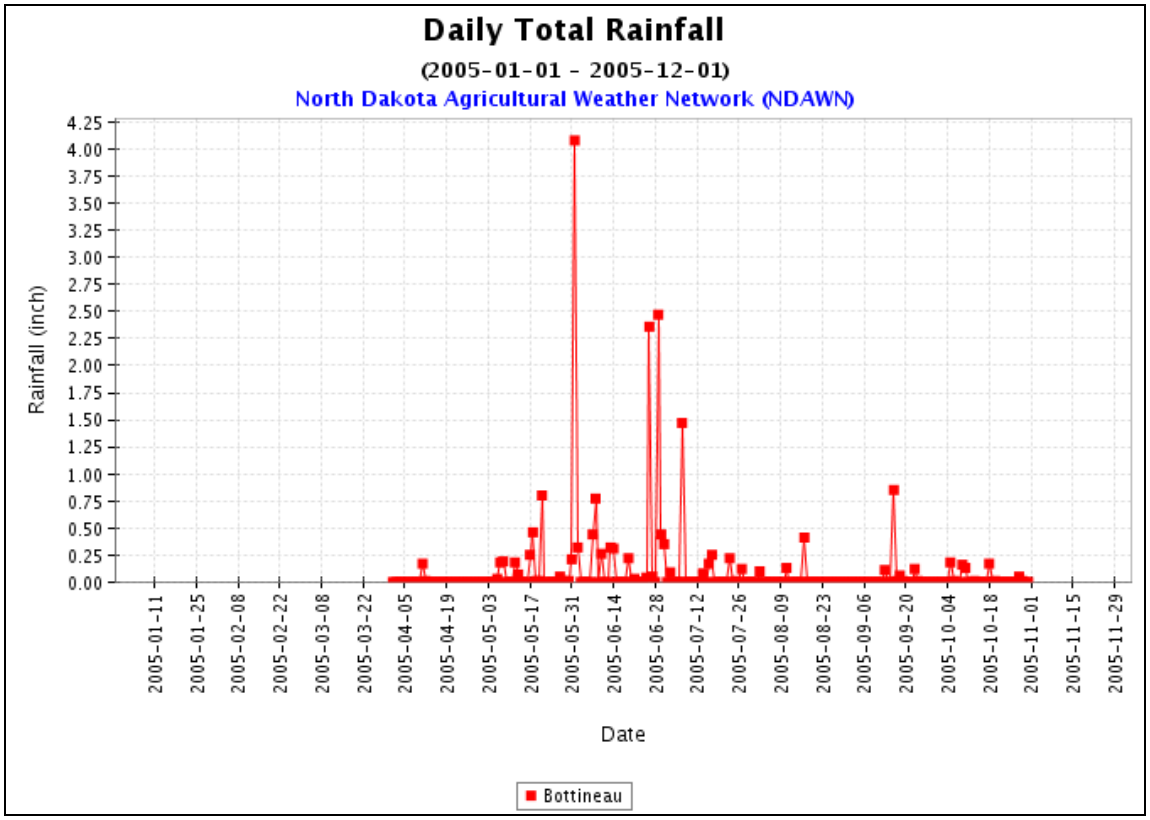


Figure 7. Rainfall for Bottineau, 2005

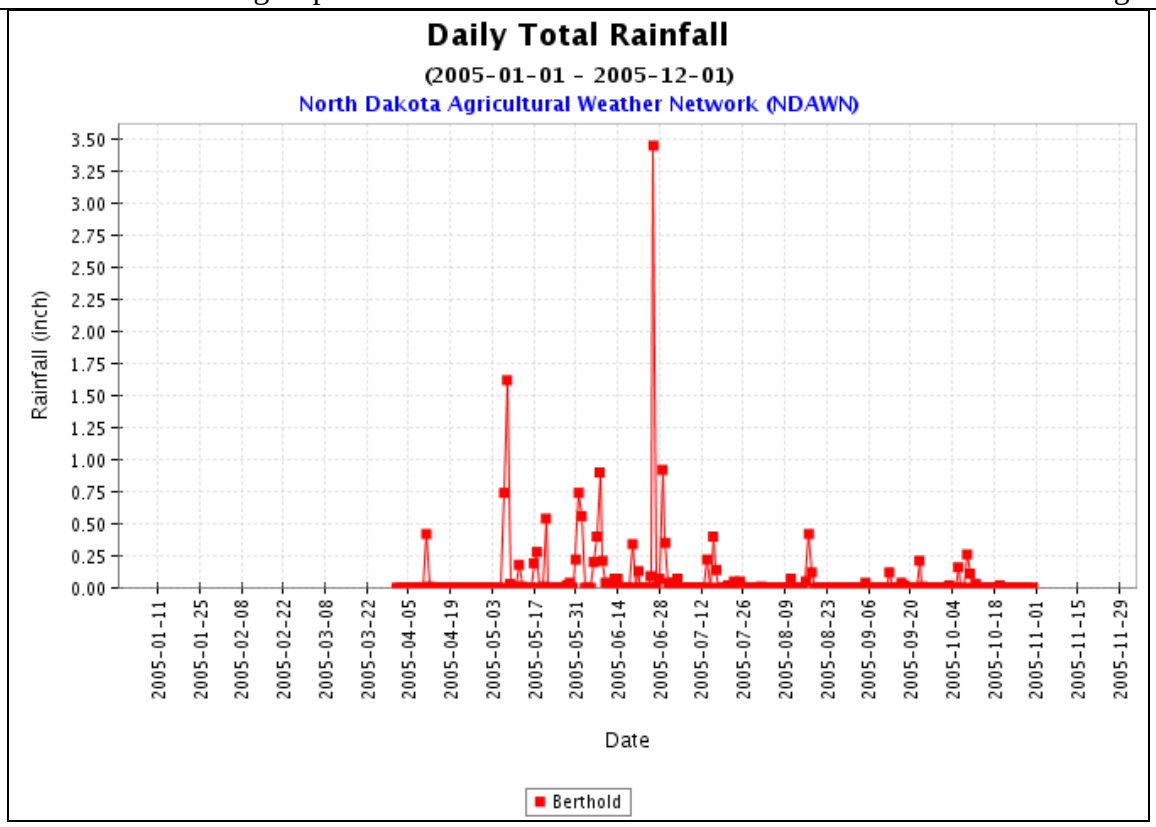


Figure 8. Rainfall for Berthold, 2005

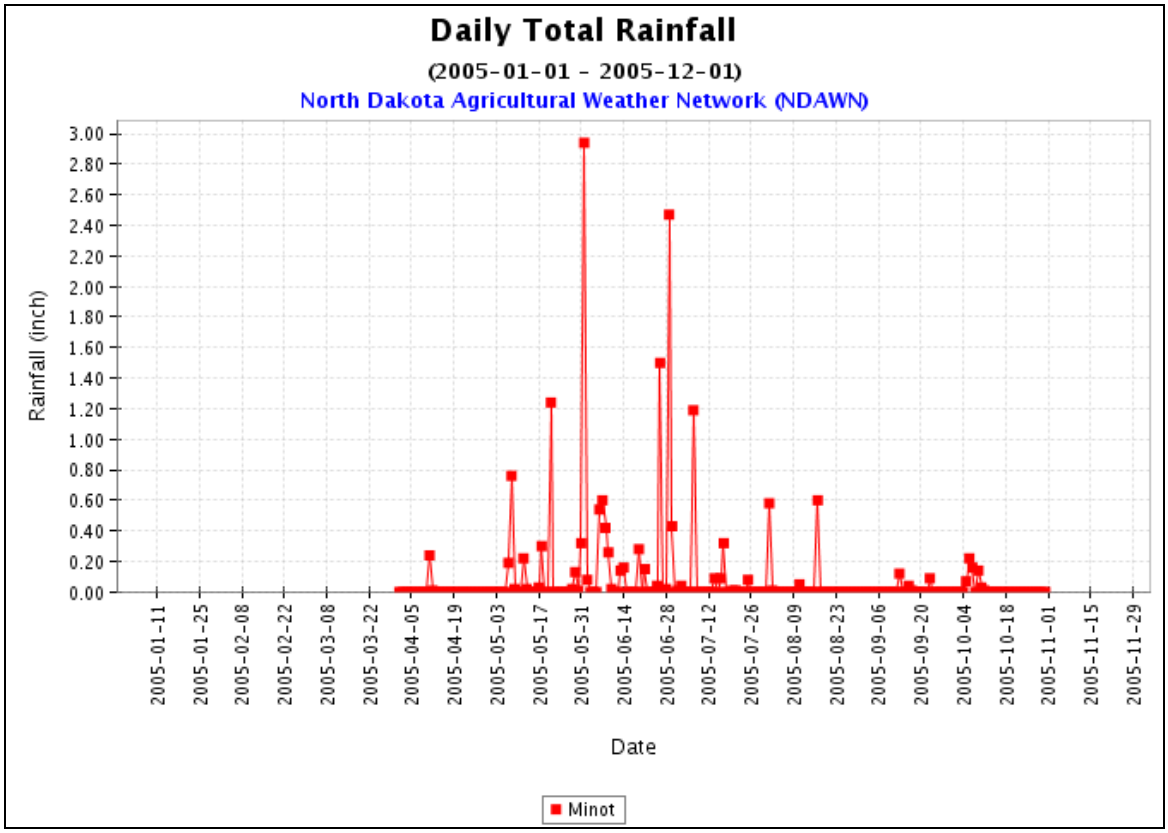


Figure 9. Rainfall for Minot, 2005.

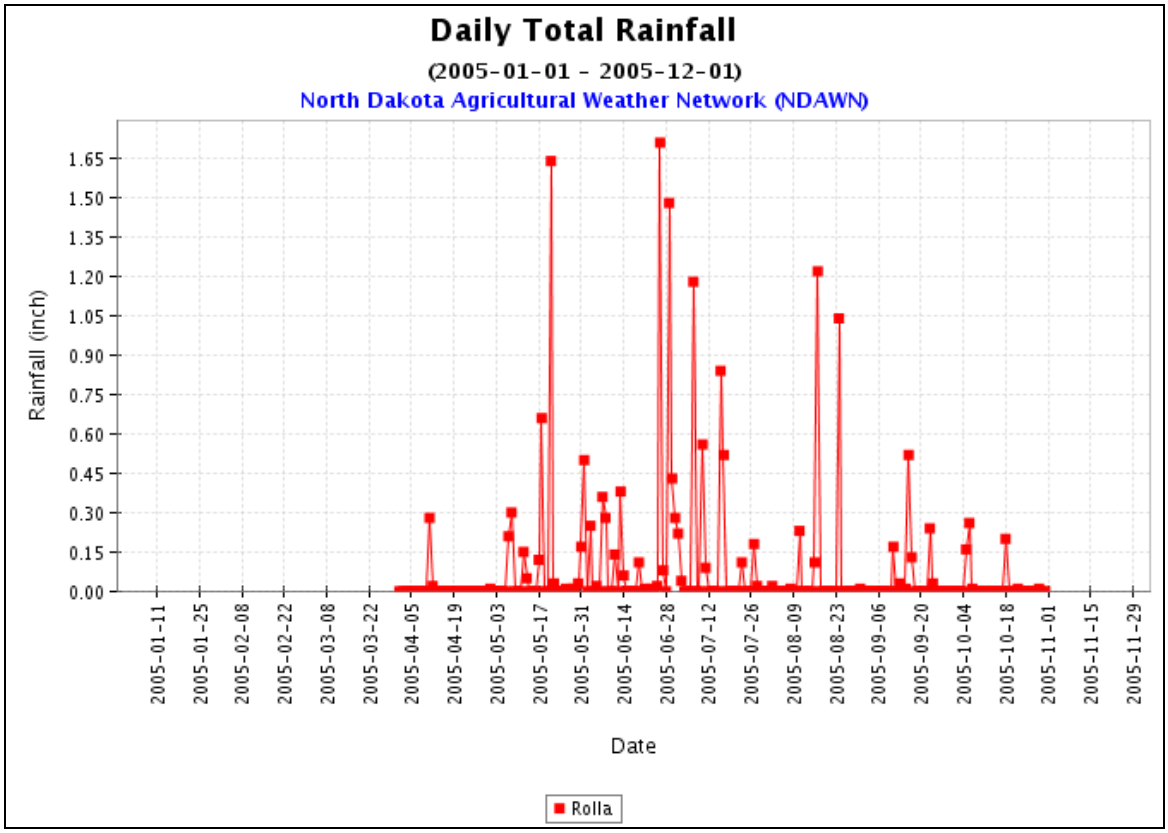


Figure 10. Rainfall for Rolla, 2005.

