Lower Chippewa River Baseline Monitoring

Fisheries Inventory

By
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Lower Chippewa River Basin
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Abstract

The Wisconsin Department of Natural Resources (WDNR) water program staff surveyed the lower Chippewa River during the 2000 and 2001 field seasons as part of the nonwadeable baseline monitoring strategy for Wisconsin's large rivers. A total of sixty-five species of fish were collected from the lower Chippewa River using a variety of techniques. Of those sixty-five species of fish collected, nine are listed on the states endangered, threatened or special concern species list. Index of Biotic Integrity sampling indicates that the lower Chippewa River fish community is in excellent condition. Species diversity and biomass is high, riverine specialist species are abundant and the fish assemblage composition is represented by a diverse and specialized large river fish community.

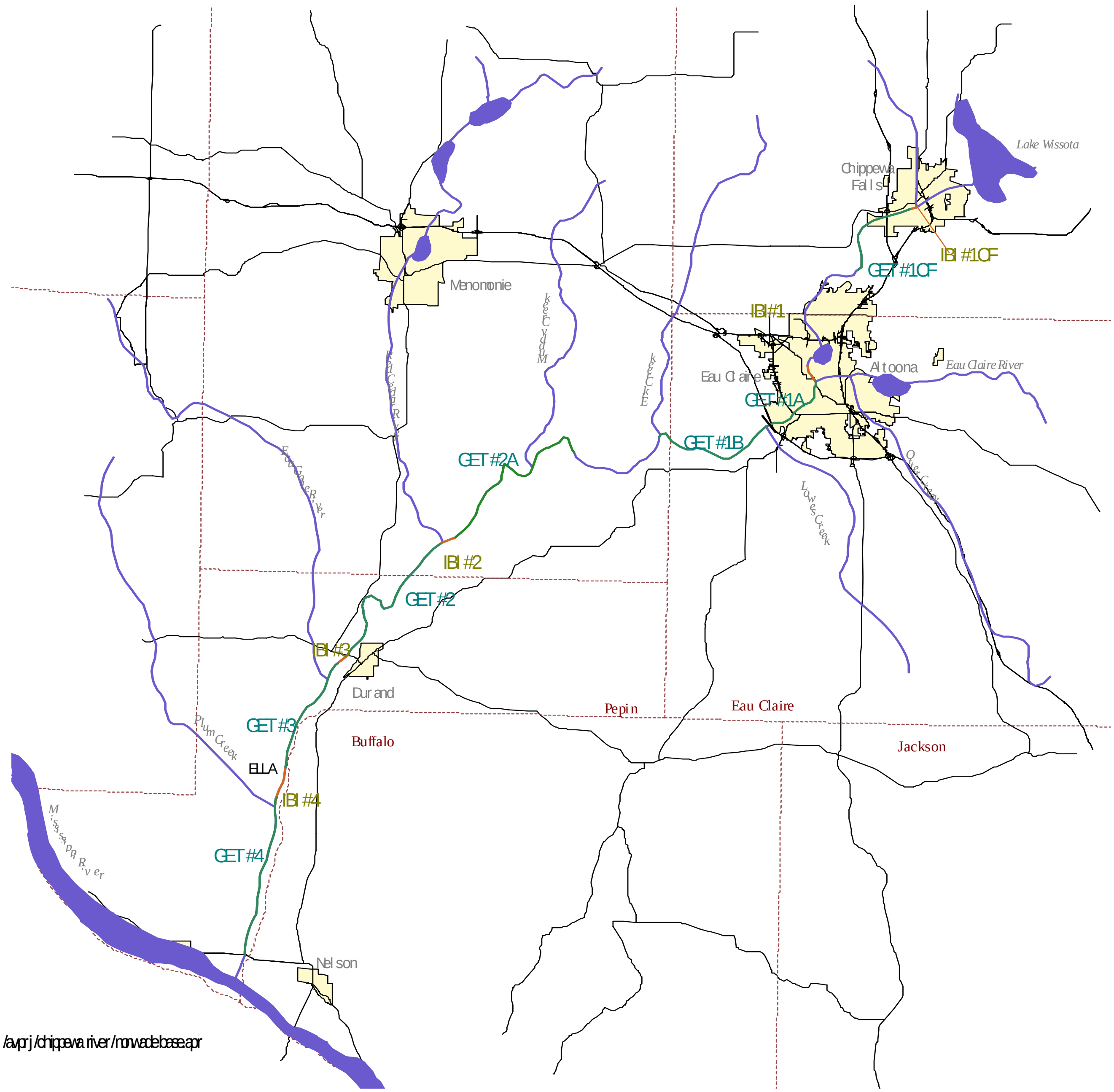
Shorthead redhorse was the most abundant fish captured during IBI sampling runs. During the gamefish and endangered and threatened species runs, smallmouth bass were the most abundant gamefish followed by walleye and northern pike.

Although the river is in excellent shape, we did identify one primary problem in the fish community. Of utmost importance is the status of the shovelnose sturgeon fishery. Shovelnose sturgeon had been historically documented in high abundance throughout the lower Chippewa River. Historic survey information has shown that it was the most abundant gamefish on the lower Chippewa River. Our recent survey documented only ten shovelnose sturgeon during three seasonal sampling bouts using similar gear, seasonal sampling periods and under similar flow conditions when compared to past fisheries assessments. At this time, it appears that the shovelnose sturgeon fishery on the lower Chippewa River is considerably lower when compared to historic records. Future studies and regulation evaluations are needed to address this high priority issue.

Overall, the lower Chippewa River fish community is in very good condition. This can be attributed to the fact that the lower Chippewa River has not been fragmented by dams and near shore habitat degradation has been minimized. Fish access is not impeded from the larger Mississippi River, thereby providing a large free-flowing riverine system with suitable habitat in which the large river fish community in the lower Chippewa River needs to survive.

Future management activities should target efforts in which to avoid and minimize habitat losses associated from various sources. Habitat losses can range from such impacts as water level fluctuations, fish passage obstruction from dams, fragmentation and destruction of riverine shoreline habitat from landuse changes, near shore habitat losses from development pressures and deterioration of water quality conditions in the watershed. In efforts to maintain the biological integrity of the lower Chippewa River all these factors must be taken into consideration and be of equitable importance if the preservation of this river and its associated biological community are to be preserved for future generations.

Figure 1: Sampling Stations, lower Chippewa River, 2000-2001 Nonwadeable Baseline Monitoring.



Sampling Dates:	**July: 17,18,24,25,26,27-2000** **September: 20,21,25,26,27,28-2000** **May: 16,17,21,23,24,30,31-2001**
Field Crew:	**Heath Benike, Marty Engel, Dean Johnson, Brian Spangler, John Paddock, Joseph Kurz, Dan Hatleli, Ted Cummings, Sterling Raske, Scott Peavy, Brian Michalek Amanda Rabuck, Patty Asher, Sarah Beaster, Ron Melecki, Greg Wagner, Jennifer Hurt, Luke Zarens, Paul LaLiberte, Ken Schreiber, Jordan Weeks, Arno Lamm, Jodi Hanson, Pat Oldenberg and Holly Eaton.**
Data Management:	**Heath Benike, Dean Johnson and Brian Michalek**

INTRODUCTION

As part of the baseline monitoring strategy for non-wadeable rivers in Wisconsin, the Wisconsin Department of Natural Resources, lower Chippewa River Basin water staff sampled the lower Chippewa River during the 2000 and 2001 field seasons. The purpose of this survey was to develop a baseline inventory of the existing fisheries resources in the lower Chippewa River and make recommendations for future fisheries management activities. In addition, the work that was conducted will be used to develop standardized methods and procedures for monitoring non-wadeable rivers in the West Central Region and throughout the state of Wisconsin.

