

Appendix G

Restoration of Extirpated Lake Sturgeon (*Acipenser fulvescens*) in the Red River of the North Watershed

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LAKE STURGEON (*Acipenser fulvescens*)
IN THE RED RIVER OF THE NORTH WATERSHED**

Minnesota Department of Natural Resources

Division of Fisheries

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Work Plan Summary

Background - Discussions on restoration of the lake sturgeon population in the Red River basin have been ongoing for over a decade. The Minnesota Department of Natural Resources (MNDNR) formally addressed lake sturgeon populations in the 1986-1992 Fisheries Long Range Plan (LRP). The LRP objectives for lake sturgeon included 1) determine statewide distribution and status, 2) maintain existing natural populations, 3) provide and protect necessary habitat for natural reproduction, and 4) acquire additional knowledge needed to manage and restore lake sturgeon populations.

Accomplishments resulting from the 1986-92 LRP set direction for future management of lake sturgeon in Minnesota waters. Among the accomplishments was a cooperative telemetry project with the Ontario Ministry of Natural Resources (OMNR). This project determined critical spawning sites, seasonal movements, spawning periodicity, and population dynamics of lake sturgeon stocks of Lake of the Woods and the Rainy River.

New regulations were also established to protect and enhance lake sturgeon populations in Minnesota and its border waters. Harvest closures were implemented on border waters with North Dakota, South Dakota and on Wisconsin border waters of the St. Croix River above Taylors Falls. Angling regulations were also standardized with Ontario to reflect common opening and closing dates and minimum size limits.

A second generation of the Fisheries Long Range Plan for the period 1994 -1999 revised management direction for lake sturgeon in Minnesota. The goal of the 1999 LRP was to enhance current populations and to establish new populations into their former range. With the direction given in the 1994-1999 LRP, the Division of Fisheries began discussions on how to best approach restoration of a viable lake sturgeon population in the Red River basin.

Lake Sturgeon restoration efforts are also ongoing in Manitoba. Manitoba Conservation, Fisheries Branch, has been stocking lake sturgeon fry and fingerlings in the Assiniboine River, a tributary of the Red River, for the past several years.

Restoration efforts by the Wisconsin and Minnesota Departments of Natural Resources were very successful in reestablishing a lake sturgeon population in the St. Louis River, a tributary to Lake Superior, following twelve years of fry and fingerling stocking.

Lake Sturgeon in the Red River basin - Historical accounts suggest that lake sturgeon were abundant in the Red River basin until the late 1800's. Lake sturgeon populations, throughout Minnesota, were decimated by over exploitation, construction of dams, and declines in water quality. By the mid-1900's lake sturgeon had effectively been extirpated from the Red River basin. Although there are occasional, unconfirmed reports of lake sturgeon being caught in the Red River, there is little chance that this population could recover on its own.

Coordination, Planning, and Past Management of Lake Sturgeon Restoration - Along with internal coordination, the MNDNR has worked with North Dakota, South Dakota, and Manitoba in developing comprehensive fisheries management strategies for the Red River. Representatives from these states and province formed the Red River Fisheries Steering Committee (RRFSC) in 1989. The RRFSC provides a forum for coordination and information exchange between management agencies directly responsible for fisheries management in the Red River. Coordination of environmental review input has resulted in a more unified message from fisheries managers on various water development projects in the basin.

Early work of the RRFSC focused on information gathering, primarily directed at the channel catfish population. More recent efforts have been directed at habitat restoration in the main stem and tributaries of the Red River. Connectivity of the river and its tributaries has become a major focus of the RRFSC and the MNDNR. Members of the RRFSC have catalyzed several dam removal and modification plans that will eventually restore fish passage in the Red River basin.

Barriers to fish passage are thought to be the most significant obstacle to the restoration of lake sturgeon populations. Re-connecting river habitat by providing fish passage and the reintroduction of the lake sturgeon population should occur simultaneously. The restoration of fish movement throughout the system will be a long process. However, with the removal or modification of each dam, more miles of river habitat will be connected. Given that lake sturgeon are slow to mature and are long lived, it is our intention to restore a sexually mature population over the next 20 to 30 years. As fish passage is restored, the maturing sturgeon population will be able to access historic spawning areas and hopefully, reproduce naturally.