Summary of 2005 Flooding on J. Clark Salyer Refuge: In mid-June, cool temperatures and localized record precipitation delivered flood waters from ephemeral creeks. This started June 1-2, when a heavy rainstorm flooded the town of Souris, ND and the surrounding area. These waters began to enter the Refuge at Pool 357 from Boundary Creek on June 3rd with flows exceeding 2,000 cfs. The Refuge immediately began discharging water from Pool 357 into Manitoba. Discharge rates began at 1,300 cfs on June 3 and increased to 2,420 cfs by June 8. The discharge rate remained over 1,000 cfs until June 21 when flood waters diminished from Boundary Creek. The Refuge was able to decrease the discharge rate to around 500 cfs for the remainder of the month.

In early July 2005 several heavy rainstorms hit east of the Refuge and north into the Turtle Mountains and southern Manitoba. Record summer flood waters passed through Oak and Willow creeks, causing extensive flooding. It was compounded by additional flooding from ephemeral creeks to the northeast. Flow rates in Willow Creek reached 2,670 cfs on July 11th and flooding occurred until August 23rd. To compound the problem, heavy rains in the Des Lacs River watershed exceeded 1000 cfs and added to the flows in the Mouse (Souris) River. These waters worked their way down the Mouse (Souris) River to the Refuge and arrived just before the flood waters of Willow Creek joined the Mouse (Souris) River. This stacked up water at this location and exasperated an already bad situation. The southern-most water unit, Pool 320, was in a drawdown state and was dry. With the high

flows entering the pool, it filled to capacity in a few days. All water control structures were opened to allow maximum flows through the Refuge. It was not enough to compensate for the heavy volume of water and resulted in the topping of most emergency spillways. The Refuge was able to maintain control of Pool 357 by early releases of water. Consequently, water reached the top of the spillway, but did not flow over.

Total outflow measured at Westhope for 2005 was 469,257 acre-feet of water. Total outflow was 308,730 acre-feet more than the total measured inflow on the Mouse (Souris) River at Bantry. Outflow during the June 1 to October 31 period was 392,180 acre-feet or 386,111 acre-feet above the required 6,069 acre-feet required minimum. The lowest recorded daily mean flow during the period was 216 cfs on October 31.

1.6 Other Factors That Contributed to the Flooding

Topography: The topography of both the Mouse (Souris) River and Willow Creek are very flat, causing slow moving water on a "normal" year. When faster moving water from the upper reaches of the subwatersheds meet this low gradient area, which in 2005 was already at bank full, flooding will occur and it will take a long time for the flooding to subside.

Culvert/Bridge Maintenance: In lower population areas, debris removal from culverts does not always happen immediately as the responsible party is not aware of it until a problem arises. There are also jurisdictional issues arising as different counties, Water Resource Boards, NDDOT etc., all have different ways in which they address the issue. The backlog of maintenance of culverts (debris removal) played a role in some of the flooding.

Beaver: Throughout the five counties of the Willow Creek watershed beaver have a roll in damming up streams and rivers. Their impacts are greater on those low gradient steams where spring floods do not wash the dams out and larger areas of land are inundated by floodwaters. Again, different counties have different rules and methods for addressing beaver and beaver dam removal.

Wetland Drainage: Wetlands are an area of land that is regularly saturated by surface water or groundwater and is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions. "Wetland" is also a general term to describe and area of land that is neither fully terrestrial nor fully aquatic. Wetlands protect the quality of surface waters by retarding the erosive forces of moving water and trapping waterborne sediment and its associated pollutants. They also provide a natural means of flood control and storm damage protection through absorption and storage of water during high-runoff periods and through the reduction of flood crests, thereby protecting against the loss of life and property. One acre of wetland will hold 330,000 gallons of water if filled to a depth of one foot. Wetlands also play a crucial role in maintaining critical base-flow to surface waters through the gradual release of stored flood waters and groundwater, particularly during periods of drought. Consequently, wetlands may reduce the need to create reservoirs and other water storage facilities to augment municipal water supplies in times of need. Wetlands also protect local water supplies by facilitating the purification of surface and groundwater resources, which may reduce water treatment costs for residential and commercial users.

North Dakota is a farming economy. We provide food to the world and there is no doubt that the people of North Dakota would suffer both monetarily and culturally without it.

Farming is also a very difficult vocation and making a profit is often at the whim of nature (bugs, disease, drought, flood, etc). To offset these variables in the past farmers did what they could to help ensure their success. Cities and towns also wanted to ensure economic development. As a result, one-half of North Dakota's wetlands have been lost (drained or filled and developed), with portions of the state losing 90% of their original wetlands. Due to current landowner privacy rules, specific summary information on drained wetlands in the Oak Creek watershed is not available. But, going by the example one-acre, one-foot deep wetland mentioned above, the potential for restored wetlands to reduce flooding impact in this area is extremely significant.

Riparian Area Damage: A riparian area is the stream channel plus the area of streamside vegetation including the stream bank and adjoining floodplain. Riparian areas are some of the most biologically productive ecosystems in nature and serve multiple functions, even within an urbanizing landscape. The floodplain is essential in the dissipation and storage of flood waters. The "health" of a riparian area may be defined as its ability to perform its normal functions, including sediment and nutrient filtering, stream bank building, water storing, aquifer recharging, providing fish and wildlife habitat, and dissipating stream energy.

Damage to the riparian area can occur when buildings are placed too close to edge of the stream without proper slope stabilization, drainage engineering, or vegetation buffers; when crop fields leave no buffer between the field and the stream bank; when streams are channelized so that the resulting increase in velocity scours the stream banks and streambed below the channelization; where improper or poorly designed stream stabilization methods are used and the stream degrades both up and downstream of the site; and any place the vegetation that would stabilize the streambank is removed.

1.7 Results of the Flooding

Although an estimate of total acres was not available, thousands of acres in Bottineau, McHenry, and Rolette Counties were flooded. Several flights were made during the time of flooding to photo-document the extent of area affected. A small sample of these photos can be seen in Appendix C. The remaining photographs are available in electronic file format, on a CD, or by contacting either the chairman or vice-chairman listed at the beginning of this document.

Of the 850 dwelling units served by the Metigoshe wastewater collection system, 27 units were required to shut down completely to avoid spilling raw sewage into the lake, 54 units were kept in operation only as a result of sandbagging and using sump pumps, and 26 were in danger of losing their septic systems. The entire 850 units were required to be on minimal usage of the system from July through early August. In Bottineau, flooding went over the roads and eroded residential land along the creek, coming very close to the foundations of several homes.

The following is a timeline provided by Wold Engineering on what actions were taken throughout the watershed:

OAK CREEK TIMELINE

July 5th, 2005 – Construction began on a temporary clay dike used for flow control for School Section Lake.

July 5th, 6th, 7th, 2005 – Emergency dike on School Section Lake (NW1/4 NW1/4 Sec. 36, Twp. 164 N, Rge. 75 W) - Began reinforcing by placing additional embankment on downstream side. Plan is to increase size of dike, construct spillway and place fabric/rip-rap.

July 16, 2005 – Emergency dike on School Section Lake - Finished placing embankment along the downstream side of dike. Constructed spillway 30 ft. wide on north side of dike. Placed fabric and 2ft. depth of rip-rap in spillway. The dike was widened approx. 12 ft. and raised 1 ft. Made an 8" deep, 50 foot wide cut in the service road/bike trail.

July 18, 2005 – Installed 1 - 48" x 44' CSP with canal gate at service road/bike trail crossing located at south end of Mud Lake (NE1/4 Sec. 10, Twp. 163 N, Rge. 75 W). Installed 2 – 36" x 40' CSP with canal gates on Township road South of Duck Lake (SE1/4 NW1/4 Sec. 28, Twp. 163 N, Rge. 75 W – aka Schaeffer Road).

July 19, 2005 – Installed 1 – 36" x 40' CSP with canal gate at service road/bike trail crossing. Installed 1 – 48" x 72' CSP with canal gate at Sawmill crossing (NE1/4 Sec. 16, Twp. 163 N, Rge. 75 W).

July 20, 2005 – Installed 2 – 36" x 44' CSP in Earl Roland approach (NW1/4 SW1/4 Sec. 15 Twp. 163 N, Rge. 75 W).

July 21, 2005 – Installed 2 – 36" x 50' CSP with canal gates on the Southerly end of emergency dike on School Section Lake. Made an open cut in Township road (SE1/4 SW1/4 Sec. 15, Twp. 163 N, Rge. 75 W - aka Lund Road).

July 25, 2005 – Lowered open cut in service road/bike trail crossing to a total of 12" deep.

July 28, 2005 – Installed 1 – 48" x 50' CSP in roadway going to Boy Scout Camp in Lake Metigoshe State Park (NW1/4 Sec. 36, Twp. 164 N, Rge. 75 W). Lowered open cut in service road/bike trail crossing 3".

July 29, 2005 – Began releasing water from School Section Lake.

August 12, 2005 - Filled in a portion of the open cut made in the service road/bike trail to allow Recreation Service District employees access to the Lagoon cells for maintenance. Water had stopped flowing through open cut.

October 26, 2005 – Began removal of emergency dike, culverts and spillway on School Section Lake.

October 27, 2005 – Completed removal of emergency dike. General cleanup will be completed next spring when the site dries up.

2.0 AREA OF CONCERN - OAK CREEK

2.1 Area I –Lake Metigoshe and the Watershed Above

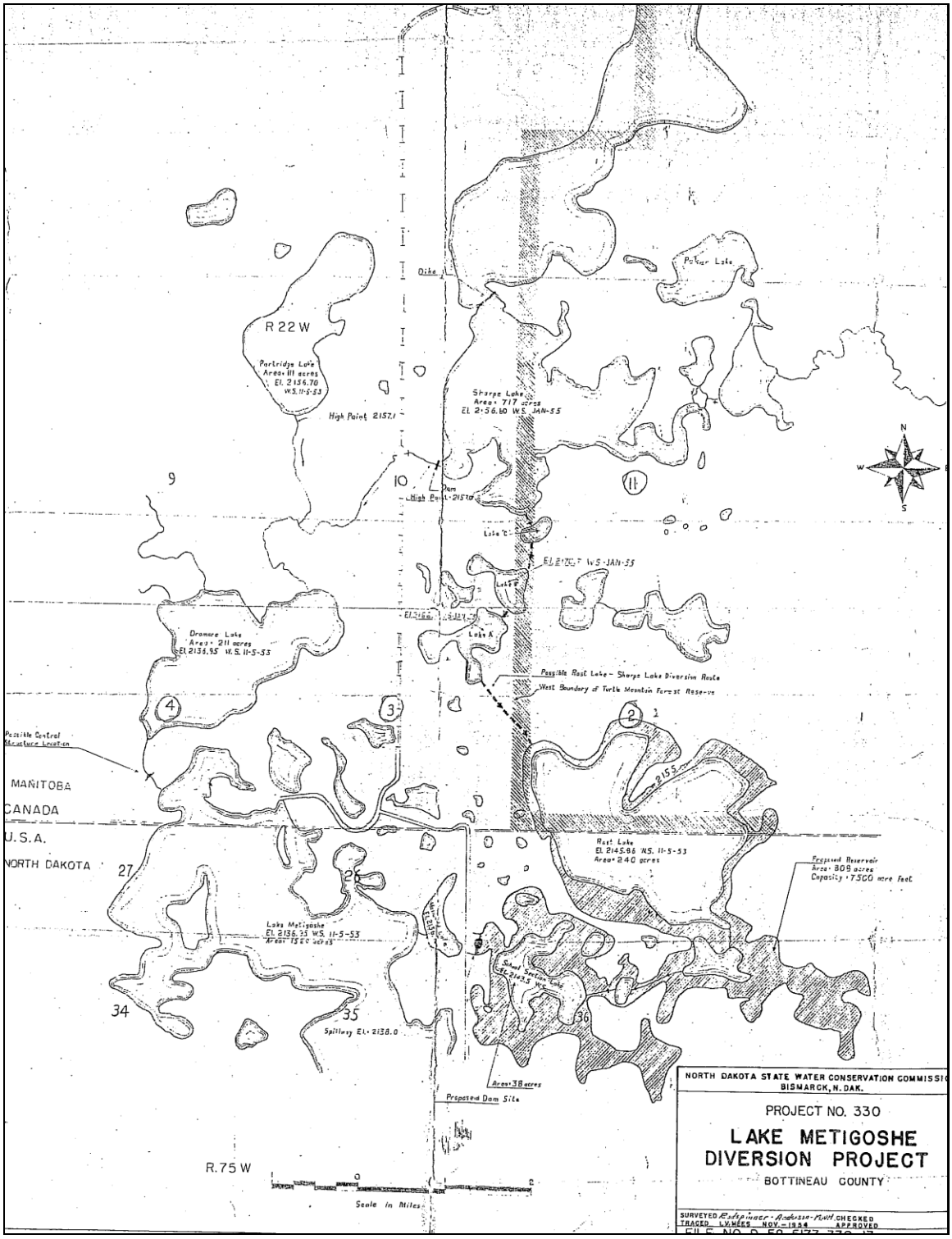


Figure 11. Lake Metigoshe - US and Canada (1954)