PHYSICAL DESCRIPTION

The lower Chippewa River starts below the Dells hydropower facility (Federal Energy Regulatory Commission (FERC) project # 2670) and is free flowing for approximately 59.5 miles before it joins the Mississippi River near Nelson, Wisconsin. The Dells hydropower facility affects current flow conditions on the lower Chippewa River. The current FERC license requires that a constant minimum flow of 500 cubic feet per second (cfs) be released from the hydroplant at all times, with no limitations on maximum flow releases. Flow discharges on the Chippewa River are also effected by flow conditions from the Red Cedar River, which joins the Chippewa River upstream of Durand. The current minimum flow requirement from the Menomonie Dam on the lower Red Cedar River is 450 cfs and there is no limitations on maximum flow requirements. Mean annual discharge at Durand is estimated at 7684 cfs (USGS, 1999).

The riparian corridor along the lower Chippewa River is primarily wooded and well protected with the exception of the portion which flows through Eau Claire which is mostly urban. Development pressure along the riparian corridor has historically been low, but is increasing with the rapid growth currently experienced in Western Wisconsin. The physical nature of the lower Chippewa River changes dramatically. From Eau Claire to Carryville the river primarily consists of coarse gravel substrate with limited bank erosion. From Carryville to Meridean the river goes through an island complex and the substrate consists of gravel and sand. From Meridean to Durand the substrate is mostly dominated by sand with some limited gravel and from Durand to the Mississippi River the substrate is primarily sand. Near Ella, Wisconsin the Chippewa River splits off into several secondary channels to form the Tiffany Bottoms. This area is the largest contiguous floodplain forest in the Upper Midwest. Bank erosion intensifies from Carryville downstream due the primary parent material found along the valley floor and the wide floodplain that allows for active channel movement. Woody debris input is most pronounced in this reach due to active channel movement and its associated bank failure.

METHODS

Four IBI stations were established on the lower Chippewa River (Figure 1). Each station was divided into two sampling reaches. Each sampling station consisted of a one-mile index of biotic integrity run (IBI) and longer or gamefish and endangered and threatened resources run (GET). Two additional GET stations were established in an effort to determine GET relative abundance. Sampling was conducted in mid-July, late-September and mid-May, when water temperatures were above 59 degrees F.

Within the one-mile (IBI) station the following sampling techniques were used:

A. **Large Rivers IBI**: Fish were collected using two pulsed-DC mini-boomshockers during daylight hours. Shocking proceeded downstream with one boat per shoreline operating at approximately 400 volts and 10 amps. The catch and effort was kept separately for each individual boat. Boat operators were instructed to follow the shoreline for a distance of one mile. Dipnetters were instructed to collect all fish greater than two inches in length. Species were identified and individual length and weight information was recorded from all fish captured within the one-mile IBI run. Due to the large numbers and biomass of fish collected (mainly non-game fish), several processing stops were made within the one-mile IBI run. Any fish that was not identifiable in the field was preserved in a 10% formalin solution for later identification purposes.

B. **Small Fish Assemblage** *(SFA)*

Mini Stream Shocker: Fish were collected using a DC-mini streamshocker with three electrodes within the one-mile IBI station operating at approximately 250 volts and 4 amps. Shocking proceeded upstream for approximately 3300-5280 feet from the end of the one-mile IBI station. Accessibility and depth were the determining factors to which side of the stream was sampled, however an attempt was made to sample diverse habitat sites. Effort was recorded in minutes. All fish collected were identified by species and counted. Any fish that was not identifiable in the field was preserved in a 10% formalin solution for later identification purposes.

C. Gamefish and Endangered and Threatened Species Run (GET): Fish were collected using two pulsed-DC mini-boomshockers operating at approximately 400 volts and 10 amps. Shocking proceeded downstream with one boat covering each shoreline. The catch and effort (minutes) for each boat was recorded separately. Boat operators were instructed to follow the shoreline for entire GET run, but they could "work" cover where appropriate. Dipnetters were instructed to collect all gamefish, endangered and threatened species. Bluegill, crappie, yellow perch and white bass were not collected during this run. In addition, if a nongame fish was observed that had not been collected during other sampling events or methods it was captured once to document its presence on the river (ex. Longnose gar).

DISCUSSION

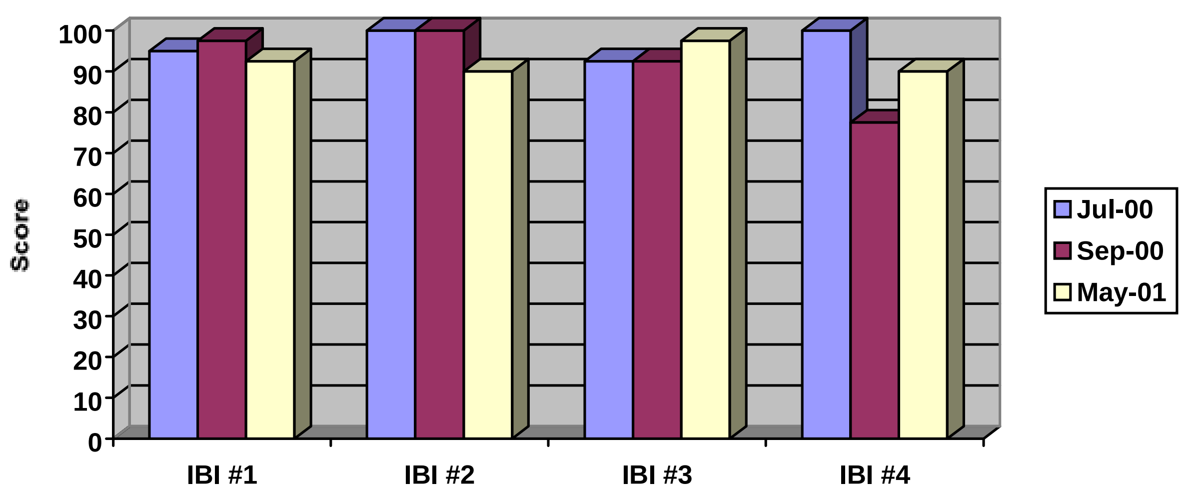
LARGE RIVERS IBI

An index of biotic integrity (IBI) for large river systems was recently developed for Wisconsin's nonwadeable rivers, Lyons et al (2001).

Mean large rivers IBI scores were calculated for all stations on the lower Chippewa during the three seasonal sampling bouts (Figure 2). Mean scores ranged between 90-

100, which indicates that the overall health of the lower Chippewa River fish community is in excellent condition. This can be expected, due to the diverse and unique fish community currently found in the lower Chippewa River. The lower Chippewa River, represents some of the last remaining un-impounded large riverine habitat in the upper Mississippi River drainage. A major reason for the diverse fish fauna is likely due to the fact that dams have not fragmented, flooded or eliminated fish access to this important large river system and its associated habitats. Studies have shown that dam construction can negatively impact native fish communities; Winston and Taylor (1991) DeJalon, Sanchez and Camargo (1994) and Bonner and Wilde, (2000). If dams were to be constructed or if any barriers to fish migration were provided it is very likely that the health of the native lower Chippewa River fish community would be in serious jeopardy. Another primary reason for the diverse fish community is that near shore habitat development and fragmentation has been minimized along the riparian corridor. Currently most of the riparian corridor is undeveloped and is essentially wild land that consists of a mixture of floodplain forest, upland hardwoods and river terraces. If the existing land use changes along the river corridor and near shore habitat becomes fragmented and degraded, it is very likely that the health of the lower Chippewa River fish community could be adversely impacted.