Coordination of lake sturgeon restoration plans has also occurred with the OMNR and the White Earth Biology Department (WEBD), though most interaction has been related to the Rainy River and Lake of the Woods. In prior meetings between MNDNR, OMNR, and WEBD all have indicated that restoration of lake sturgeon population is a high priority. The ongoing recovery of lake sturgeon in the Rainy River is a clear example of how water quality improvement and river level management can accelerate recovery of a species.

The White Earth Biology Department (WEBD) has recently begun a lake sturgeon restoration-stocking program in White Earth and Round lakes within the White Earth Reservation. In 2001, 6,000 and 12,000 six to eight-inch fingerlings were stocked in Round and White Earth Lakes, respectively. WEBD plans call for annual stocking of 5,000 and 8,000 fingerlings in these lakes, respectively. A larger number of fingerlings were stocked in 2001 to make up for the stocking that did not occur in 2000.

Restoration Sites - Several sites in the upper reaches of the Red River basin have been chosen for reintroduction of lake sturgeon. Location of each site is described on the accompanying map, Lake Sturgeon Stocking in the Red River Valley.

Otter Tail River

The Otter Tail River, which joins the Bois de Sioux River to form the Red River, has been negatively impacted by channelization, wetland drainage and construction of dams. Fish passage has been restored to the lower 40 miles of this river as a result of modifications to the Lake Breckenridge dam and Breckenridge water plant dam. A third dam (Kidder Dam at Wahpeton/Breckenridge) was modified in 2000 further restoring fish passage in the upper reaches of the Red River.

The Otter Tail River, from the mouth to Orwell Dam, provides suitable spawning sites for adults residing in the Red River. Migration of lake sturgeon above Orwell Dam and to the headwaters of the river is not possible because of several high profile dams in and near Fergus Falls.

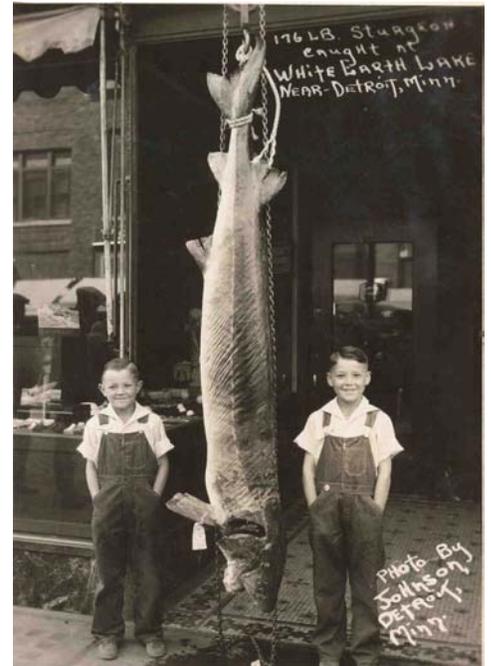
Otter Tail Lake - Otter Tail Lake is a large (13,725 acre) flowage lake located in central Otter Tail County. The Otter Tail River flows through the lake connecting numerous lakes both upstream and downstream of the lake. Fish passage is not possible from the Red River because of several dams in and near Fergus Falls; however, with the removal of the Frazee Dam fish passage is now possible upstream of Otter Tail Lake into the headwaters of the Otter Tail River.

Suitable lake sturgeon spawning habitat exists in Otter Tail Lake, the Otter Tail River and in several of the upstream lakes. An abundant forage base, consisting of invertebrates and crayfish, exists in the lake and river and will provide adequate food for the various life stages.

Lake sturgeon were found in the Otter Tail River watershed at one time but were extirpated by over-exploitation and construction of dams that blocked their migration routes. By re-introducing lake sturgeon to Otter Tail Lake and the upper headwater watershed a population may develop, which over time may augment the lower Otter Tail River and Red River through downstream movement.

Round Lake – Round Lake is located within the White Earth Indian Reservation and is a headwater lake of the Otter Tail River system. Historical accounts indicate lake sturgeon were once present in the system. Potential spawning sites are located near Many Point Lake on the Otter Tail River. Much like other lake sturgeon populations throughout their historic range, these populations were lost by over-fishing and construction of dams that blocked migration routes to critical habitat.