Lake Metigoshe is a natural lake located in the Turtle Mountains on the North Dakota-Manitoba border approximately 13 miles north of Bottineau, ND (Figure 11). Data from the newly revised North Dakota Game and Fish map describes it as a relatively large lake covering 1,544.1 surface acres with a maximum depth at full pool of 24.3 feet, and an average depth of 11.3 feet. At full pool it holds a volume of 17,446 acre-feet of water (Figure 12), and has 27.6 miles of shoreline. Lake Metigoshe has a very intricate shoreline with four main islands located throughout the waterbody and a narrow area which divides the lake into two. Twenty-two acres of the northern half of the lake extends into Manitoba, Canada. The majority of the lake is under private ownership. The Metigoshe Recreation Service District services anything within ¼ mile of the high water mark, which are approximately 850 dwellings. The north half of the lake has approximately 350 lake cabins/homes and a state park. The south half has approximately 500 lake cabins/homes and one picnic area. There are about 150-200 lake cabins/homes on the Canadian side of the lake.

Lake Metigoshe is classified as a cool water fishery, "Waters capable of supporting growth and propagation of non-salmonid fishes and marginal growth of salmonid fishes and associated aquatic biota". The North Dakota Game and Fish's fishery records begin in 1959 at which time a stunted yellow perch and black bullhead population was present. Primary sport fish stocked in the lake today are yellow perch, bluegill, walleye, and northern pike.

Recreational use on Lake Metigoshe is heavy year-round. Activities include all types of water-based recreation, hiking, camping, bicycling, cross-country skiing, and snowmobiling. Public facilities on Lake Metigoshe include a state park, two picnic areas, boat ramps and associated parking, hiking and biking trails, restaurants, convenience stores and gas stations.

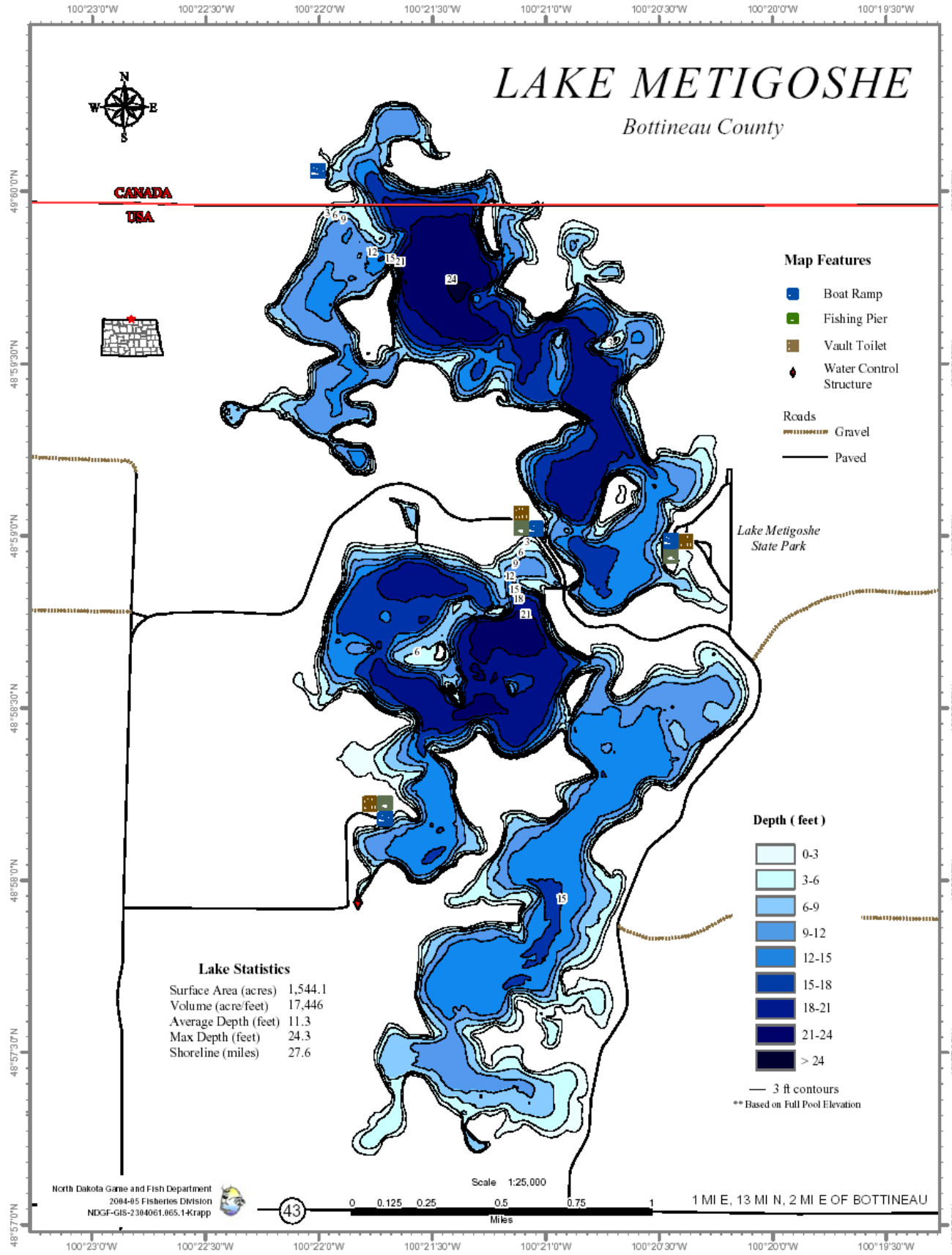


Figure 12. Lake Metigoshe Contour Map from the North Dakota State Game and Fish Dept.

AREAS OF DISCUSSION:

Sharp Lake (Canada):
Description of Area and Review of Information: Sharp Lake drains to Dromore Lake before entering Lake Metigoshe. US Geological Survey measurements at the Sharp Lake outlet measured 89 cfs during the flood, 138 cfs at the Dromore outlet.

Local Canadian government put in a rock dam during the emergency to slow the flow of water. They are currently trying to get a license to keep it. This rock dam was able to slow about 1/3 of the drainage flow, without holding water permanently. To improve their chances of obtaining a license, the local Canadian officials are requesting a letter of support from the Oak Creek Water Resource Board and the Lake Metigoshe Recreation Service District.

Proposal: Keep the rock dam, provide letters of support.

Action Taken: The Bottineau County Commissioners sent their approval for the rock dam to stay in. The Oak Creek Water Resource Board sent a recommendation letter that stated the rock dam was ok at high water, but that it should be removed during times of low water so as not to impede the natural flow of water. Other members felt that the structure did not allow any flow control. It was also noted that it would need International Joint Committee approval for it to stay, so any recommendations were left to that Board.

Responsible Agency/Party: Oak Creek Water Resource Board, Lake Metigoshe Recreation Service District, Bottineau County Commissioners

Ermosh Lake/Rost Lake/School Section Channel/Dam Proposals:
Description of Area and Review of Information: Rost Lake drains to School Section Lake. In the past some planning was completed on the possibility of providing a series of channels and dams to control the flow of water through the watershed above Lake Metigoshe (mostly on the Canadian side) and thereby controlling the flow of water into Lake Metigoshe. Talks between the US and Canada have been initiated several times, but no agreement has been reached. More information on flows/hydrology may help future discussions.

Proposal: At this time nothing is proposed until more information can be gathered.

Partridge Lake:
It may also be possible to hold a limited amount of water here, but it would have to go through the Canadian permitting process. All dams would be gated, but potential issues include who would control the gates and under what plan. While this item was discussed, there is no wish to pursue it at the current time.

School Section Lake:
Description of Area and Review of Information: This is located on ND State Parks and Recreation Department land to the northeast of Lake Metigoshe and drains into Lake Metigoshe. During the flood an emergency dam was constructed to control the flow of water. This structure has since been removed. If a new dam was constructed, it could not

be in the same location due to concerns about the soil there. It would back water onto Canadian government land, most probably. A permit would have to be issued for its construction by the State Water Commission.

Proposal: Construct a dam at School Section Lake to provide flood protection to Lake Metigoshe and control the flow of water entering from Canada. An agreement would need to spell out specifically the flow management; both how and when water is to be released and who controls the gates.

Action Taken: A staff gage was purchased by the Oak Creek Water Resource Board and will be monitored. The dam was removed according to US Army Corps of Engineers and State Water Commission policy. Discussion is underway between the State Water Commission, ND State Parks and Recreation Dept., and the Oak Creek Water Resource Board on construction of a new dam at this location. The dam would operate only under high flows for emergency flood control.

Responsible Agency/Party: Oak Creek Water Resource Board, ND State Parks and Recreation Department, permit thought the ND State Water Commission and Manitoba, Canada.

Dam at Lake Metigoshe

Description of Area and Review of Information: The Oak Creek Water Resource Board controls the operation of the dam. Currently they are working with the State Water Commission and the International Joint Commission on previous legal issues regarding the dam.

Proposal: It was recommended that an inventory of all available inflows to Lake Metigoshe be made. This would include the size and location of all culverts that direct flow into the lake as well as accessing local knowledge on the subject. It was felt that more information is needed regarding the amount of water coming into Lake Metigoshe vs. the amount of outflow.

Dredging Lake Metigoshe

Description of Area and Review of Information: There was a discussion about the possibility of dredging Lake Metigoshe to provide more storage in case of a flood. This idea was turned down for two reasons: 1) Cost would be extremely prohibitive - $100,000 per acre dredged down 3 feet was one estimate. 2) The lake users and residents would want to keep the lake very near its current full level to make the most out of recreational opportunities. So while the lake would hold more water, there would be no room for the lake to accept any additional flood waters.

Proposal: None at this time. While the project still holds merit it was not thought to be related to flood control

Comments: There was discussion on possibility of creating a storage area at south end of Duck Lake and the Kamrud/Mastfelton area for emergency storage. This would depend on availability of funds.

Lake Metigoshe Zoning
Description of Area and Review of Information: Many lakes throughout the northern part of the U.S. have zoning ordinances to protect water quality and lessen the impacts of floods. These include residence setbacks, no mow zones near the lakeshore to reduce the impact of wave action, and set backs from the shoreline for dwellings and fertilizer use.

Action Taken: None. Roland Township has a 2001 zoning ordinance in place that was amended in 2002. It is an ongoing process and is reviewed as needed.

Responsible Agency/Party: Roland Township

Mud Lake
Description of Area and Review of Information: This lake is located just south of Lake Metigoshe and before the Recreation Service District's sewage lagoon. Local citizens have contacted members of the Tri-County Task Force to suggest changes to both Lake Metigoshe's dam and the Mud Lake outlet.

Comments: Based on this concern raised by a member of the public, discussion took place on how one could relocate the Lake Metigoshe dam so that Lake Metigoshe and Mud Lake essentially become one lake. A new road will be constructed to the south of this area, so the appropriate culverts could be put in.

Action Taken: None. Not currently a problem for restricting water flow. Any work done in this area is beyond the scope of a Task Force recommendation and is solely a private development issue.

Hiking/Biking Trail (Shared Use Path)/Metigoshe Rec. Service District Access Rd.
Description of Area and Review of Information: This area is just downstream of Mud Lake. Previous to the flood, two culverts were in place with the trail going over them. As a result of the flood, two more culverts were added. During the process of adding the culverts, this section of the hiking/biking trail (shared use path) was destroyed. The land is owned by the Lake Metigoshe Recreation Service District, with Bottineau County having an easement to go over and across the property. This gives the County the right to construct and maintain the hiking and biking trail (shared use path).