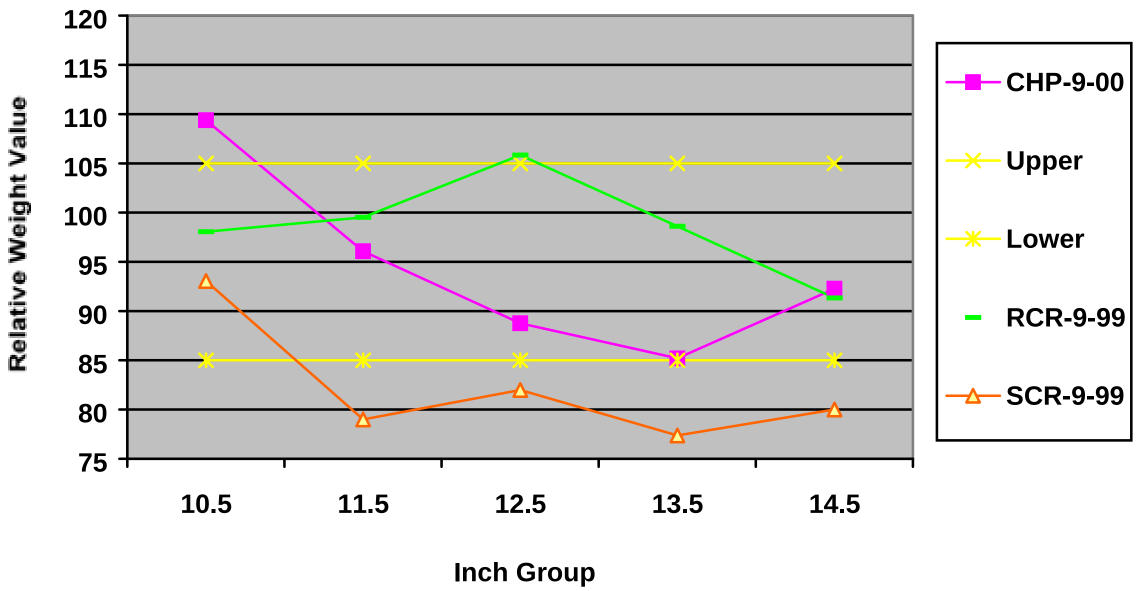
Figure #2: Mean Large River IBI Scores for the Lower Chippewa River



Relative Weight Measure

Relative weight is one of several condition indices used to assess the general health of fishes. Proposed relative weight equations and standard lengths were proposed for large river fishes Bister et al (2000). Relative weight values were calculated for shorthead redhorse on the lower Chippewa River (Figure 3) for the September sampling period. In addition, we compared relative weight values from shorthead redhorse from the lower Red Cedar River and lower St. Croix River in Western Wisconsin (Figure 3). Relative weight values were within the normal range for most inch groups on the lower Chippewa River, in addition relative weight values were higher at all inch groups when compared to the lower St. Croix River and variable when compared to the lower Red Cedar River.

Figure 3: Shorthead Redhorse Relative Weight, Lower Chippewa River

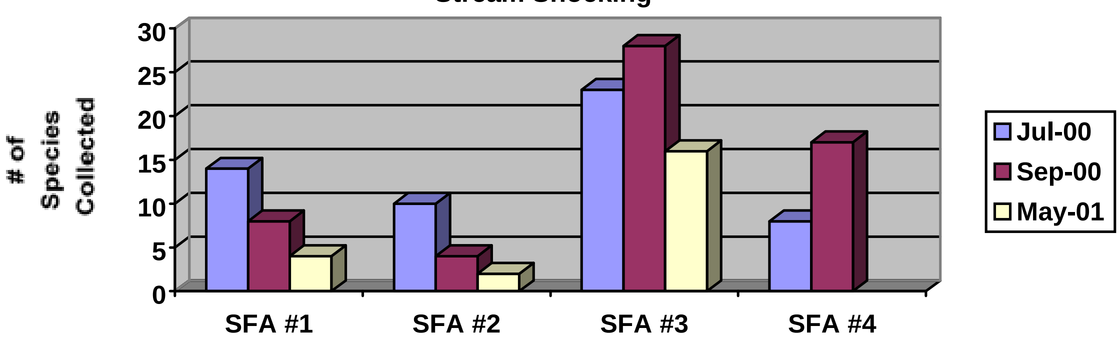


Small Fish Assemblage (SFA)

Shoreline Stream Shocking

Species diversity was highest at SFA #3 during all sampling periods (Figure 4). In addition species diversity was also lowest at all sites during the May sampling period. A complete listing of species presence/absence is presented in Appendix A.

Figure 4: Species Diversity - Lower Chippewa River, Stream Shocking



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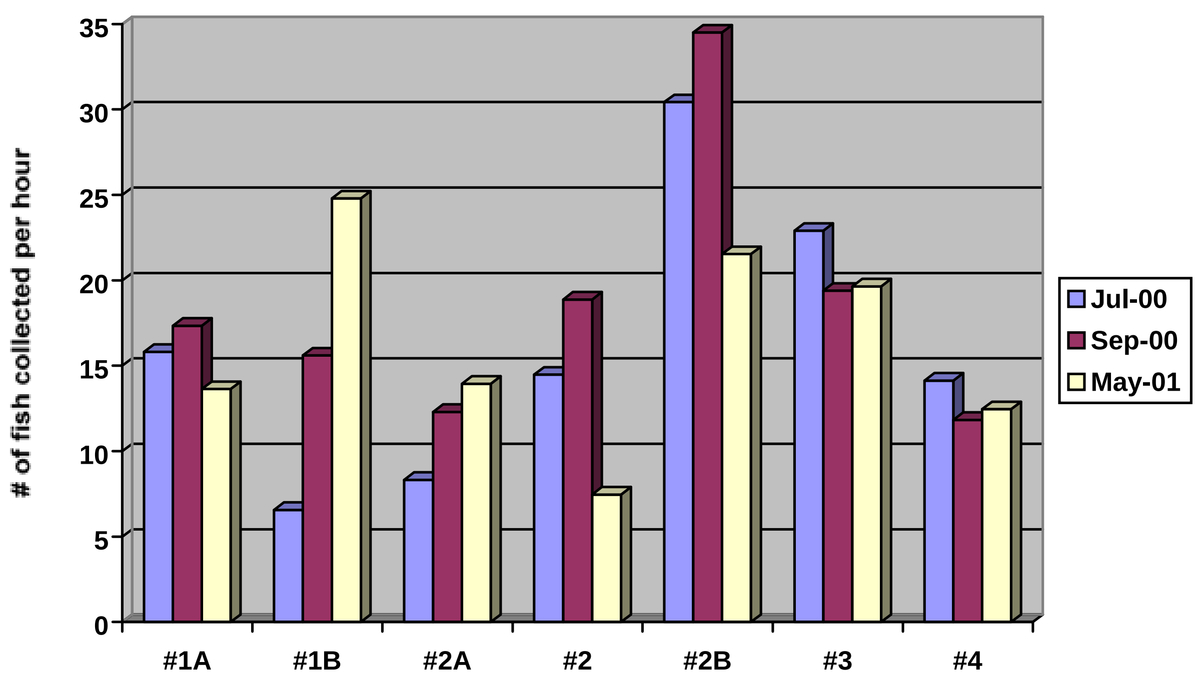
GET (Gamefish and Endangered and Threatened Species Run)

Smallmouth Bass

Smallmouth bass was the most abundant gamefish collected on the lower Chippewa River. Catch per hour was highest at GET station #2B during the July and September sampling periods and highest at GET station #1B during the May sampling period (Figure 5). Possible explanations for the higher catch rates at stations #2B is likely caused by the extensive shoreline restoration/stabilization work conducted by area sportsmans groups and private landowners over the past decade in this particular reach of river. This data also shows that catch rates did not vary appreciably at stations #1A, #3 and #4.