White Earth Lake – White Earth Lake is located within the White Earth Indian Reservation. This lake is the headwater lake for the White Earth River that flows into the Wild Rice River near Mahanomen. Historical accounts indicate lake sturgeon were once present in this lake. A 176-pound specimen was caught in White Earth Lake on May 12, 1926. Potential spawning sites are located in the Wild Rice and White Earth rivers. In particular, the high gradient beach ridge area of the Wild Rice River (just upstream of Twin Valley) contains good sturgeon spawning habitat. Much like lake sturgeon populations throughout their native range, these populations were extirpated by over-exploitation and construction of dams that blocked their migration routes. The Heiberg and White Earth dams are presently blocking fish passage from the Red River to the Wild Rice and White Earth River and Lake. A cost-sharing grant from the USFWS has been attained for modification of the Heiberg Dam for fish passage. Talks with the Wild Rice Watershed District on the project have been favorable. If matching funding can be obtained, a rock slope could be built on the downstream side of the dam to provide access to the upper 75 miles of Wild Rice River, the White Earth River, and White Earth Lake.



Detroit Lake - Detroit Lake is located within the city limits of Detroit Lakes and is a popular lake for recreation. The lake is located in the upper Pelican River system. The river connects numerous lakes and eventually flows into the Otter Tail River. Several lakes in the Pelican River systems once had abundant lake sturgeon populations. A photo of a 106-pound sturgeon that was caught from Detroit Lake in 1890 was found at the Becker County Historical Museum. The fish measured 76 inches and had a girth of 34 inches. A dam on the Pelican River at the outlet of Muskrat Lake, just downstream of Detroit Lake, was recently converted into a rock rapid and should provide sturgeon spawning habitat and access to the upper reaches of the river and Big



Detroit Lake. Numerous other downstream dams on the Pelican and Otter Tail River still need to be modified or removed.



Roseau River - The Roseau River is Minnesota's most northern tributary to the Red River of the North. The stream reach near Caribou has high quality spawning habitat for walleye, sauger and other riverine species. This reach of river was a historic lake sturgeon spawning area as reported by early settlers. The largest known lake sturgeon, weighing over 400 lbs, was taken from the Roseau River near Dominion City, Manitoba. The Dominion City, Manitoba low head dam was modified with a rock rapid in 1996 to facilitate fish passage. The project reconnected the Roseau River to Roseau, MN. In January 2001, the Roseau City Dam was modified with a rock rapid to reconnect the stream reach from Roseau to Hayes Lake.

Much like lake sturgeon populations throughout their native range, these populations were extirpated by over-exploitation and construction of dams that blocked their migration routes. A MN DNR tagged lake sturgeon from the 1998 stocking in the Otter Tail River was recaptured and released (2000) near Roseau River, Manitoba.

Red Lake River - The Red Lake River is the largest tributary on the Minnesota side of the Red River of the North. A major lake sturgeon-spawning site is located at the confluence of the Red Lake and Clearwater Rivers, Red Lake County, MN. The Crookston and East Grand Forks low head dams block fish passage to this historic spawning site. Upstream movement of fish is only possible during large flood events. The Crookston dam is being modified in 2002 to address safety, erosion and fish passage concerns. Partial funding has been secured to modify the East Grand Forks dam in 2003. Stocked lake sturgeon from the 1997 and 1998 Otter Tail River stocking events have been captured downstream of the dam at Crookston following high flow events. The removal or modification of the East Grand Forks and Crookston dams will reconnect the Red River with the Red Lake River to Thief River Falls, MN. Fish will also have access to high quality spawning habitat in the Clearwater River.



Buffalo River

The Buffalo River is the next large tributary upstream of the Wild Rice River on the Minnesota side of the Red River. It is 140 miles in length from the confluence of the Red River to the headwaters. At around river mile 50, the gradient increases as the stream flows through the beach ridge area. About twenty miles of high quality higher gradient stream habitat exist in the beach ridge area. The Buffalo River State Park Dam is located in the beach ridge area and blocks fish migration to around 75 miles of river upstream. Removal of the dam is scheduled for the summer of 2002.