Proposal 1: An option is to replace the missing section of the trail with a Texas Crossing. Legal input is being sought in regards to this option as it is felt that liability will be a big issue. It is very difficult to keep people off of the trail whenever water might be passing over the crossing. Proposal was not recommended.

Proposal 2: A second option was to create a bridge going over this portion of Oak Creek. A concrete bridge would be very expensive and a wood bridge would have high maintenance costs associated with it. Wold Engineering said that they could work with the State Highway Dept. (DOT) on a proposal for a pedestrian bridge, but the DOT would need justification. Proposal was not recommended.

Action Taken: An agreement was reached where the Lake Metigoshe Recreation Service District will maintain the road with the current culverts, and that the hiking and biking trail will have an elevation of 2139.5 feet msl. The two additional culverts were approved by FEMA and will stay in place. Part of the trail (shared use path) was excavated to act as an emergency spillway to move the water and the grade has been changed to allow water flow.

Gorge Area

Description of Area and Review of Information: This is the section of Oak Creek from the Metigoshe Sewage Lagoons down to just north of the town of Bottineau. This area experienced high erosion and flow constrictions from debris being lodged in culverts and by bridges, as well as elsewhere along the creek. The Oak Creek Water Resource Board cleared the channel from Mud Lake to the sewage lagoons. Concern was expressed over the bare soil left after the channel clearing and its potential for high soil loss through erosion with the spring runoff. The mild fall however allowed revegetation of most of this area.

***Proposal 1*:** Bank Stabilization. There are many methods for bank stabilization that can be utilized. It was originally planned that the Turtle Mountain Soil Conservation District initiate a bank stabilization/demonstration project along some portion of Oak Creek in 2007. However, due to new State planning guidelines and the loss of their watershed coordinator the project was not undertaken at that time. Currently the Oak Creek Water Resource Board, in cooperation with the Turtle Mountain Soil Conservation District, the Upper Dakota RC&D, the North Dakota Dept. of Health, and Wold Engineering is working to develop both a short range and long range plans for bank stabilization along the portion of Oak Creek that goes through Bottineau. Of immediate interest is the portion just south of the Hwy 5 bridge.

Responsible Agency/Party: Oak Creek WRB, TMSCD, NDDoH, NRCS

Funding Sources: City/County money, NDDoH 319 grant program.

Comments: An assessment on Oak Creek was completed in 2006 by the Turtle Mountain SCD through funding by the NDDoH. Data from this assessment will be used to make a determination as to the best course of action for improvement. This item is pending more information and completion of the assessment report.

Proposal 2: Flow Dissipation. This can be done mostly through the addition of water storage areas in the watershed. This includes both wetland restorations and creations. There are many drained wetlands in the Oak Creek watershed. Since these storage areas no longer exist, more water is entering the stream during a rainfall event than the stream had evolved over time to handle. By holding back the water in the watershed and allowing it to dissipate slowly, both overland and through the groundwater, flooding all along the river can be reduced.

Responsible Agency/Party and Funding Sources: NRCS has a wetland reserve program that includes a 30 year contract. They also have funding available through the Emergency Watershed Program. This is a perpetual easement through a FEMA application. Currently FEMA is quite backlogged, so immediate availability of funds under this program is doubtful. The US Fish and Wildlife Service has many programs for restoring wetlands.

They include both perpetual easements and contracts to restore wetlands that last 10-20 years with incentive payments. Other agencies that have provided funding in the past for wetland restoration and creations include ND Natural Resources Trust, Ducks Unlimited, North Dakota RC & D, and the NDDoH through their 319 grant. There is also the potential for the county to provide flood easements.

Bridge ½ Mile S. of Sawmill Corner

Description of Area and Review of Information: The water does not enter this bridge at a 90 degree angle. This provides the potential for debris to be lodged and excessive forces to be placed on the bridge, possibly leading to structural problems.

Proposal : Improve the channel of Oak Creek at this point so that it enters the bridge at a more direct angle.

Action Taken: The Oak Creek Water Resource Board completed the needed bridge and channel enhancement/restoration at the Sawmill Corner in 2007, and more gated culverts were added.

Responsible Agency/Party: Oak Creek Water Resource Board, Bottineau County,

Culverts, Bridges, and the Channel Along this Section of Oak Creek

Description of Area and Review of Information: It is believed that part of the flooding problem was due to debris causing flow restrictions through culverts and bridges. It is also believed that beaver dams added to the problem. Currently there is no annual maintenance plan established.

Proposal 1 : Monitoring network. This would be useful both for yearly maintenance and during times of flood events. It is suggested that it start now to monitor culverts for ice up. Each township would have a field representative, either a volunteer or person assigned by the water resource board, which would go out and a schedule to be determined and check the creek for dams and debris that could be restricting the flow. This field representative would then report to a designated water resource board member. During potential flood events, the water resource board member could then call the command center who could inform city, county, state, and federal agencies so they are better informed.

Action Taken: Ongoing. It was discussed and passed that the Oak Creek Water Resource Board will maintain and keep check of culverts and beaver dam problems for their area of jurisdiction. Other water boards will address their areas of jurisdiction as they see fit.

Responsible Agency/Party: Water Resource Boards, Emergency Management Coordinator, County Sheriff, Command Center.

Proposal 2: Allow water to run high in culverts to freeze high. During our meeting the gentlemen from Canada informed us of how they prepare for winter and spring flood events. They let the water freeze at a higher level, so when/if it flows again it will all go unrestricted under the ice.

Action Taken: While on the positive side, it would seem to reduce problems with the ice up of culverts or some impediment of the flow, the negative side would indicate that there

could be some liability issue since there is now an air space under the ice and there is some potential that snowmobilers or others traveling along the ice would fall through. In the end it was decided that it would be left to individual water resource boards to explore this option as they see fit.

Responsible Agency/Party: Water Resource Boards

Lake Metigoshe Recreation Service District Sewer System

Description of Area and Review of Information: The Lake Metigoshe Waste Water Collection System (Sewer System) is owned and operated by the Lake Metigoshe Recreation Service District. Recreation Service Districts are authorized under Section 11-28.2-01 thru 11-28.2-08 of the North Dakota Century Code.

Originally constructed in 1982-83, the system has worked well despite the fact the original design specifications were to serve the existing 725 seasonal and full time dwellings, with no allowance for future development. Additional development has occurred since then requiring expansion of service and force main lines, increasing the number of grinder basins, upgrading the lift station's pumping capacity, as well as two expansions to the lagoon system. The lagoon system now contains four cells with an effective capacity of 23,935,000 gallons – approximately 15,700,000 gallons more than the original system.

During the 2005 high water event, the system operated well beyond its design capacity. Despite the voluntary restrictions on usage that were implemented from early July until early August, nearly 10,000,000 more gallons were processed through the system than during the previous high water mark in 1999. Also, and additional discharge of approximately 3,500,000 gallons was required during late April of 2006. Both of these situations were due to high levels of infiltration into the system as a result of the record high water levels at the lake, and the super-saturation of surrounding soils.

Proposal: The Lake Metigoshe Recreation Service District continues to develop plans to meet the increasing demands placed upon the waste water collection system from the expansion and development of the service area. Some of the proposals discussed, such as replacing existing manhole and grinder basin covers with a new type that could be sealed, are simply no workable. The basins are not one piece units and as such seepage is bound to occur, and no practicable solution to seal the entire structure exists. Further, the basins contain pumping and electrical equipment so must be accessible for servicing.

The suggestion that sewer cleanouts, floor drains, etc., not be allowed below a certain elevation has been a requirement of the Joint Turtle Mountain Zoning Commission, later the Roland Township Zoning Ordinance, since the system was constructed in the early 1980's. This standard was increased in June 2001 when the new Roland Township Zoning Ordinance was adopted. The vast majority of dwelling units were already in existence prior to the construction of the water collection system, and it was inevitable that many of them can not and do not meet the current elevation standards – 4 feet above the outlet dam elevation.

The discussion on exploring the possibility of connecting the dwelling units on the Canadian side into the Recreation Service District collection system has been explored before. However, due to the lack of funding by the Canadian government it was abandoned.

Responsible Agency/Party: Lake Metigoshe Recreation Service District.

Additional Comment: During the summer of 2005, the North Dakota Department of Health conducted fecal coliform bacteria sampling on Lake Metigoshe at eight sites (Appendix D). Concern was raised by the public that due to the high water and unknown condition of septic systems on the Canadian side of the lake, coliform bacteria had contaminated the lake. Of the eight samples taken only one was above detection limits, and this sample was much below the State's water quality standard limit for safe recreational waters.

2.2 Area II – Town of Bottineau

Description of Area and Review of Information: The Bottineau Emergency Management coordinator worked with the State and Federal governments to create an Emergency Evacuation and Sheltering Plan. Some provisions need to be changed in the law to allow its approval and implementation. Amendments to the law will be brought to the next legislative session.

Locally, the Emergency Management Coordinator has worked out a local plan and mutual aid agreement. Some supplies are already on hand and the rest are readily available. (sandbags, etc.) Also working with Minot- Job Corps and Air Force Base to provide volunteers to fill sandbags, etc. if needed again.

Proposal: Develop citywide emergency plan and have communications and command center in place for next emergency.

Action Taken: This plan has been completed and is in effect. The city of Bottineau has adopted the county emergency management plan and the command center, with back up, has been established and all agreements for supplies and support are in place.

Responsible Agency/Party: Bottineau County Emergency Management Coordinator

Channel Clearing/Bridges/Culverts

1) Description of Area and Review of Information: A significant portion of the Oak Creek channel around bridges and culverts was clogged with debris, creating flooding problems. There was also some concern about the consistency of culvert size along the stream. There is an ongoing need to look into other bridges to see if any are limiting flow (5th St., 7th St., Hwy 5, 13th St., culverts by college, railroad bridge) There is a lot of concern about culverts freezing in the winter and there is little that can be done. It is possible to steam the culverts open, but that process is slow and very expensive.

Action Taken: Channel clearing from Hwy 5 to Lake Rd. is done. A new bridge (box culvert) was installed spring/summer 2006 on Hwy 5. The remaining bridges/culverts were addressed/cleared by the appropriate organization. This process is ongoing and identification of problem areas with flow will be conducted yearly by the appropriate Water Resource Boards.

Responsible Agency/Party: Water Resource Boards, City of Bottineau, Counties, ND DOT

2). Description of Area and Review of Information: Old bridge by Stewart's, 1 mi. South of Bottineau. Bridge is old and may limit flow or be damaged in another flood.

Proposal: Motion was made and carried for Bottineau County to look at the bridge by Greg Stewart's for the possibility of replacement or abandonment. The Bottineau County Commissioners have put this option on the list for review.

Action Taken: After review the bridge was determined to be in good condition and it will be rip-rapped.

Responsible Party: Bottineau County

Beaver Dams

Description of Area and Review of Information: This is an ongoing problem for all Water Resource Boards. Last year $4,000 was spent in the removal of beaver dams in the Turtle Mountains. There is not much control in Canada.

Proposal: Program through USDA/APHIS to hire 4 full time trappers for 30 counties. Cost (portion of match) would be split evenly among all counties, regardless of how many beaver were removed from each county.

The option of putting a bounty out was also discussed. It might be more cost effective in projects like these that are labor intensive.

Action Taken: Nothing more has been heard on the APHIS Grant. Until this grant program comes through or other cooperative agreement is reached, individual counties/water resource boards will continue to address the issue individually as their rules dictate or time and funding allow.

Areas Sandbagged in Bottineau

Description of Area and Review of Information: Several parts of Bottineau experienced the need to place sandbags to prevent flash flooding. Options to prevent flooding on a more permanent basis were discussed.

Proposal: To create permanent berms to eliminate the need to sandbag areas in town.

Discussion: This is an effective means of flood control but there are some concerns. Principally, the cost of the construction for what seems at this point to be a very limited event and how the regular rains will reach the creek. It was decided to keep this option available to individuals wishing to pursue it. National Flood Insurance Plan was also discussed, but Bottineau and McHenry counties have decided not to pursue it.

Diversion Around Bottineau

Description of Area and Review of Information: In the event of another series of events that create a major flood, the option of creating an emergency diversion of Oak Creek around the town of Bottineau was discussed.

Proposal 1): Diversion East of the Airport.
This diversion would join back up with Oak Creek about 3 miles south of town. There would be a gated structure for Emergency Use Only. While the diversion would be within the same watershed landowner permission would be needed to create the channel, it would be expensive, and a plan would have to be developed to accommodate different scenarios (how many inches of rain in what areas would open the gates, etc).