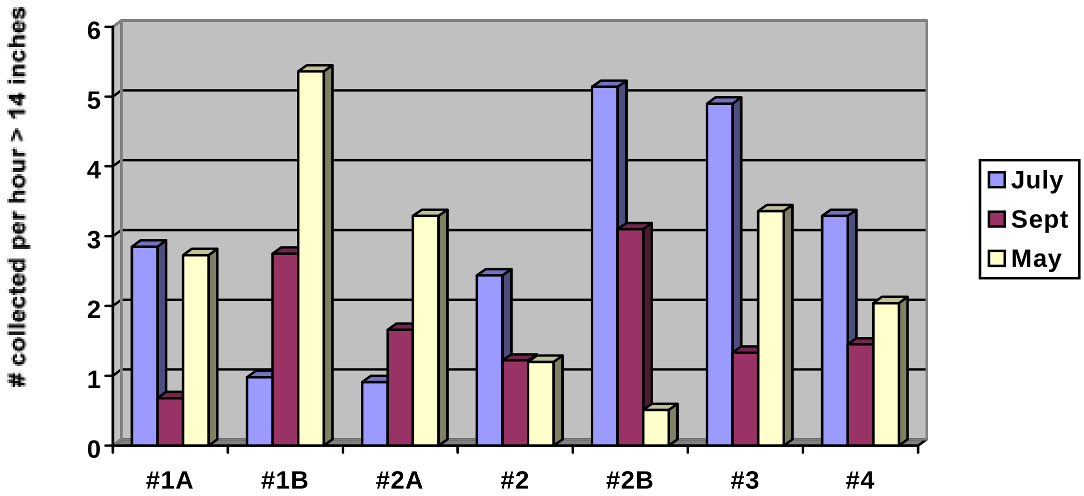
When comparing catch rates for smallmouth bass greater than 14 inches, catch rates at

Figure 5: Smallmouth bass relative abundance, lower Chippewa River



GET station #2B was again highest during the July and September sampling period but, had the lowest catch rate of all sites during the May sampling period. Station #1B and #2A had the lowest catch rate in the July sample but the highest catch rates in the May sample. Possible explanations for this change in catch rate are likely related to seasonal spawning areas. GET station # 1B and #2A has a substrate that consists of small to medium sized gravel which is ideal smallmouth spawning habitat but has little overhead cover such as rip-rapped shoreline or large woody-debris which is fairly common at GET station #2B. It is likely that a large number of lower Chippewa River smallmouth bass make seasonal spawning movements into GET station #1B and #2A, spawn and then filter back downstream into lower reaches of the lower Chippewa River near GET #2B.

Figure 6: Smallmouth bass, relative abundance greater than 14 inches.



Mortality Estimates

Catch curves were developed for smallmouth bass from the September 2000 sample on the lower Chippewa River (Table 1). Total annual mortality (A) for the month of September is 56% (r^2=.96), for ages 3-8.

Table 1: Lower Chippewa River-Estimated Total Annual Mortality Rates (A)-Smallmouth Bass

Month	Age Range	Annual Mortality	R-Squared
September	3-8	56%	.96
	4-8	60%	.95
	5-8	58%	.90
	6-8	69%	.95

Growth Rates

Growth rates were estimated for smallmouth bass on the lower Chippewa River during the September sampling event. Fish that were collected during the September sampling event where considered done growing for the 2000 growth season. Smallmouth bass growth rates as compared to the statewide average are presented in (Figure 7). Growth rates are nearly identical to the statewide average for ages 1-3 and slightly above the statewide average for ages 4-7. In addition, growth rates are also faster for ages 4-8 when compared to the lower St. Croix and lower Red Cedar Rivers in Western Wisconsin.

Figure 7: Mean Length at Age. Smallmouth Bass, lower Chippewa River

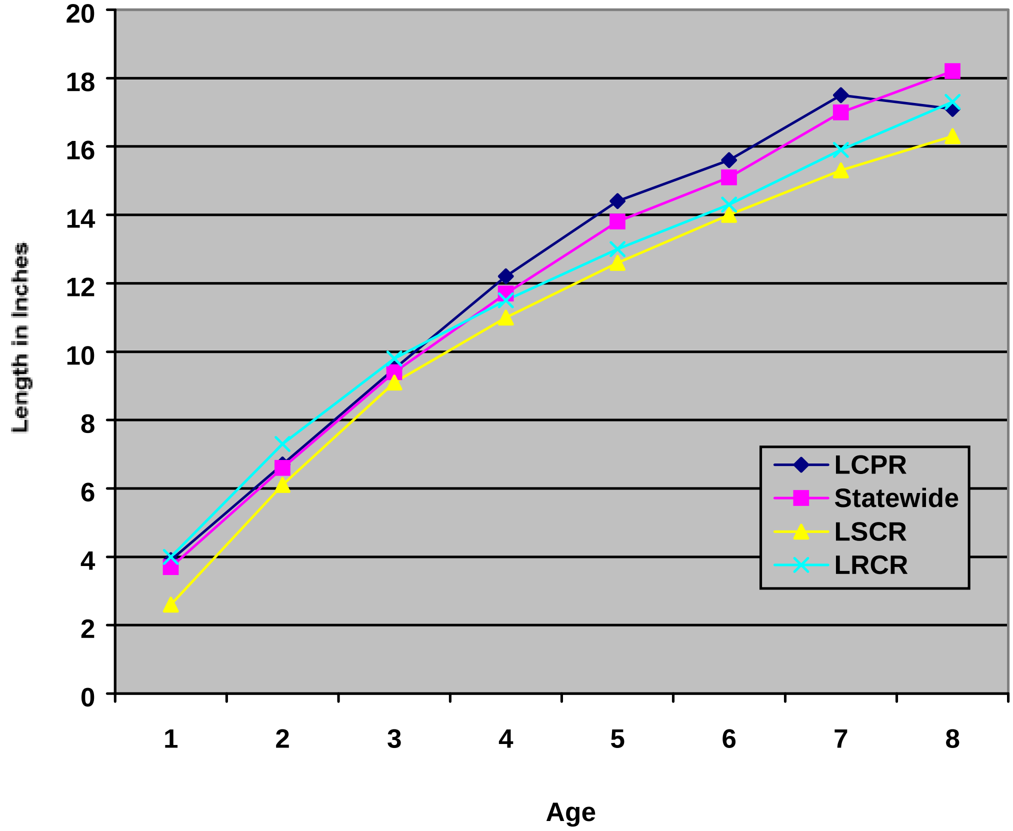


Table 2: Mean length at age smallmouth bass, lower Chippewa River.