Stocking Plans

Initial restoration efforts in the late 1990's focused on the capture and relocation of sub-adult lake sturgeon from the Rainy River to the Red River watershed. During 1997 and 1998, 378 lake sturgeon (4-10 yr old) were transferred. Seventy-five fish were stocked in Big Detroit Lake and 303 fish were stocked in the Otter Tail River. The relocation of sub-adults from the Rainy River was hampered by high water conditions in 1999-2000. High angler harvest of sturgeon from the Rainy River since 2000 has subsequently eliminated efforts to relocate sub-adult lake sturgeon to the Red River Basin. In 2001, we began investigating alternative stocking strategies to support restoration efforts, relying largely on the documented success from the St. Louis River sturgeon restoration project.

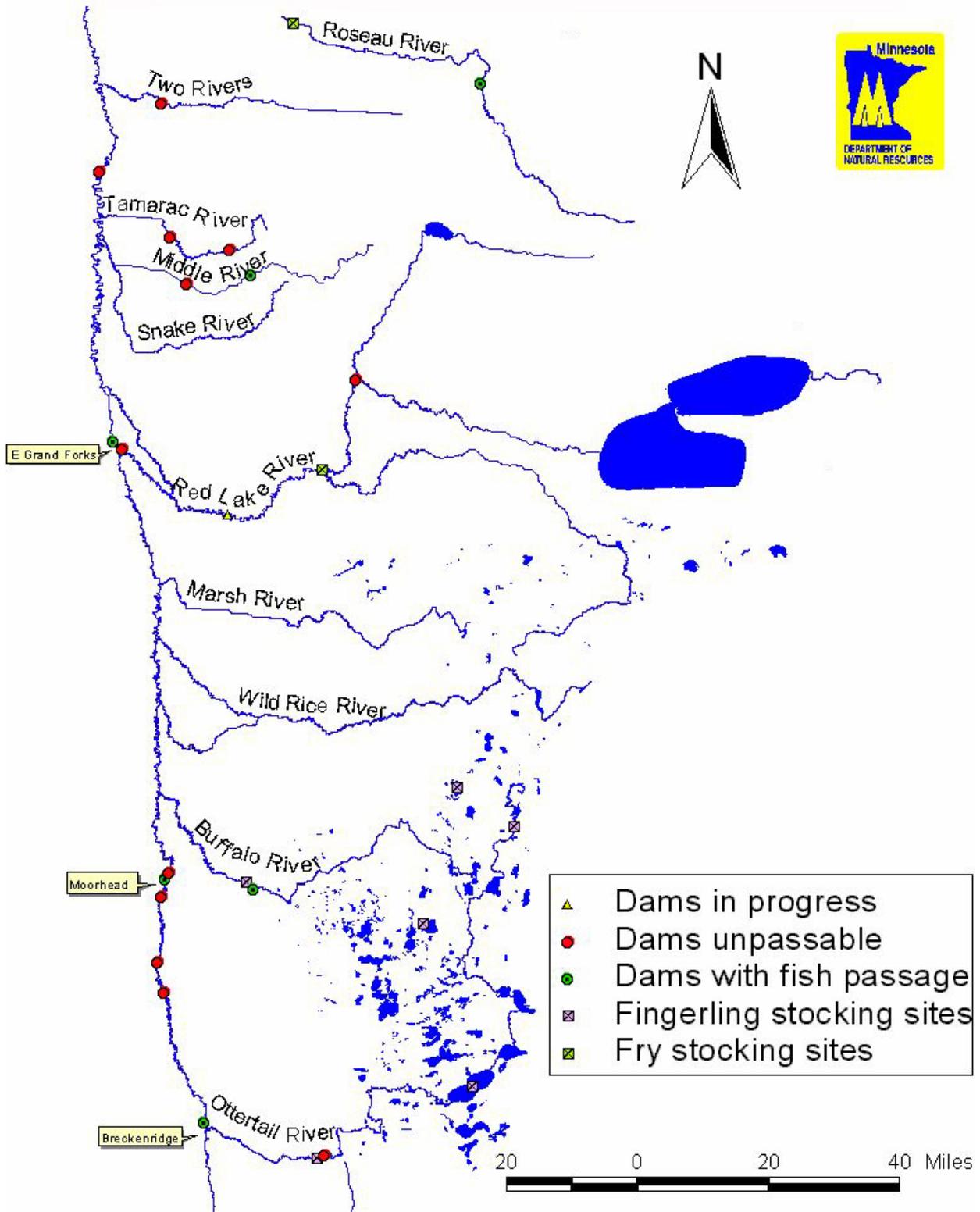
Lake sturgeon reintroduction efforts in the St. Louis River estuary were very successful following twelve years of fry/fingerling stocking. Successful reintroduction efforts may hinge upon stocking a young enough life stage so that imprinting to the receiving water is maximized. Because lake sturgeon grow so slow and mature at such a late age it is recommended that a minimum of 20 lake sturgeon year classes be stocked. It is recommended that fry and fingerlings not be stocked in the same water each year as this would complicate the evaluation analysis.