Action Taken: It was decided that this idea was worth investigating, but that it would be up to the Oak Creek Water Resource Board or Bottineau County to do so. It was considered a future option, but due to expensive cost, heavily dependant on a funding source.

Comments: Wold Engineering could conduct a cost/benefit proposal on this proposal, but the Task Force would need to look for money locally and then ask the governor with help for funding the research proposal. There could be a joint Water Resource Board established to control the emergency structure.

Proposal 2): Divert Oak Creek west to Stone Creek where it would join up with the Mouse (Souris) River north of the refuge. This proposal might be more difficult to get agreement on. This area already has its own flooding problems, a plan would have to be established for different scenarios, and there is a hydrologic concern with routing water to a different watershed.

Action Taken: It was decided that this idea was also worth investigating, but that it would be up to the Oak Creek Water Resource Board or Bottineau County to do so. It was considered a future option but due to extensive cost, heavily dependant on a funding source.

Comments: Wold Engineering could conduct a cost/benefit proposal on this proposal, but the Task Force would need to look for money locally and then ask the governor with help for funding the research proposal. There could be a joint Water Resource Board established to control the emergency structure.

Proposal 3): Increasing the flow through Bottineau (channel clearing and maintenance. Compare the costs to the diversions. Also look at how often the town might be flooded.

Action Taken: Extensive channel clearing has been completed. The Oak Creek Water Resource Board spent $14,000 for 1 mile of channel clearing. It was cost shared 50/50 with the City of Bottineau.

2.3 Area III – Bottineau to Willow Creek

Description of Area and Review of Information: This area of the watershed is primarily agricultural. Some channel maintenance was requested around the Gardena area. Along with the possibility of creating some flood easements and storage reservoirs, there is also the possibility of restoring the in-channel portion of a section of Oak Creek that was channelized with berms. By restoring meanders to the thalweg portion of the creek, it is possible to restore some of the flow function of the stream while keeping the height/depth of the berms to protect agricultural land in the event of flooding. It would also reduce the maintenance needed to keep the cattails in control.

Proposal: 1) Channel maintenance/restoration/improvment.

Action Taken: Channel clearing and maintenance completed. Other plans to improve the function of the channel for water flow and transport will have to be initiated by interested Water Resource Boards or Soil Conservation Districts through grant applications.

Responsible Agency/Party: Oak Creek WRB, Turtle Mountain SCD, ND Dept. of Health

Proposal: 2) Flood easements.

Action Taken: None. This is considered an option for the future; limited funding is available.

Proposal: 3) Storage/retention reservoirs

Action Taken: None. This is considered an option for the future, dependant on funding and more data.

3.0 AREA OF CONCERN - WILLOW CREEK

Description of Area and Review of Information:
Many of the problems adding to Oak Creek's flood are connected to issues within the entire Willow Creek watershed, including its other subwatersheds. As mentioned in the introduction, Oak Creek is a part of the larger Willow Creek Watershed. There is currently very little information available about flow and conditions in the Willow Creek watershed, especially in regards to contributions from its subwatersheds.

Proposal: It would be of great assistance to have more information on flow measurements for flood control purposes, especially relating to flow capacity in the upper subwatersheds of Willow Creek. Of the greatest assistance would be to establish at least one USGS gauging station within the upper portions of the Willow Creek watershed (upstream of Snake Creek).

Estimates on cost for a real-time flow monitoring station are $13,200 to $13,500 per year. Cost for a seasonal gage without real-time flow monitoring is estimated at $8,500 to $9,000 per year. This is extremely cost prohibitive and are almost no funding sources for this type of proposal. A possibility would be to acquire funding from the State of North Dakota with the help of the Governor's office.

Responsible Agency/Party: State Water Commissoin, Soil Conservation District Boards, Water Resource Boards, NDDoH.

Funding Sources: Unknown. The State Water Commission has a co-op program were the funding would be 50% USGS, 25% SWC, and 25% local match for USGS approved projects. Due to the limited funding sources available for this proposal, financial assistance will have to be requested from State Agencies.

3.1 Area I - Upper Watershed (Rolette County)

Improvement of Belcourt Dam

Description of Area and Review of Information:
Belcourt Dam lies at the headwaters of Ox Creek, within the Willow Creek watershed. It was an area considered to assist with flood control.

Proposal: The Bureau of Indian Affairs is looking into improvements to the Belcourt Dam. The earliest date set forth for construction of a new dam would be 2007 – 2008. Primarily, improvement to dam maintenance (refuse disposal) would be the most effective measure taken. This lies under the jurisdiction of the BIA. Proposal would be to recommend to the BIA to implement and maintain a maintenance schedule.

Action Taken: None at this time

3.2 Area II - Other Subwatersheds as They Flow into Willow Creek

Description of Area and Review of Information: As discussion progressed it was noted that more should be known about the flow regimes of the five other subwatersheds that make up the Willow Creek watershed (Ox Creek, Miller Creek, Mud Creek, Snake Creek, and Wolf Creek). This is increasingly important as the channel clearing and debris removal is being completed on Oak Creek, allowing more water to arrive at the confluence of Oak Creek and Willow Creek sooner. However at the current time little information is available.

Proposal**:** Investigations into flow regimes and data collection for the other subwatersheds of Willow Creek.

Action Taken: This will also require significant funding. A USGS gaging station, as mentioned previously, would help a great deal initially. As funding presents itself, the North Dakota Department of Health, Division of Water Quality, will initiate data gathering assessments (which include flow quantity and velocity measurements) with willing Soil Conservation Districts, Water Resource Bboards, and other organizations.

3.3 Area III – McHenry County Line to Confluence with Oak Creek

Description of Area and Review of Information: As with other areas, beaver are of concern to this section of Willow Creek as well. Currently the Willow Creek Township has a code, specific to the township, which states that beaver may not be shot. In order to more effectively control the population and eradicate dams in culverts and other areas of concern, this restriction needs to be removed from the State Code.

Proposal: Removal of shooting restriction from State Code. This would require a proposal on the next election ballot, or contacting the ND Game and Fish to see if it has expired.

Responsible Agency/Party: Willow Creek Township Water Resource Board

Funding Sources: Removal of the restriction would not require any funding sources, but actual removal of nuisance beaver would. Assistance for this could be sought by the

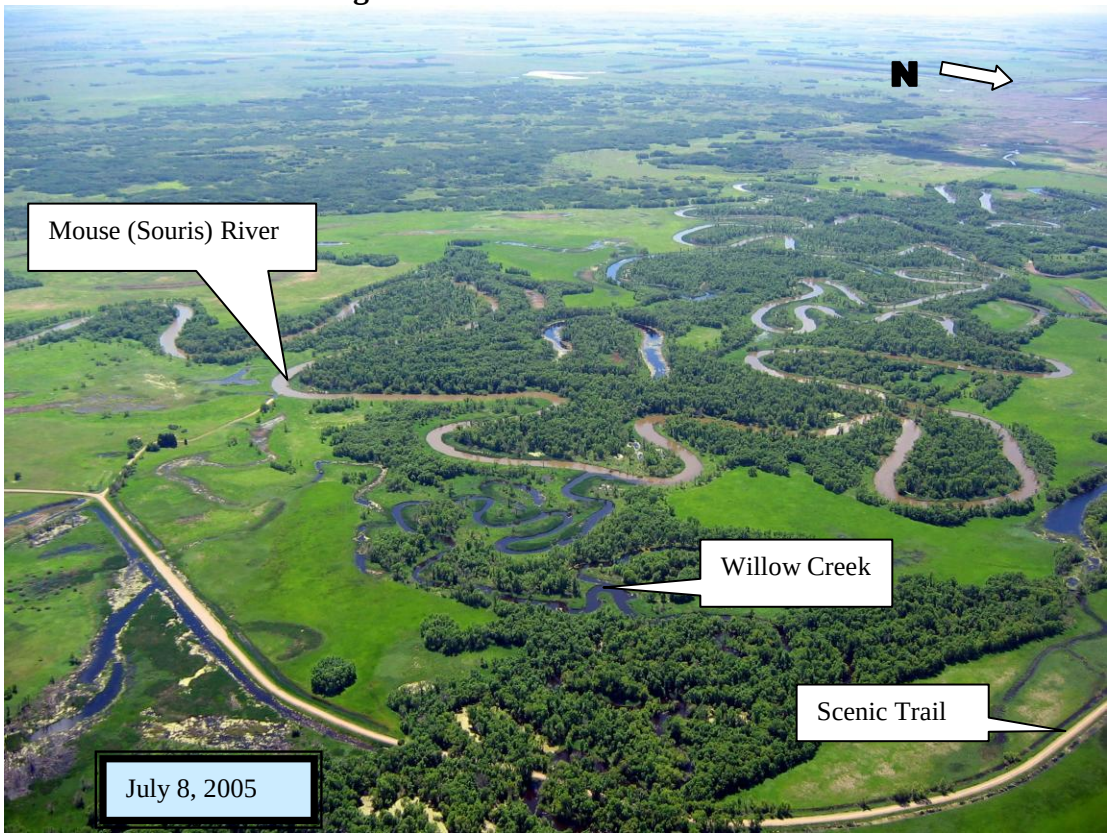
township joining the cooperative effort proposal put forth by APHIS for a multi-county control effort. This might be done either by joining the group itself, or by a cooperative agreement with the McHenry County water resource board.

Action Taken: After talks with the ND Game and Fish, it was stated that this ordinance is not in any of their game proclamations, therefore would not be enforced. Further research was conducted and it was determined that it is no longer a part of the State Century Code.

3.4 Area IV – From Confluence with Oak Creek through the Refuge to the Mouse (Souris) River

The lower end of Willow Creek is a very flat, with approximately 15 miles from its confluence with Oak Creek until it meets the Mouse (Souris) River and flows north into Manitoba, Canada. The Willow Creek watershed also received a great deal of rain just prior to and during Oak Creek flooding.

Willow Creek to the Refuge:



Willow Creek Township (T159N, R76W), about 2 miles upstream from confluence with Mouse(Souris) River

Description of Area and Review of Information: There were numerous problems with the flooding of property and roads. New culverts need to be installed. Willow Creek floods every two years now. The construction of reservoirs/retention ponds would be helpful.

Proposal: Five new culverts were put in on the county line immediately south of the junction with Oak Creek. (3 – 48", 2 - 42"). Wold Engineering also had a meeting with Willow Creek Township Water Resource Board to discuss bridges in the area. It was decided that nothing much can be done short of removing the road. It was proposed that during the Tri-County Task Force meeting there be a discussion on culverts between the various counties to see who is doing what.

There is also a need to determine interest in the construction of reservoirs/retention ponds in the upper Willow Creek basin. If there is an interest, then areas for placement will need to be identified and funding sought.