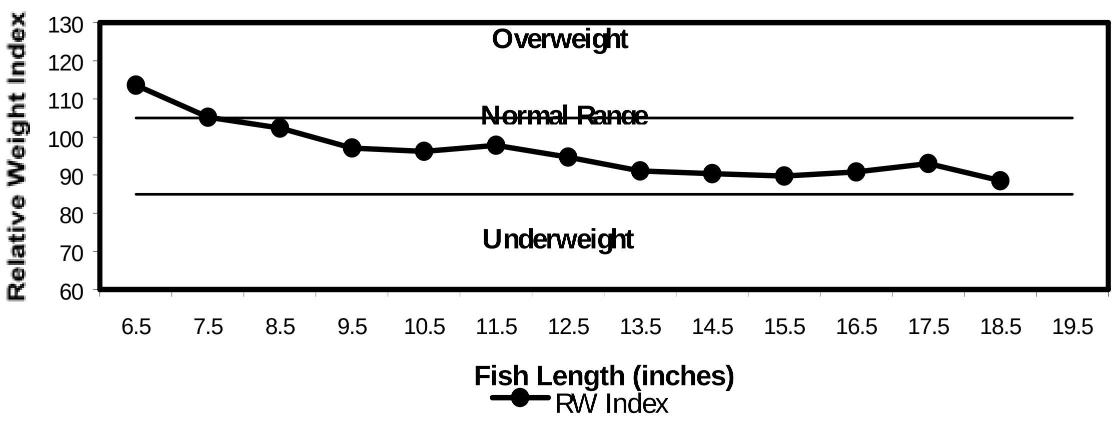
Mean length at age; September 2000

Year Class	Age	# Aged	SD	Mean Length
2000	1	2	1.34	3.9
1999	2	82	1.16	6.7
1998	3	219	0.95	9.5
1997	4	166	0.97	12.2
1996	5	46	0.96	14.4
1995	6	32	0.71	15.6
1994	7	16	0.71	17.5
1993	8	3	0.26	17.1
1992	9	2	0.42	18.0

Relative Weight

Relative weight metrics were calculated for the September sampling period for smallmouth bass between 6 and 16 inches (Figure 10). Relative weight values for smallmouth bass were calculated using the formula devised by Kolander et al (1993). Relative weight values were slightly above or within the normal range for most inch groups during the September sampling period.

Figure 8: Relative Weights of Smallmouth Bass: Lower Chippewa River: September 2000



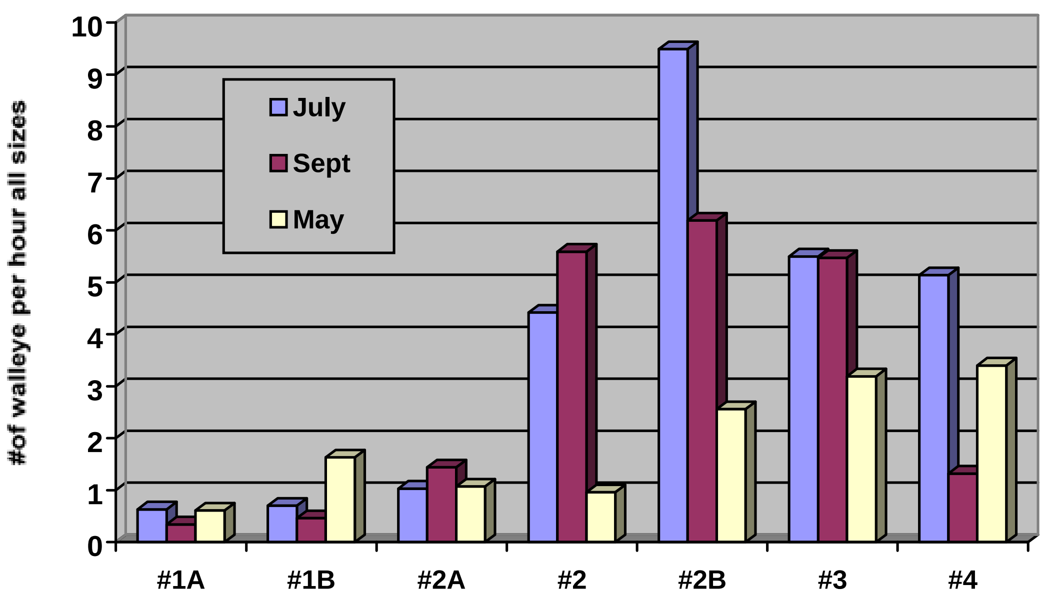
Smallmouth Bass Overall

Smallmouth bass relative abundance varies on a seasonal basis on the lower Chippewa River. During the July and September sampling period smallmouth bass relative abundance was lower near the Eau Claire and Carryville area, increased near the mouth of the Red Cedar River and peaked near Durand and decreased as you proceed downstream to the mouth of the Mississippi River. The high numbers of smallmouth bass at GET #2B near Durand is likely caused by the extensive shoreline stabilization work that has taken place in this reach. Over the past few decades local landowners and sportsman clubs have targeted this reach to reduce bank erosion and sedimentation in the lower Chippewa River by initiating large riprapping and bank stabilization projects. In addition stations #2, #2B, #3 and #4 have extensive micro habitat features such as woody debris piles from tree snags that are found along the outside bends of the river which provide optimal overhead cover, when compared to stations further upstream which has less of this micro habitat feature. In contrast, during the May sampling period the data shows that site #2B had the lowest relative abundance values for smallmouth bass greater than 14 inches and sites #1B and #2A had the highest catch rates for smallmouth bass greater than 14 inches. This possibly indicates that portions of the lower Chippewa River smallmouth bass likely make a spring spawning migration seeking optimal spawning habitat which is abundant at sites #1B and #2A, when compared to other stations on the lower Chippewa River. Growth rates and relative weight values are within the normal range for smallmouth bass on the lower Chippewa River.

WALLEYE

Walleye catch per unit of effort ranged from a high of 9.5 fish per hour at GET #2B in July to a low of .3 fish per hour at GET #1A in September (Figure 9). Catch rates for walleye were highest at stations #2, #2B, #3 and #4 during most sampling periods and lowest at stations #1A, #1B and #2A during all sampling periods. The increase in walleye abundance occurred downstream of where the Red Cedar River joins the Chippewa River. Possible explanations for this could be related to additional recruitment of walleye from the lower Red Cedar River as well as additional flow, which increases the rivers overall size and volume. Another potential cause of the change in relative abundance may be related to hydropower peaking operations. Numerous studies have documented negative impacts from hydropower peaking operations on riverine habitat and organisms (Cushman 1985, Moog 1993, Kinsolving and Bain 1993 and Bain et al 1998) Walleye relative abundance increased substantially downstream from where the lower Red Cedar River joins the lower Chippewa River (stations 2-4). Peaking operations on the lower Red Cedar River tend to buffer peaking operations on the lower Chippewa River because of travel times. In other words, when the high flow peak discharge occurs from the Red Cedar River, the Chippewa River is at low water and when the Chippewa River is at high flow peak discharge the Red Cedar is at low flow. In essence the hydropower peaking operations off-set each other and it would be expected that impacts would be less pronounced on the lower Chippewa River downstream from the mouth of the Red Cedar River. Nevertheless, it is difficult to pinpoint the exact reason for the increase in abundance, but it is likely that all of these factors contribute to the increase in walleye relative abundance downstream from the mouth of the lower Red Cedar River.