We propose a 20 year plan that relies on stocking fry and fingerlings originating from Rainy River stock. The USFWS has established working relationships with Rainy River First Nations and the White Earth Reservation and demonstrated the ability to produce 6-8 inch fingerlings. Through the USFWS we would obtain hardened eggs from the USFWS on their way back to Federal hatcheries. The eggs would be hatched for programmed fry stocking at either Detroit Lakes or Fergus Falls. Fingerlings would be obtained from the Neosho USFWS hatchery in Missouri.

The following table and map summarizes proposed stocking locations and operational plans for the twenty year program (2002-2022).

<u>Stocking Locations</u>	<u>Life Stage</u>	<u>Number</u>	<u>Frequency</u>	<u>Jurisdiction</u>
Big Detroit Lake	Fingerling	4,000	Annual	MN DNR
Otter Tail Lake	Fingerling	15,000	Annual	MN DNR
Round Lake	Fingerling	5,000	Annual	White Earth
White Earth Lake	Fingerling	8,000	Annual	White Earth
Otter Tail River	Fingerling	1,000	Annual	MN DNR
Buffalo River	Fingerling	1,000	Annual	MN DNR
Roseau River	Fry	200,000	Annual	MN DNR
Red Lake River	Fry	400,000	Annual	MN DNR

Lake Sturgeon Stocking in the Red River Valley



Evaluation Plans

The following table summarizes evaluation plans for waters receiving lake sturgeon stockings:

Water	Survey Type	Survey Gear	Survey Year	Jurisdiction
Big Detroit Lake	Lake Population Assessment	Experimental & Large Mesh Gill Nets	2003, 2007 - 4 yr intervals	MN DNR
Otter Tail Lake	Lake Population Assessment	Experimental & Large Mesh Gill Nets	2004, 2007 - 3 yr intervals	MN DNR
Round Lake	Lake Population Assessment	Experimental & Large Mesh Gill Nets	2005, 2010 – 5 yr intervals	White Earth
White Earth Lake	Lake Population Assessment	Experimental & Large Mesh Gill Nets	2002, 2007 – 5 yr intervals	White Earth
Red River	Stream Population Assessment	Electrofishing, Trap Nets	2005, 2010 – 5 yr intervals	MN DNR
Red River	Creel Survey		2010/2011	MN DNR
Otter Tail River	Stream Population Assessment	Electrofishing, Trap Nets	2004, 2009 – 5 yr intervals	MN DNR
Buffalo River	Stream Population Assessment	Electrofishing, Trap Nets		MN DNR
Roseau River	Stream Population Assessment	Electrofishing, Trap Nets	2005 – 5 yr intervals	MN DNR
Red Lake River	Stream Population Assessment	Electrofishing, Trap Nets	2005 – 5 yr intervals	MN DNR

Public Information

Angler reports will probably be the most effective method of documenting distribution and movement of lake sturgeon. Area DNR offices will work with the media, anglers and angling groups to inform them of efforts to restore lake sturgeon in the Red River basin. This intensive public outreach will be essential for evaluating the stocking programs. A billfold card (Where are the Sturgeon) has been developed and distributed to inform the public of the restoration project. Periodic information meetings will be held to up-date restoration efforts. Anglers will be informed on what they should do if they catch a lake sturgeon.

Regulations

Effective March 1, 2001, Minnesota implemented a new regulation for Lake of the Woods/Rainy River allowing one lake sturgeon per season with all fish less than 45" or greater than 55" returned to the water immediately. The season runs from July 1 through April 30. The regulation was implemented to reduce harvest with expanding fishing effort.