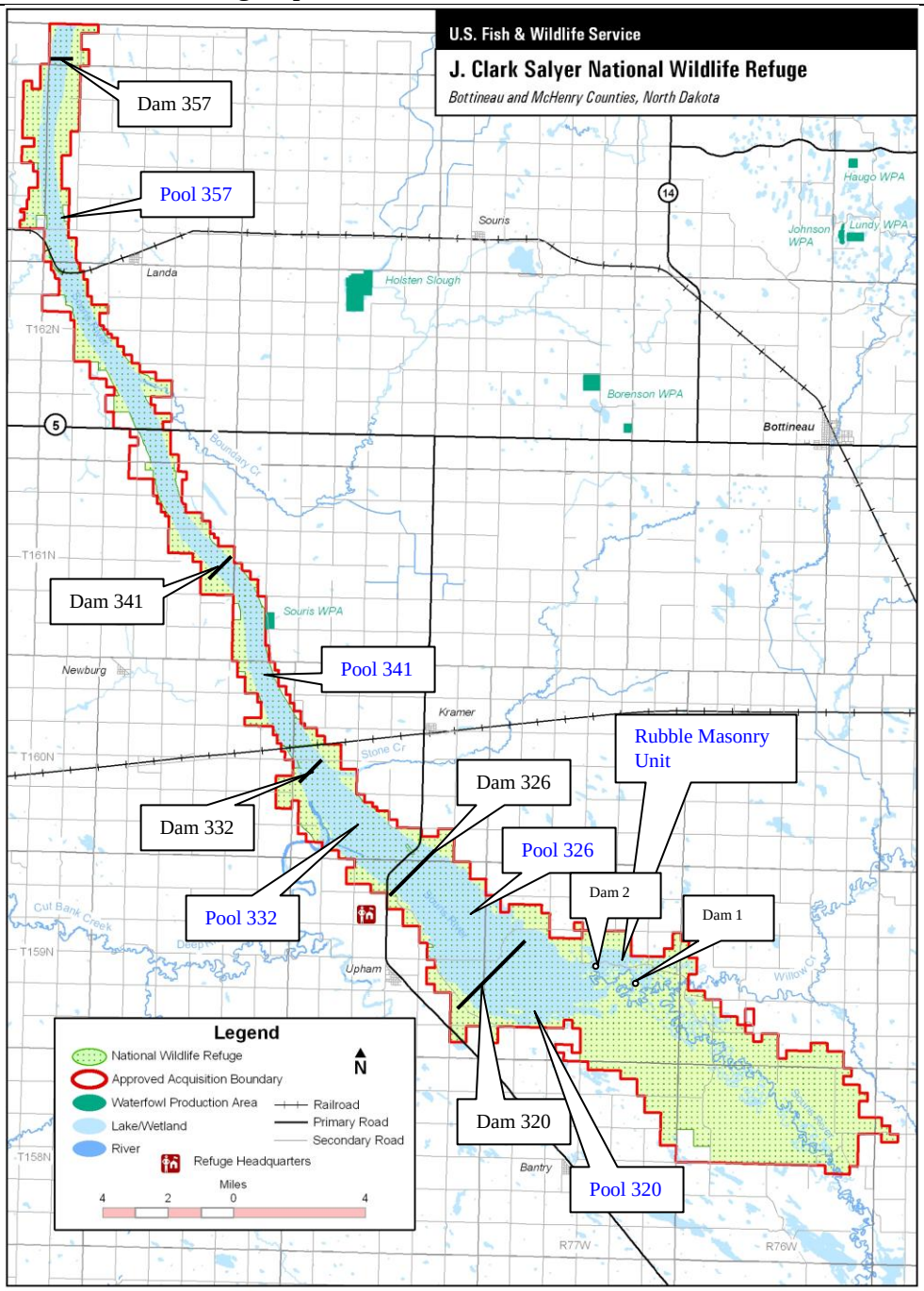


Figure 13. J. Clark Salyer National Wildlife Refuge

Flow through J. Clark Salyer National Wildlife Refuge:

Description of Area and Review of Information: There was a great deal of discussion about how the J. Clark Salyer National Wildlife Refuge (Figure 13) manages the dams along the Mouse (Souris) River to let water through.

The State, through the Boundary Water Treaty, has an agreement with Canada about the release of water. During May through October, the Refuge has to supply at least 20 cfs to Manitoba. In the fall, the flow is cut back, through discussions with Canada, to allow for ice formation in the lower reaches. The water flow management is done in coordination

with Canada through the International Souris River Board as stated in the Boundary Waters Treaty. The Refuge phones Canada prior to releases for notification. During flood events, the U.S. Army Corps of Engineers takes over control of dam management at the Upper Souris Refuge and recommends management at J. Clark Salyer Refuge for the duration of the flood.

In January 2006, the flow was about 30 to 40 cfs into Canada. During the floods of 2005, the flow was over 3,000 cfs for months. Water release is a slow process. It takes about one week for water to get from J. Clark Salyer Refuge Headquarters to Canada. It takes about one to two weeks for the water to get from the Upper Souris Refuge headquarters north of Minot to the J. Clark Salyer Refuge.

The Refuge applied for funding through the Federal Highway Administration to do work on the Scenic Trail. All the work and planning will be done to meet Federal Highway Standards. This originally had a 2008-2009 startup date. The Refuge Project Leader, Tedd Gutzke, requested that the planning phase be moved up to 2006.

Proposal: The Federal Highway Administration (FHWA) has budgeted $300,000 for the survey and planning of improvements to the J. Clark Salyer Refuge Scenic Trail. This included a review of the bridge that crosses Willow Creek that has been thought to be restricting flow.

Action Taken: Engineers from the FHWA began to survey the area in 2006 and are developing a plan for improvement. The current target date for construction to begin is 2009 due to the larger funding amount required. Johnson bridge and Willow Creek bridge will be replaced, gates will be added in some places for better control of water and the Texas crossing on the scenic trail will be concrete.

Culverts were cleaned out and debris as removed from bridges throughout the scenic trail and a new 36” culvert was installed north of Thompson Well.

Responsible Agency/Party: U.S. Fish and Wildlife Service, Federal Highway Administration

Funding Sources: Federal Highway Bill

Willow Creek Diversion (to north and around Dam 1):

Description of Area and Review of Information: The north side of the scenic trail in this area has meadows that were holding water but the south side did not. There was also a lot of water flowing very slowly in this area.

Proposal: Create a diversion around Dam 1 on the Refuge to decrease flooding above the Refuge.

Discussion: This would be at a high cost and with not much benefit. Also the purpose of Dam #1 is to pond water in dry years, so there are lots of water rights issues. In the end, it will just bring water into Pool # 320 faster.

Action Taken: Due to issues with water rights, the diversion was not possible. The Refuge cleared culverts along the scenic trail to help reduce the water flow problems. The Refuge also continues to work at reducing the number of cattails in the area.

Responsible Agency/Party: J. Clark Salyer NWR

4.0 AREA OF CONCERN – OTHER WATERSHED AND SUBWATERSHED ISSUES

Proposal: Wetland restoration and creations (voluntary) to act as storage reservoirs throughout the watershed. Riparian restorations to slow bank erosion, improve water quality.

Action Taken: A project plan was in the process of development by Turtle Mountain SCD as part of a NDDoH Section 319 Grant Proposal application process for July of 2007. Due to the loss of their watershed coordinator and other unforeseen complications, the grant was not ready for submission. Work will continue on the proposal with the hopes of submission during the July 2008 grant application process. Other SCDs and Water Resource Boards in the Willow Creek watershed will be approached to determine interest in water assessments and implementation of conservation practices as time and funding allow.

Responsible Agency/Party: SCDs, WRBs (through 319 grant), NDDoH, NRCS, USFWS.

Funding Sources: SCDs, WRBs (through NDDoH 319 grant), USFWS, NRCS.

Other Items of Concern:

Other items discussed include:

Problem: Need for flood forecasting for next year.

Solution: County Emergency Management Coordinators are continually updated on flood forecasting.

Problem: Need to establish a command center for information during potential flood events.

Solution: Bottineau County Emergency Management Coordinator has written and submitted an emergency management plan to both the State and FEMA. A command center has been established and items of need have been addressed.

Problem: Need to establish a PR person to let public know about options and what Task Force recommendations are.

Solution: Bottineau County Emergency Management Coordinator has taken on this role and will continue to keep the public informed.

Problem: Beaver impeding the flow of water through culverts, bridges, and flooding land.

As discussed earlier there is a program through USDA/APHIS to hire 4 full time trappers for 30 counties. Cost (portion of match) would be split evenly among all counties, regardless of how many beaver were removed from each county.

The option of putting a bounty out was also discussed. It might be more cost effective, but there is concern about people "importing" beaver from Canada instead of just addressing those on the North Dakota side of the border. Also there is a need to make sure that all township ordinances are current to allow the effective removal of beaver.

Solution: The counties included in this Task Force have initially agreed to the proposal and are awaiting word on funding.

Adam Powers from Nick of Time presented possible grant opportunities available:
Jeff Klein – flood mitigation projects/planning up to $100,000 – GPS culverts
Hazard Mitigation Grant Program for flood mitigation projects - $120,000
US Army Corps of Engineers – 404 project
Pre-disaster Mitigation Grant Program – nationally competitive
Community Development Block Grant – City of Bottineau – lift stations

The State Water Commission, US Fish and Wildlife Service, and the North Dakota Department of Health will continue to pursue grant funding opportunities through the International Souris River Board and International Joint Commission and other sources to assist with data collection throughout the Willow Creek watershed.

5.0 PREVIOUS REPORTS AND RECOMMENDATIONS

In 1985 the USDA Soil Conservation Service (now NRCS) prepared a Flood Plain Management Study on Oak Creek and Willow Creek and Adjacent Critical Flood Plain Areas. In it they discuss flood history, flood potential, flood plain management and have maps showing the floodplain all along Oak Creek. The report also makes recommendations. An excerpt from the report is listed below:

Flood Potential: Potential flood areas within the study area include primarily agricultural land. Flood damages include eroded land, sediment deposition, crop and pasture damage, washed out fences, and weakened roads and bridges. Floodwaters in the study area rise rapidly. Duration of flooding normally ranges from 7 to 14 days for significant flood events.

Flood Plain Management: A coordinated planning procedure such as this is a vital part of any comprehensive flood plain management program. Effective flood plain management involves public policy and action for the wise use and development of the flood plain. It also includes such measures as collection and dissemination of flood control information, acquisition of flood plain lands, construction of control structures and enactment of ordinances and statutes regarding flood plain land use and development.

Flood Plain Regulations: Flood plain regulations are designed to permit realistic use of flood plain areas without increasing potential damage. Among the various elements used to accomplish this are zoning ordinances, subdivision regulations, building codes, and sanitary and utility regulations.

Other Measures: Land use and other regulatory controls including zoning, subdivision regulation and building codes play an important role in flood plain management. In order for these measures to be effective, it is important that the communities take action to implement other programs and measure to supplement these controls. A few possible measures to protect and control developments in flood prone areas are: 1) open space land acquisition programs, 2) urban renewal programs, 3) preferential tax assessment, 4) flood proofing of

existing structures, and 5) public policy governing the construction of utilities and public facilities such as bridges and streets. The Office of the State Engineer, upon request, will provide assistance in flood proofing techniques, the implementation of a flood warning system and establishment of a local flood data collection program.

Recommendations:
1) Adoption of local land use and zoning regulations for all flood plain areas. The basic purpose of flood plain regulations is to control development on the flood plain consistent with nature's needs for conveyance of flood flows.

2) Flood proofing existing or future buildings that otherwise cannot be adequately protected.

3) Using as much of the flood hazard areas as possible for parks and other open space uses.

4) Installation of a dike system to protect intensively developed flood plain areas (especially residential, farmsteads, and other buildings)

5) Increase the areas of bridge and culvert openings to minimize the restriction of large floods.

6) Construct upstream floodwater retarding dams, as feasible, to retard flood flows. None appear to be economically feasible under SCS criteria.

6.0 SUGGESTIONS OF THE TRI-COUNTY TASK FORCE

Current data suggests flooding trends of Willow Creek are more frequent and of longer duration than previously reported. Therefore, there is a significant need for future planning and preparation. Through much discussion among members of the Task Force, representing a diverse range of local entities, county boards, and State and Federal agencies, the following suggestions were thought to be most beneficial in preparing for future flooding events. Throughout this document the appropriate entities for addressing most of these suggestions have been identified. It is also recognized that these suggestions have no binding or legal effect.

The creation of a joint water resource board might also be beneficial to address the remaining suggestions, as throughout the discussions it was realized that the problem went beyond the Oak Creek watershed and into the much larger Willow Creek watershed, with each sub-watershed (Oak Creek, Ox Creek, Snake Creek, etc.) contributing an unknown quantity to the problems during flooding events.

Below is a summary of the suggestions proposed by the Task Force to address future flooding problems:

1. Inventory of all available inflows to Lake Metigoshe (culverts and other drainages)

2. Any temporary dams that were put in place should be removed.

3. Continue to improve Willow Creek access to Mouse River.

4. Continue to improve Willow Creek water flow through McHenry County.

5. Propose a possible flood control structure on School Section Lake

6. All water resource boards become proactive in developing an ongoing maintenance plan for the Oak Creek and Willow Creek channels for improved water flow.