Figure 9: Lower Chippewa River, Walleye, CPUE/HR



Mortality Estimates

Catch curves where developed for walleye on the lower Chippewa River from the May sample. Total annual mortality rates (A) for various age groups are presented in (Table 3).

Table 3. Lower Chippewa River-Estimated Annual Mortality Rates-Walleye.

Month	Year	Age Range	Annual Mortality	R-Squared
May	2001	3-8	47%	.94
		4-8	54%	.99
		5-8	54%	.99

Age and Growth

Walleye were aged from the May 2001 sampling period. Walleye growth rates on the lower Chippewa River are generally consistent with the statewide average, but slower when compared to the lower St. Croix and lower Red Cedar Rivers in Western Wisconsin.

FIgure 10: Mean Length at Age; Walleye, WCR Large Rivers.

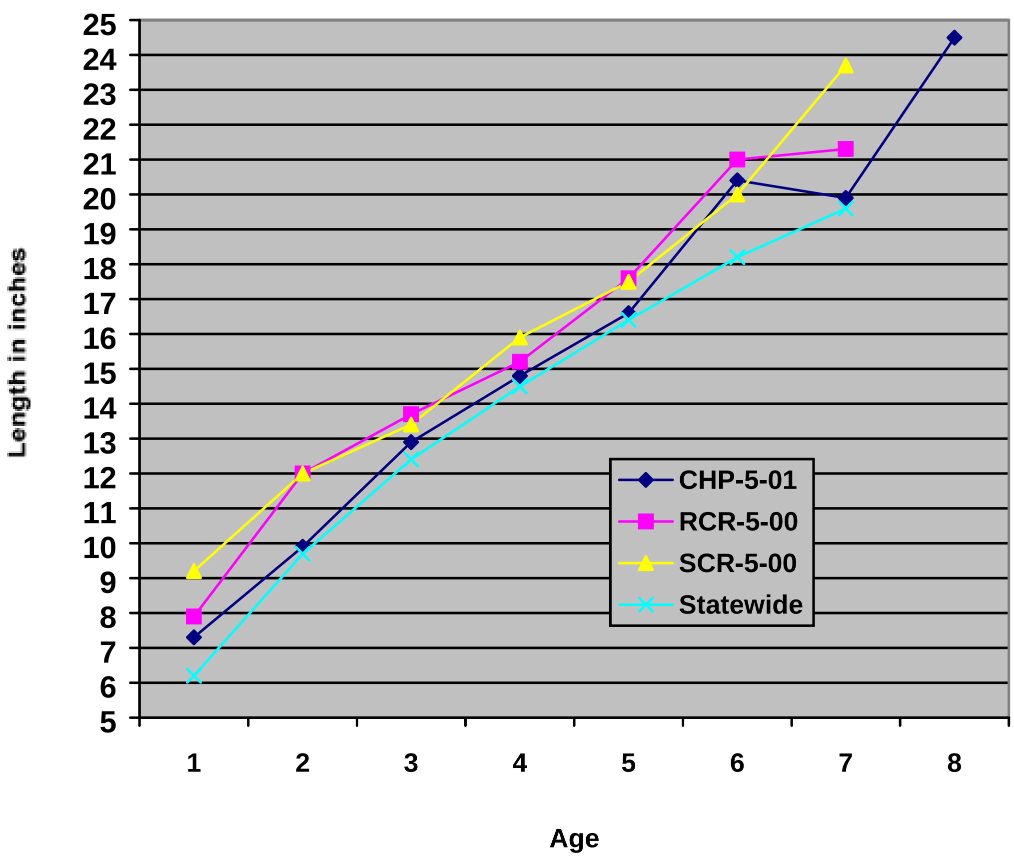


Table 3: Mean Length at Age, Walleye, lower Chippewa River, May 2001.

Year Class	Age	# Aged	SD	Mean Length
2000	1	1	N/A	7.3
1999	2	13	1.1	9.9
1998	3	40	1.1	12.9
1997	4	45	.95	14.8
1996	5	21	.98	16.6
1995	6	10	2.3	20.4
1994	7	5	2.3	19.9
1993	8	2	4.3	24.5

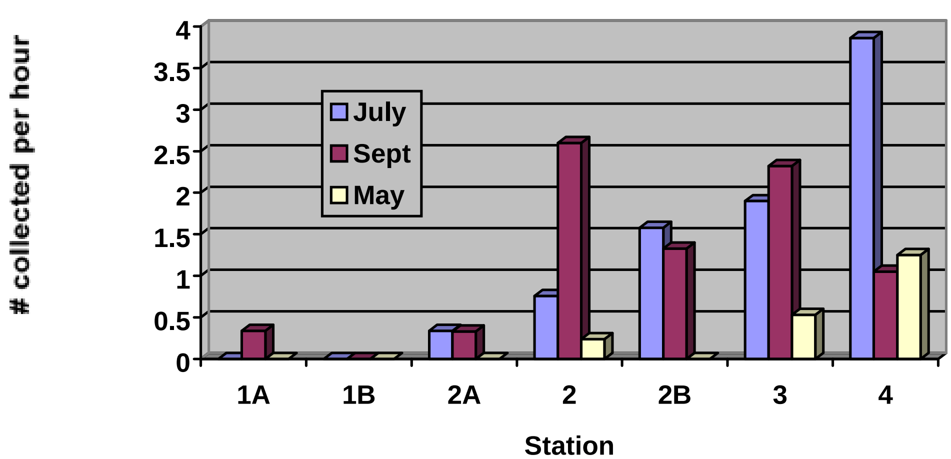
Walleye Overall

Growth rates for walleye are consistent with the statewide average but slower when compared to other large rivers in the West Central Region. Mortality estimates are within the normal range for walleye in Wisconsin. Walleye relative abundance is higher on the lower Chippewa River downstream of the mouth of the Red Cedar River and peaks near Durand. Walleye relative abundance near Eau Claire was lower when compared to other locations on the lower Chippewa River. Possible explanations for the lower relative abundance near Eau Claire could be related to a lack of coarse woody debris, smaller river size or the proximity of hydropower peaking operations.

SAUGER

Sauger relative abundance ranged from 2.6 fish per hour to 0.0 fish per hour. Sauger catch rates were higher on the Chippewa River downstream of the mouth of the Red Cedar River. This similar trend was observed for walleye on the lower Chippewa River. Overall, sauger relative abundance is lower when compared to walleye. In addition, most sauger collected were less than the 15-inch minimum size limit.

Figure 11: Sauger relative abundance lower Chippewa River



CHANNEL AND FLATHEAD CATFISH

Both channel and flathead catfish were collected on the lower Chippewa River. 40% of the channel catfish collected (n=88) were greater than 20 inches. Flathead catfish were only collected in the July and May sampling periods and 50% of the flathead catfish collected (n=12) were greater than 34 inches. Our sampling techniques likely underestimate catfish relative abundance in the lower Chippewa River.

STURGEON

Lake Sturgeon

Five lake sturgeon were collected during all three sampling periods. Three of the five fish collected were greater than 50 inches. The other two fish were sub-adult fish that ranged between 22-24 inches in length, which indicates there is likely some limited natural reproduction of lake sturgeon in the lower Chippewa River.