A closure to harvest will remain in effect indefinitely on the Red River and all inland tributary waters.

Specific Concerns Addressed - Throughout the planning and coordination process the MNDNR addressed key areas of concern before proceeding with the reintroductions. A summary of the concerns and findings are given below.

1. Genetic suitability - A 2001 lake sturgeon genetic study in the Saskatchewan and Winnipeg Rivers suggest that lake sturgeon populations from each major river system are unique and have a distinct genetic makeup (Robinson and Ferguson, 2001). Fields and Phillip reported in 1997 that lake sturgeon in the upper Hudson Bay are of one genetic stock. This apparent contradiction can be explained through the use of genetic tools each researcher used at the time of their study. The genetic tools Robinson and Ferguson used have been found to detect finer population structure than the tools of Fields and Phillip.

The province of Manitoba has offered lake sturgeon fry for our restoration efforts; however they may only be available on a limited or infrequent basis. Our restoration stocking plans should include lake sturgeon from a dependable, consistent source. Previous sturgeon stockings in the Red River watershed by the MN DNR and the White Earth Band have utilized fish from the Rainy River. We should not mix lake sturgeon from a variety of different sources as this may eventually reduce fitness in lake sturgeon offspring.

For these reasons and since lake sturgeon are considered to be extirpated from the Red River drainage, we have chosen the Rainy River source as the strain to stock for our restoration efforts. Establishment of lake sturgeon populations in the Otter Tail River and Big Detroit Lake would also serve as an additional source of this genetic stock for future rehabilitation of other sites in the Red River basin. As the population matures and individuals move downstream, they will also contribute to restoring abundance in areas where migration routes out of Lake Winnipeg have been blocked by dams. A lake sturgeon population in the Red River basin, with origins from the Rainy River, would also provide a genetic pool as protection against a catastrophic event to Lake of the Woods and Rainy River populations.

2. Barriers that caused decline are still in place - What has changed?

Connectivity of the Red River and its tributaries is being addressed through the Red River Steering Committee, Corps of Engineers and many other project partners. In October, 1997, the COE prioritized the eight main stem dam removal or modification projects to address public safety, erosion potential and fish passage issues. The Fargo Midtown dam (Fargo, ND) was modified in 1997. The Lake Breckenridge dam fish by-pass (Breckenridge, MN on Otter Tail River) was constructed in 1998. Kidder dam (Wahpeton, ND) was modified in 2000. The Riverside dam modification (Grand Forks, ND) was completed in 2002. Modification of the North Dam (Fargo, ND) was completed in 2002. The Crookston Dam (Crookston, MN on the Red Lake River) is being modified in 2002. The MN DNR set priorities for main stem and tributaries dams in 2001 for dam removal or modification project funding. The Roseau City dam modification (Roseau River) and Old Mill State Park dam removal (Middle River) projects were completed in 2001. The Fargo/Moorhead South Dam is being let for bids in 2002. The Buffalo River State Park dam (Buffalo River) is being removed in 2002. The MN DNR and ND Water Commission are looking at the Drayton, Hickston, and Christine Dams for potential removal. The Heiberg and White Earth dams are presently blocking fish passage from the Red River to the Wild Rice and White Earth River and Lake. A cost-sharing grant from the USFWS has been attained for modification of the Heiberg Dam for fish passage. Talks with the Wild Rice Watershed District on the project have been favorable. If matching funding can be obtained, a rock slope could be built on the downstream side of the dam to provide access to the upper 75 miles of Wild Rice River, the White Earth River, and White Earth Lake. Several other dams are being reviewed in the watershed. Efforts to remove or modify dams to address public safety concerns and permit fish passage are ongoing and may be completed within twenty years.

The process of restoring the connectivity of the Red River basin will be long, but each dam removed and each barrier eliminated will accelerate the process. As the process of barrier removal occurs, so will the maturing of the lake sturgeon population. Through our monitoring and evaluation plans we hope to identify the factors most critical to insuring a self-sustaining population. The momentum and direction of public opinion toward dam removal and modification has changed substantially in recent years. The added incentive of restoring the lake sturgeon population will certainly further our efforts toward a more informed and proactive public.