

**Pallid Sturgeon Population  
Assessment Program  
2003 Annual Report  
Segments 5 and 6**



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## INTRODUCTION

A team of biologist representing State and Federal resource management agencies was assembled to develop and implement a long tem resource monitoring program for the Missouri River. This team is now known as the Pallid Sturgeon Population Assessment Team. Although the monitoring program is directed towards the native riverine fish community, emphasis is being placed on pallid sturgeon monitoring activities. Four high priority pallid sturgeon recovery/management areas encompass nearly 1775 KM (1,100 miles) of the Missouri River system. The Pallid Sturgeon Population Assessment Team selected 14 sampling segments within the four high priority pallid sturgeon recovery areas to implement the monitoring program. Each sampling segment has been selected based on a variety of characteristics such as water temperature, turbidity, tributary influences, degrading or aggrading stream bed, stream gradient, natural hydrograph, spillway releases and flow fluctuations. Sampling within these segments allows biologists to monitor trends of pallid sturgeon and the associated fish community as well as evaluate mitigation and shallow water restoration projects. These sampling sites are also selected to assess the native fish community. Additional sites are selected to assess various habitat improvement projects targeting the creation of shallow water habitat. Additionally, hatchery reared juvenile pallid sturgeon have been released into sampling segments 2, 8, 9, 10, 12 and 14. The monitoring plan will serve to assess the success of hatchery propagated fish as well as future stocking efforts.

Because current pallid sturgeon abundance is extremely low, data collection solely targeting pallid sturgeon would not likely provide adequate information to evaluate restoration projects and flow modifications to the Missouri River. A long-term population assessment approach is being adopted to address this concern and evaluate the warm water benthic fish community in the Missouri River as required by the US Fish & Wildlife Service's Biological Opinion on Operations of the Mainstem Missouri River Dams. Additionally, evaluation of the responses of other native Missouri River fish species to changes in habitat or flow modifications may be more sensitive indicators of responses to the habitat changes. Information derived from this project will be vital in providing sound management recommendations for recovering the native Missouri River fauna. Because the pallid sturgeon is a known piscivore, assessment of the native Missouri River fishery that likely serves as pallid sturgeon prey is also a critical component of the Missouri River ecosystem. A representative group of native Missouri River fishes have been selected as indicator species for detecting improvements in the warm water benthic fish community. Among the species selected are: Sand Shiner *Notropis stramineus*, Sicklefin Chub *Macrhybopsis meeki*, Sauger *Stizostedion canadense*, Shovelnose Sturgeon *Scaphirhynchus platorynchus*, Plains minnow *Hybognathus placitus*, Western silvery minnow *Hybognathus argyritis*, Speckled Chub *Macrhybopsis aestivalis*, and Sturgeon Chub *Macrhybopsis gelida*, Blue sucker *Cycleptus elangatus*, and Bigmouth buffalo *Ictiobus cyprinellus*. For these 10 native species, we will assess age, growth and body condition (relative weight information). All fish collected during population assessment activities are recorded; however, detailed data is only being collected on pallid sturgeon and the representative group of native Missouri River species.

Two sampling seasons are used to guide assessment efforts. These seasons include a Sturgeon Season focusing on the assessment of sturgeon species and a Fish Community Season that continues to assess sturgeon but places an additional emphasis on the native fish community. During the Fish Community Season, additional gears are deployed to assess the shallow water habitats (<1.2 meters) fish community. Due to the diverse habitats in the river and the longitudinal changes in climate, wide sampling time frames are necessary to facilitate comparable sampling efforts. For example, gill netting in the Ft. Peck reach is “typically” not feasible because water temperature restriction in the protocol creates a narrow time frame when they can be deployed in this area. However, water temperatures in the lower reaches of the Missouri River permit gill netting during most of the winter while adhering to the protocol. Focused studies to fulfill unique biological information gaps are initiated in conjunction with these assessment activities (i.e., food habits, telemetry projects). These specialized studies fall into the focused research category.

**Success Criteria:**

Evaluating the success of habitat and hydrograph modifications will be tied directly to biological changes identified through the long term monitoring program. The monitoring program is being developed using the following four criteria.

- 1 The long term trend data will be collected with sufficient rigor to detect population changes in the native riverine fishery.
- 2 The monitoring program will identify survival and growth rates, of hatchery reared and stocked pallid sturgeon in the river.
- 3 The monitoring program will be designed with the goal of documenting pallid sturgeon reproduction and recruitment in the Missouri River.

## STUDY AREA

Lewis and Clark Lake was formed by Gavins Point Dam (river kilometer [RK] 1,305) and extends to Fort Randall Dam (RK 1,588), which defines the upper end of Lewis and Clark Lake (Figure 1). Both dams are operated by the U. S. Army Corps of Engineers (USACE).

Gavins Point Dam is the most downstream dam of the mainstem dams on the Missouri River. The primary function of Gavins Point Dam is to level out release fluctuations from upstream dams to serve downstream purposes. The riverine section of Lewis and Clark Lake extends approximately 71 km with a maximum depth of 12 m and a channel width of 45-90 m, from Fort Randall Dam to Springfield, SD where its features become more like a reservoir (Figure 1). The reservoir section has a maximum depth of 17.7 m, an average width of 3.4 km, and a maximum surface area of approximately 4,500 ha (Walburg 1976).