Shovelnose Sturgeon

Ten shovelnose sturgeon were collected during the July and May sampling periods combined, no shovelnose were collected during the September sampling period. Total length ranged from 24-30 inches. In general, it appears, shovelnose sturgeon relative abundance is lower when compared to historic survey records. A 1965 survey by the Wisconsin Conservation Commission reported that shovelnose sturgeon were the most common gamefish on the lower Chippewa River followed by smallmouth bass. During this survey, the Commission sampled 23 miles of the lower Chippewa River each during July and September 1965. Catch rate was approximately 2.5 shovelnose sturgeon per mile. Our sampling events captured 4 shovelnose sturgeon with a catch rate of .03 fish per mile. Future management actions should occur immediately to determine the status of shovelnose sturgeon in the lower Chippewa River.

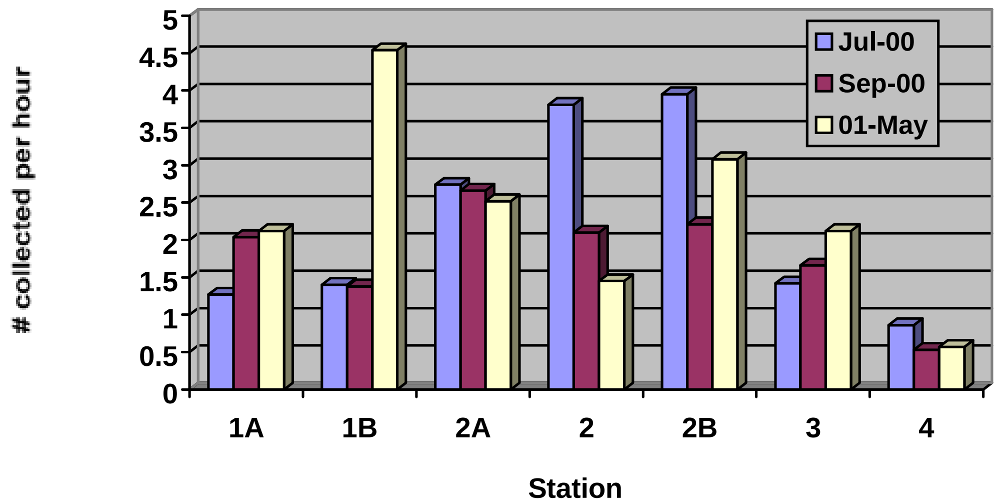
Table1: Shovelnose Sturgeon Historic Information

Year	Gear	# Boats	July Miles Sampled	September Miles-Sept	Total Catch	Fish/Mile
1965	AC-Boomshocker	1	23	23	115	2.50
2000	DC-Miniboom	2	53	53	4	.03

NORTHERN PIKE

Northern pike were the third most abundant gamefish collected on the lower Chippewa River (n=256). Northern pike relative abundance was fairly consistent riverwide (Figure 12). 14% of the Northern Pike collected were greater than 30 inches which indicates that quality northern pike fishing opportunities are present on the lower Chippewa River.

Figure 12 : Northern pike relative abundance, lower Chippewa River



MUSKELLUNGE

A total of 37 muskellunge were collected from the lower Chippewa River during all three sampling events. The largest fish collected was 44 inches in length. Some evidence that muskellunge reproduction is occurring in the lower Chippewa River can be seen from the July 2000 sample, where two small 5 inch muskellunge were collected. These fish are were not descendants from upstream stocking efforts, because all stocking that occurred on the upstream tributary streams occurred in August of 2000 which was after our July 2000 sample (Kurz personal communication). The muskellunge fishery could be improved by supplementing natural reproduction by stocking large fingerlings because the lower Chippewa River has an robust forage and non-game fishery. Similar stocking efforts on the lower Black River in West Central Wisconsin have resulted in a quality sized muskellunge fishery with little if any impacts on the current fish community.

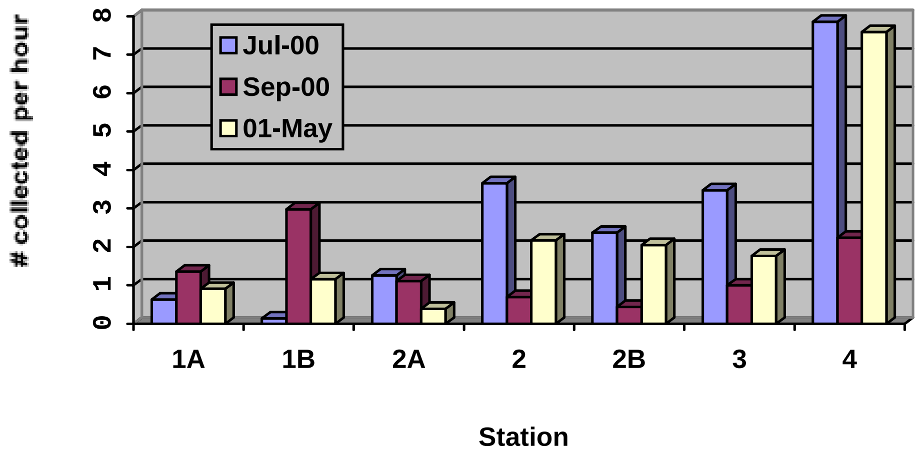
ENDANGERED AND THREATENED SPECIES

Blue sucker were the second most abundant endangered and threatened species collected that is listed as threatened or endangered under Wisconsin law (n=284). Blue sucker was typically captured in deep-fast habitat usually associated with a fast run environment on some form of woody-debris cover in 2-6 feet of water. Catch rates for blue sucker are presented in (Figure 13). Blue sucker relative abundance at station 4 was twice as high as any other station on the lower Chippewa River during the July and May sampling periods. In addition, it appears blue sucker relative abundance is lower near Eau Claire and increases as you proceed downstream. This is consistent with findings from Christenson (1974).

Only one blue sucker greater than thirty inches was collected on the lower Chippewa River. Benike (2001) reported that13% (n=235) of all blue sucker from the lower Red

Cedar River were greater than 30 inches. It is unknown why larger adult blue sucker are present in the lower Red Cedar but scarcer in the lower Chippewa River. One possible explanation is that the Red Cedar River is "hypereutrophic" due to excessive nutrients from watershed impairments where as the lower Chippewa River is less euthrophic and growth rates may be lower because of this.

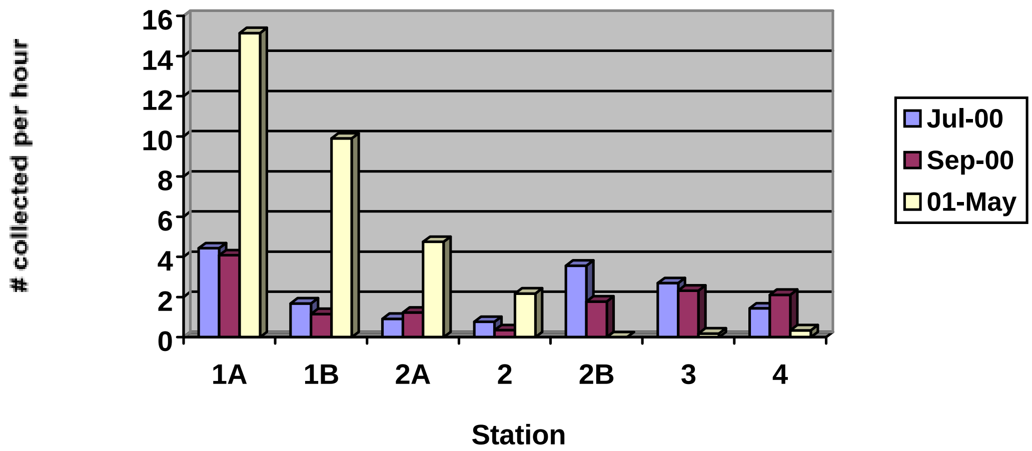
Figure 13: Blue sucker relative abundance lower Chippewa River



River and Greater Redhorse

River and greater redhorse are listed as a threatened species under Wisconsin Law. Catch rates were combined due to potential misidentification efforts during GET runs. It is the opinion of the authors that the vast majority of the fish captured were river redhorse (over 95%), but both species were captured on the lower Chippewa River. River and greater redhorse catch per hour was highest in May when compared to July and September (Figure 14). In addition river and greater redhorse relative abundance was highest near Eau Claire and tapered off considerably as you went downstream during the May sample. This information shows a strong relationship to a likely spring spawning migration in May and once spawning is complete, this information shows that fish disperse because relative abundance in July and Sept is fairly uniformly distributed at all stations on the lower Chippewa River.