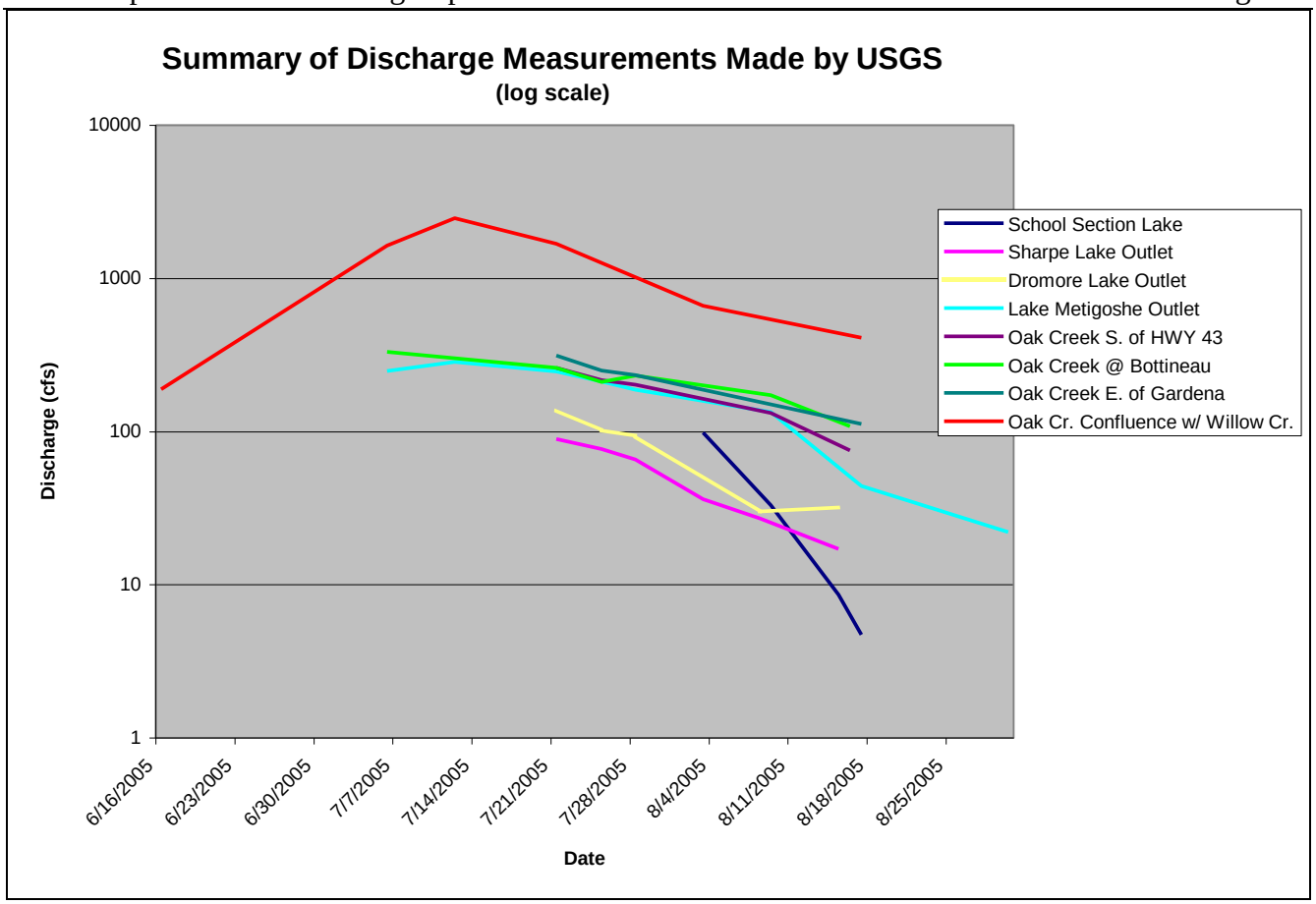
7. Investigate the creation of storage areas/retention ponds to dissipate the amount of water hitting the flat plains of lower Willow Creek during the times of flood.

8. Set up a joint board to investigate a wide variety of the possible protective measures mentioned in this document, as well as search for sources of funding.

Items needing further study:

1. Cattails and their impact on existing waterways – are they a nuisance and need better management.
2. Control of Souris River water (downstream) in Canada. ex. – are their existing dams or obstructions.
3. Willow Creek waters entering into the Souris River.
4. Creation of Oak Creek diversion around Bottineau.

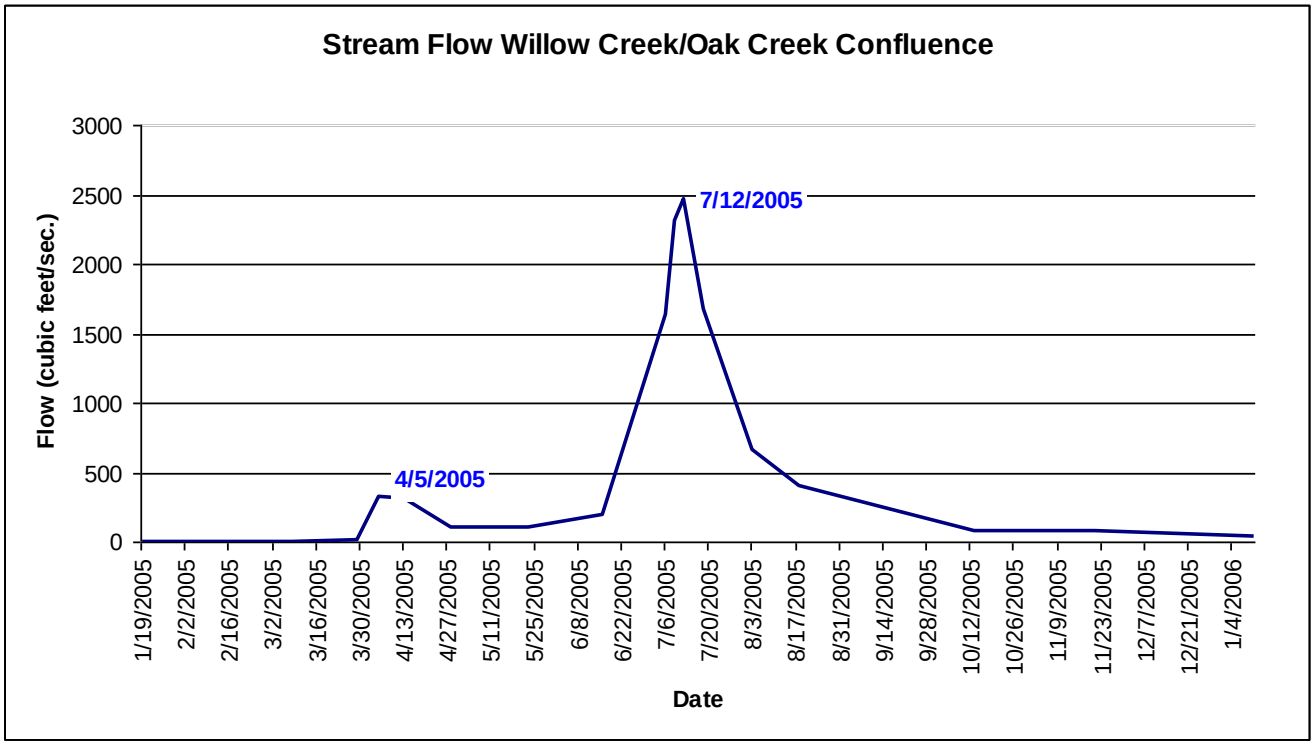
APPENDIX A
Flow Graphs from the United States Geological Survey (USGS)



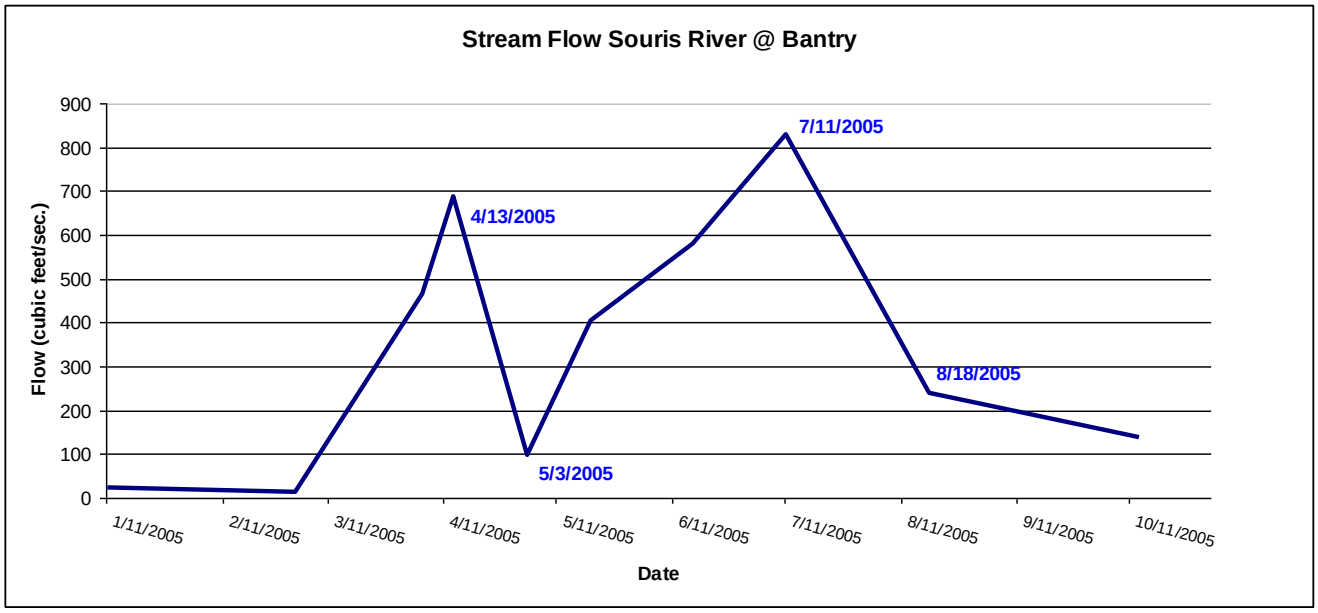
Summary of Dishcarge Measurements Made by the USGS in 2005

(in cubic feet per second)

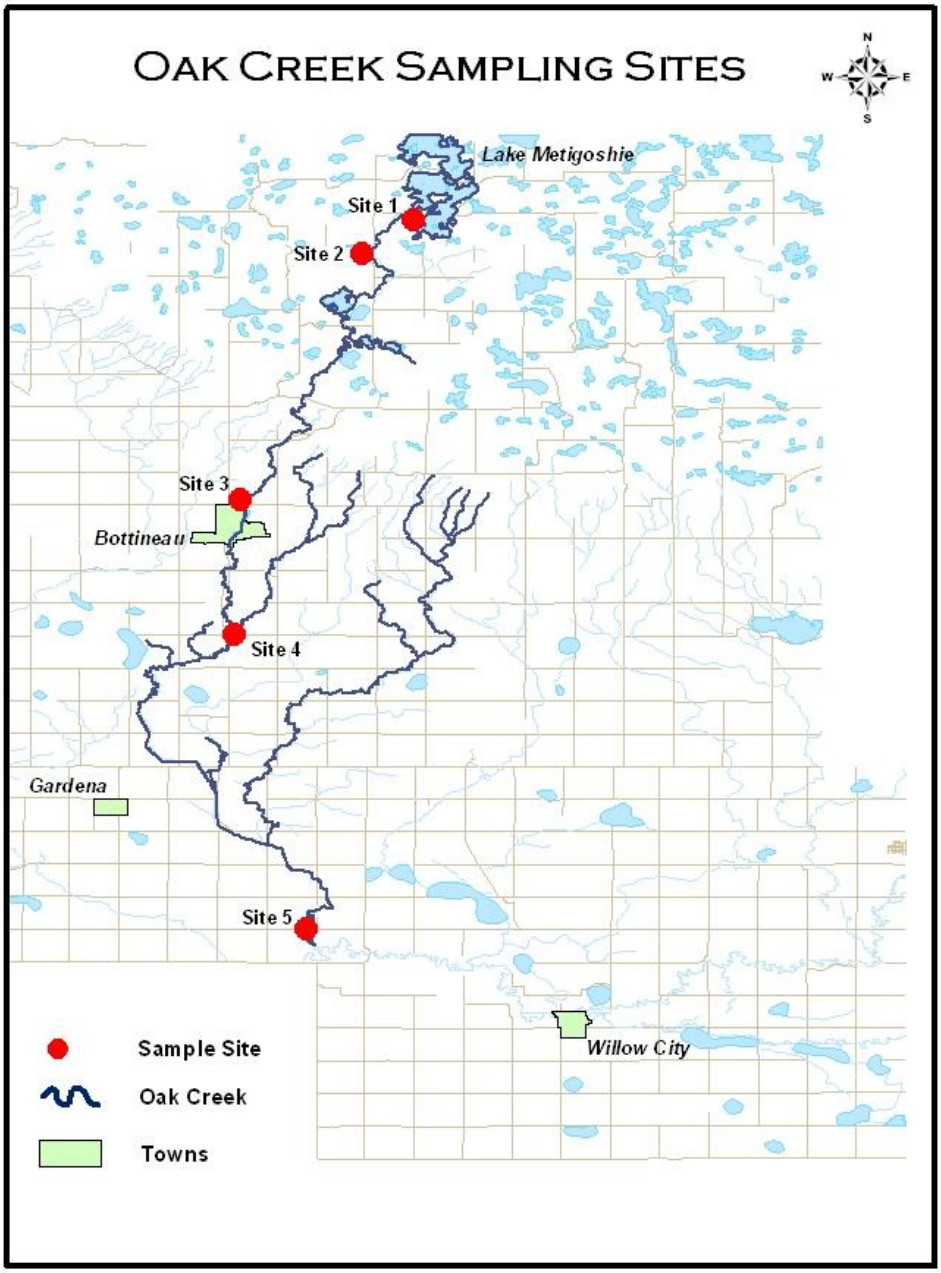
Location	Date											
	7/6	7/12	7/21	7/25	7/28	8/3	8/8	8/9	8/15	8/16	8/17	8/30
School Section lake						98		33	8.6		4.7	
Sharpe Lake Outlet			89	76.9	65.5	36	27		17.1			
Dromore Lake Outlet			138	102	93.4		30		32			
Lake Metigoshe Outlet	248	285	247	212	187			134			44	22
Oak Creek ds of HWY 43			260	217	202			132		75		
Oak Creek at Bottineau	330		261	210	231			173		108		
Oak Creek E. of Gardena			314	249	233						112	
Oak Creek at Willow Creek Confluence	1640	2470	1680			663					409	



Souris River Flows



APPENDIX B
Map of Sampling Site for Oak Creek Assessment Project (2005-2006)
Conducted by the TMSCD



Discharge and water quality samples were taken in the spring of 2005 until flooding prevented further sampling. Sampling was resumed for the entire open water season in 2006.