Figure 14: Greater and River Redhorse Relative Abundance. lower Chippewa River.



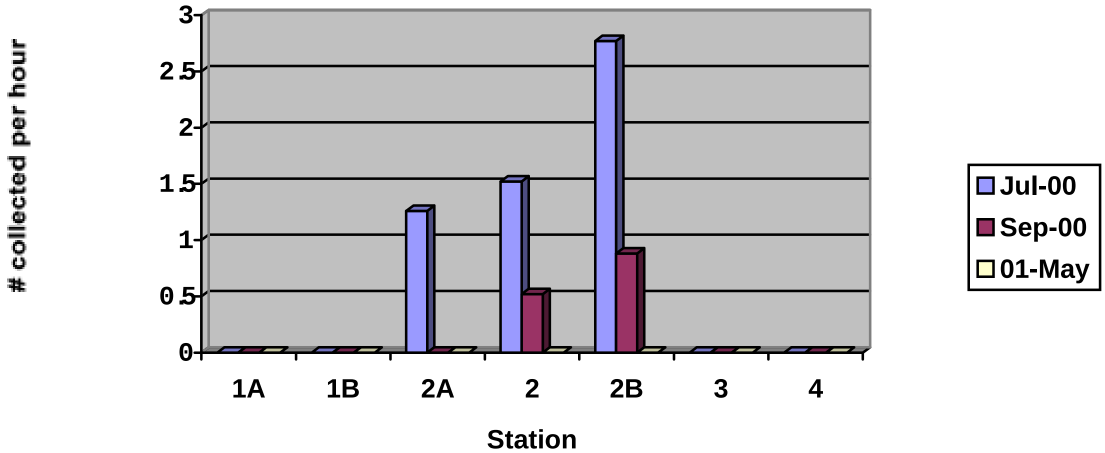
Paddlefish

Paddlefish were not collected during this survey due to potential mortality form electrofishing Scarnechia et al (1999). Boat operators were instructed to turn-off power to electrofishing equipment if they observed a paddlefish. This was done to avoid exposing paddlefish to a full force of electrical current. A total of 4 paddlefish were observed during the survey period, but not collected. Specific locations will not be disclosed in this report due to potential illegal poaching concerns.

Crystal Darter

Crystal darter were collected during the July and September sampling periods. Crystal darter relative abundance is presented in (Figure 15). Crystal darter were collected at three stations on the lower Chippewa River. In addition, crystal darter relative abundance was highest at station #2B during the July and September sampling periods. No crystal darter were collected in the May sampling. Possible explanations may be related to seasonal habitat preferences or dip netter bias. Overall, crystal darter relative abundance was limited to a section of river from Carryville to Durand. This section of river consists of large inside bends and shallow runs with medium to small gravel and sand. Similiar habitat preferences was observed on the lower Red Cedar River, Benike (2001).

Figure 15: Crystal darter relative abundance, lower Chippewa River.



Endangered and Threatened Species Overall

From the survey information collected, blue sucker and river redhorse are considered moderately abundant. Crystal darter relative abundance is considered low. Greater redhorse is considered to be rare. Paddlefish were not extensively sampled to provide and relative abundance rating.

Future management activities for endangered and threatened species should be considered a high priority for the Department. There are probably few places in the Upper Midwest, where fish species relative abundance is higher. Many of the species collected represent some of the last remaining strongholds for large river fishes in the Upper Midwest. Protection, maintenance and restoration of aquatic habitat and water quality conditions on the lower Chippewa River is of utmost importance.

Management Recommendations

1. **Habitat Protection**: Protecting and maintaining aquatic habitat conditions should be a high priority for the Department within the lower Chippewa River corridor. Protection should consist of fee-title acquisition or easement acquisition of riparian lands through the lower Chippewa State River Natural Area. Protection of this corridor would protect critical near shore-habitat, minimize bank disturbance and development and add to the scenic beauty of the lower Chippewa River. In addition, county shoreland and floodplain zoning ordinances should be enforced to protect riparian lands from unlawful development and fragmentation.

2. **Trends Monitoring**: The Department should continue long-term trends monitoring on the lower Chippewa River fish community. Trend information will allow local management staff to determine if the native fish community is stable, improving or decreasing through time following the WDNR nonwadeable baseline monitoring protocol.

3. **Life History Information:** The Department should develop species specific management projects in efforts to collect life history information on important fisheries resources in the lower Chippewa River. Acquisition of movement information, spawning requirements, etc. for select endangered and threatened species as well as possibly select gamefish and non-gamefish communities is needed. In addition, a comprehensive investigation should begin immediately to assess the possible decline in the shovelnose sturgeon fishery.

4. **Warmwater Habitat Restoration:** Fisheries staff should consider developing warmwater habitat improvement projects and/or restoration projects on the lower Chippewa River. Such projects could consist of spot-treatment bank stabilization, boulder clusters, woody-debris/snag incorporation, and connection of backwater oxbows or restoration of native shoreline plant communities.

5. **Creel Census Survey:** The Department should develop and implement a creel census on the lower Chippewa River by 2005. No creel information exists and it would be advantageous to document angling pressure, harvest, effort and possibly any adverse effects from a year round angling season. This recommendation is consistent with the Fish and Wildlife Plan of Wisconsin.

6. **Chippewa River Trail:** Fisheries staff should work with WDNR trails and parks, lands and natural area staff in efforts to promote and manage the lower Chippewa River Corridor as a wild river, with emphasis on protecting habitat for aquatic and terrestrial life as well as, aesthetic scenic beauty.

7. **Regulation Evaluation and Year Round Angling Season Impacts:** The Department should seek public input in relationship to the current angling regulations on the lower Chippewa River. This is consistent with the WDNR Walleye Management Plan and the lower Chippewa River Basin State of the Basin Report.

8. **Fish Passage Opportunities:** The Department should consider seeking fish passage opportunities at the Dells Dam if deemed necessary in the future.

9. **Dam Construction:** The Department should not allow any new dams to be constructed on the lower 59.5 miles of the lower Chippewa River. This free-flowing large riverine habitat represents some of the rarest fish communities in the Upper Midwest. If dams were to be constructed on the lower Chippewa River, those native fish communities would likely be lost.

10. **Future Fish Stocking Practices:** The Department should consider muskellunge stocking in the lower Chippewa River. Currently muskellunge numbers are low and there is ample forage in the river to provide a more quality recreational angling opportunities for muskellunge. Muskellunge should be stocked at 0.5 fish per acre to provide a low density-quality fishery and to minimize any potential secondary impacts to other fish species.

11. **Water Quality:** The Department should promote management strategies than target maintaining water quality conditions in the lower Chippewa River.

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