Appendix C
Aerial Photographs of the 2005 Flooding

Lake Metigoshe and Oak Creek (July 5, 2005)

(Oak Creek south of Lake Metigoshe)

Willow Creek West of Willow City (July 7, 2005)

(Willow City)

Willow Creek Just Upstream of Confluence with Mouse (Souris) River (J. Clark Salyer NWR) (July 12, 2005)

Appendix D
Information from Bacteria Sample Taken
August 10, 2005

Sample Locations
(See map on following page)
Lake Metigoshe Special Project
Sampling Date 08/10/2005

#1) In the water at the swimming beach at Lake Metigoshe State Park

#2) Canada Creek – this is the tributary from Sharp Lake. Water flows from Sharp Lake to Jeromer Lake to Lake Metigoshe. We went upstream on the tributary about 0.5 miles to the bridge. Les says in low water years you can actually get the pontoon under the bridge upstream to Jeromer.

#3) North Basin of Lake Metigoshe – This has STORET number 380610 from the previous monitoring project. Cabins are located to the east, west, and north of the site. The large island, which has no cabins on it, is to the south.

#4) Birchwood Bay – This is, so far as I can tell, and unnamed tributary. Les told me that it drains a series of sloughs back to the north and the west and is mostly in livestock. Several beaver dams have recently been removed upstream. Thought it would be a good comparison to other more human areas.

#5) Central Basin – This has STORET number 380612 from the previous monitoring project. It is very close to the bridge you mentioned between the N and S basins. I thought it would be good to use this spot for comparison purposes. Flow proceeds from this point counter-clockwise around the islands of the central basin, until it reaches the dam. All the water in the south basin is basically backwater/overflow

#6) South Basin – This has STORET number 380611 from the previous monitoring project.

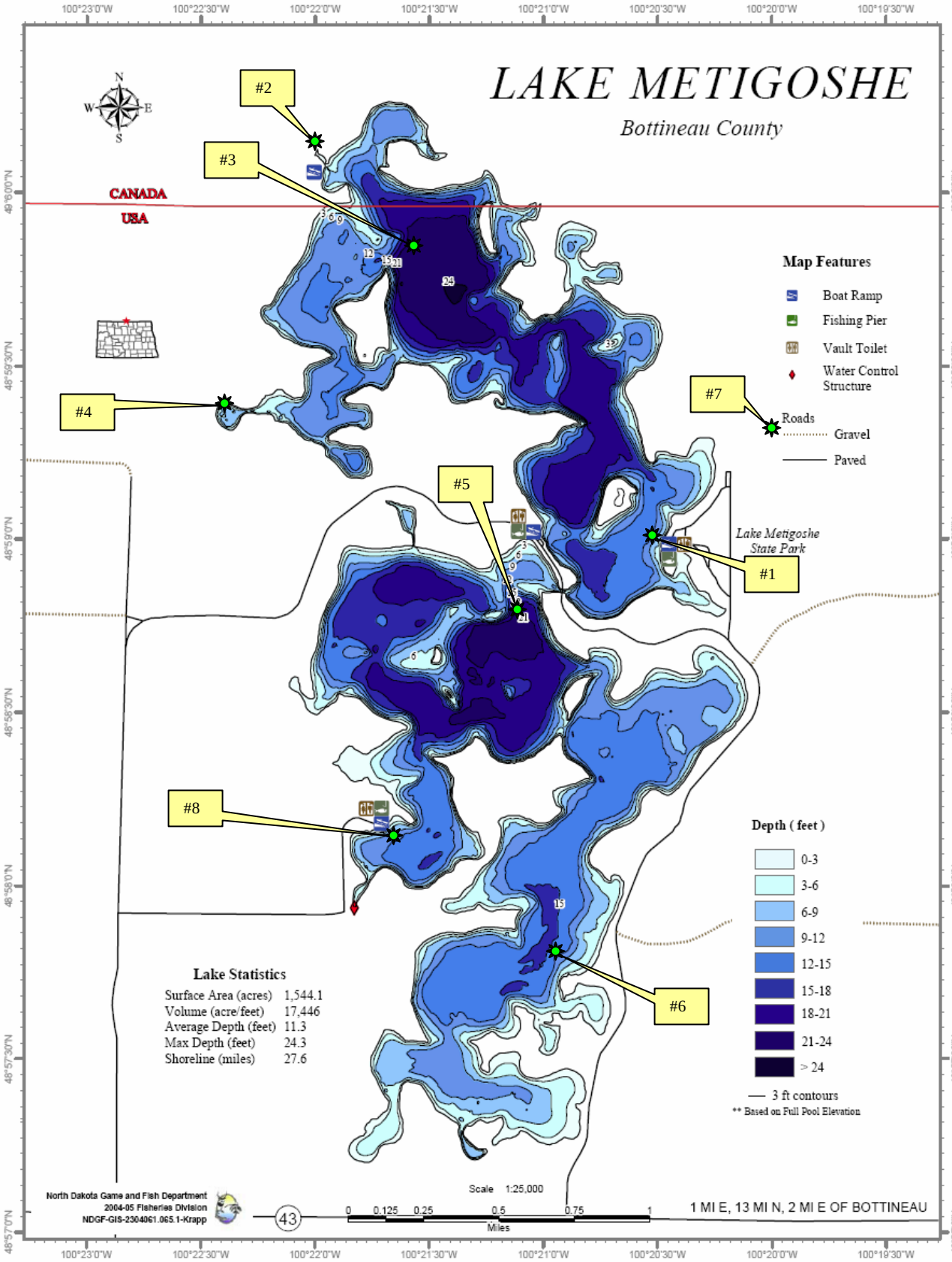
#7) School Section at the outlet – We drove onto the dam that was recently created. Two large culverts are still almost completely underwater, but you can tell it is receding. We took our sample from the southernmost culvert.

#8) Hahn's Bay Boat Dock – Lots of new construction going on in this area. Looks like condo's or mini rental units. We took the sample right from the boat dock/fishing pier as this is the most likely spot for primary contact to occur.

The #'s are what the bottles were labeled while we were sampling. All bottles were labeled with STORET number 388000 for non-assigned, unless the site already had a STORET number (3 from a previous project) then that number was used.

The Project Code I used was RPI for Pollution Investigation and a description of Lake Metigoshe Special Project was given.

I called and talked to the lab (Lydia) before sending the samples so that I was sure they had all the information they needed. The Task Force would like to see the results at the next meeting (Thursday, August 18th).


LAKE METIGOSHE
Bottineau County
CANADA
USA
#1
#2
#3
#4
#5
#6
#7
#8
Lake Metigoshe State Park
Map Features
Boat Ramp
Fishing Pier
Vault Toilet
Water Control Structure
Roads
Gravel
Paved
Depth (feet)
0-3
3-6
6-9
9-12
12-15
15-18
18-21
21-24
> 24
3 ft contours
** Based on Full Pool Elevation
Lake Statistics
Surface Area (acres) 1,544.1
Volume (acre/feet) 17,446
Average Depth (feet) 11.3
Max Depth (feet) 24.3
Shoreline (miles) 27.6
Scale 1:25,000
0 0.125 0.25 0.5 0.75 1
Miles
1 MI E, 13 MI N, 2 MI E OF BOTTINEAU
North Dakota Game and Fish Department
2004-05 Fisheries Division
NDGF-GIS-2304061.065.1-Krapp
43

Site #	SiteDescription	DATE	Parameter	Result	Units
1	Lake Metigoshe State Park Swim Beach	8/10/2005	Fecal Coliform	*NON-DETECT	#/100 mL
1	Lake Metigoshe State Park Swim Beach	8/10/2005	E. Coli	*NON-DETECT	#/100 mL
2	Canada Creek, 0.5 mi upstream from inlet	8/10/2005	Fecal Coliform	*NON-DETECT	#/100 mL
2	Canada Creek, 0.5 mi upstream from inlet	8/10/2005	E. Coli	*NON-DETECT	#/100 mL
4	Lake Metigoshe tributary inlet @ Birchwood Bay	8/10/2005	Fecal Coliform	*NON-DETECT	#/100 mL
4	Lake Metigoshe tributary inlet @ Birchwood Bay	8/10/2005	E. Coli	*NON-DETECT	#/100 mL
7	School Section Lake culverts @ outlet	8/10/2005	Fecal Coliform	*NON-DETECT	#/100 mL
7	School Section Lake culverts @ outlet	8/10/2005	E. Coli	*NON-DETECT	#/100 mL
8	Lake Metigoshe boat dock @ Hahn's Bay	8/10/2005	Fecal Coliform	*NON-DETECT	#/100 mL
8	Lake Metigoshe boat dock @ Hahn's Bay	8/10/2005	E. Coli	*NON-DETECT	#/100 mL
3	Lake Metigoshe - N Basin	8/10/2005	Fecal Coliform	*NON-DETECT	#/100 mL
3	Lake Metigoshe - N Basin	8/10/2005	E. Coli	*NON-DETECT	#/100 mL
6	Lake Metigoshe - S Basin	8/10/2005	Fecal Coliform	*NON-DETECT	#/100 mL
6	Lake Metigoshe - S Basin	8/10/2005	E. Coli	*NON-DETECT	#/100 mL
5	Lake Metigoshe - Center Basin	8/10/2005	Fecal Coliform	10.	#/100 mL
5	Lake Metigoshe - Center Basin	8/10/2005	E. Coli	10.	#/100 mL

Standards of Quality for Waters of the State (State Century Code 33-16-02.1): The beneficial uses and parameter limitations designated for Class I Streams shall apply to all classified lakes or reservoirs. Lake Metigoshe is a classified reservoir.

Maximum Limits for Substances in or Characteristics of Class I Streams

Substance	Maximum Limit
Fecal Coliform[2]	Not to exceed 200 organisms per 100 mL as a geometric mean of representative samples collected during any 30-day consecutive period, nor shall more than 10 percent of samples collected during any 30-day consecutive period individually exceed 400 organisms per 100 mL. For assessment purposes, the 30-day consecutive period shall follow the calendar month. This standard shall apply only during the recreation season of May 1 to Spetmeber 30.
E. coli[2]	Not to exceed 126 organisms per 100 mL as a geometric mean of representative samples collected during any 30-day consecutive period, nor shall more than 10 percent of samples collected during any 30-day consecutive period individually exceed 409 organisms per 100 mL. For assessment purposes, the 30-day consecutive period shall follow the calendar month. This standard shall apply only during the recreation season of May 1 to September 30.

[2]Where the fecal coliform or E. coli criteria, or both are exceeded and there are natural sources, the criteria may be considered attained, provided there is reasonable basis for concluding tat the indicator bacteria density attributable to anthropogenic sources is consistent with the level of water quality required by the criteria. This may be the situation, for example, in headwater streams that are minimally affected by anthropogenic activities.