The riverine section retains many natural characteristics such as sandbars, sandbar pools, side channels, backwater areas, islands, old growth riparian forest and year round flows. However the historical temperature and flow (i.e., the hydrograph) in the riverine section has been altered due to Fort Randall Dam. Water levels fluctuate substantially daily and seasonally. Water levels are subject to changes of almost 1 m during a 24-h period. The lowest flows appear to occur at 0600 hours with peak flows at 1200 to 1900 hours that support power generation demands (USACE 1994). The USACE Missouri River Main Stem Reservoirs 2000-2001 Annual Operating Plan (<http://www.nwd-mr.usace.army.mil/rcc/reports/aop.html>) reports the highest releases from Ft. Randall dam were from August through November to support navigation on the Missouri River

below Sioux City, Iowa. The lowest releases were from December through April to prevent flooding due to ice jams.

Segment five encompasses the riverine section below Ft Randall Dam to the Missouri River Niobrara River confluence area. Water temperatures are controlled by discharges from the upstream dam and turbidity is very low. Segment six encompasses the riverine section from the Missouri/Niobrara River confluence area to the headwaters of Lewis and Clark Lake (Figure 2). This segment has water temperatures and turbidity moderated by the Niobrara River inflows.

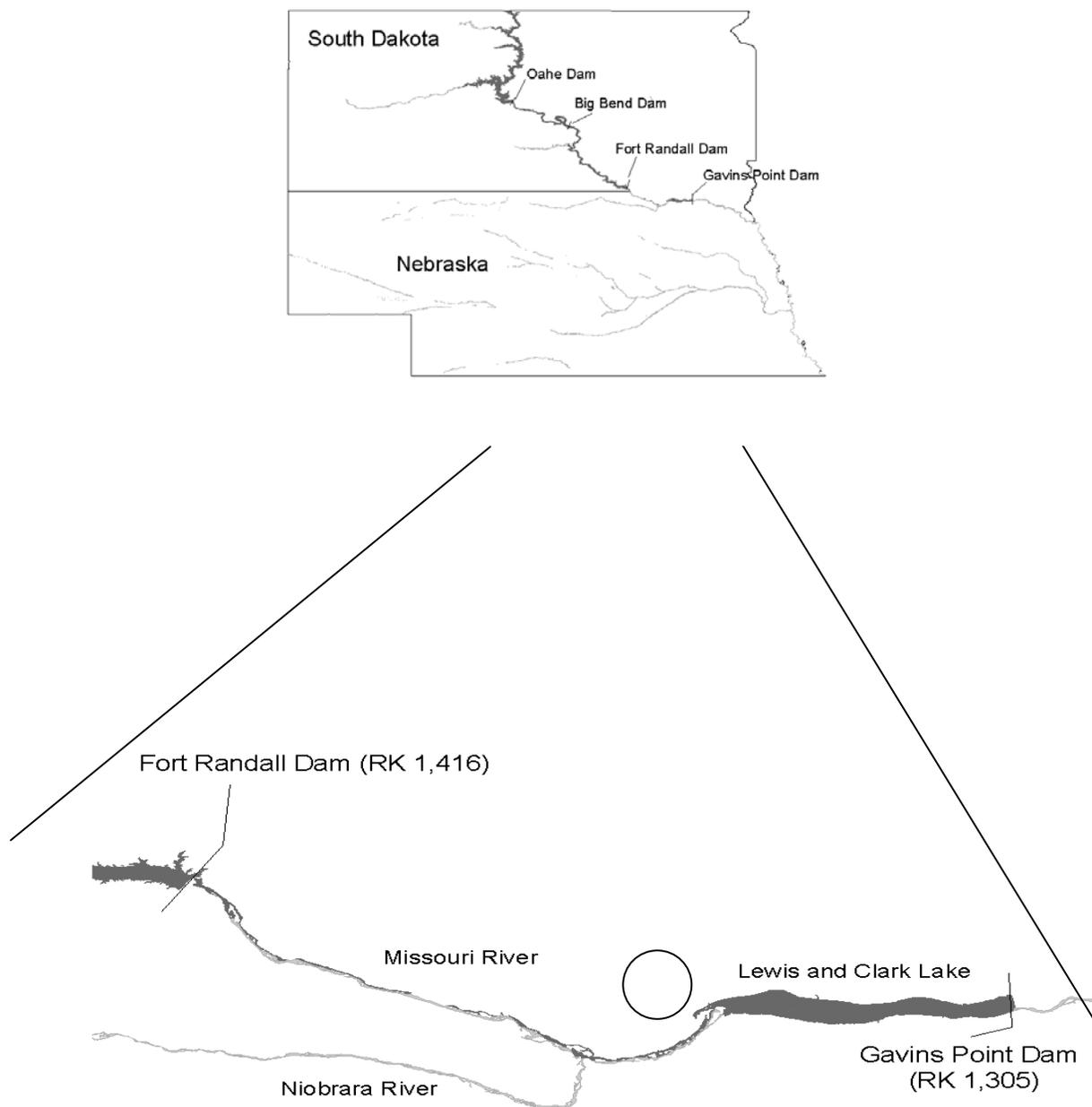


Figure 1. Map of the mainstem Missouri River reservoirs with the Ft Randall to Gavins Point section highlighted.

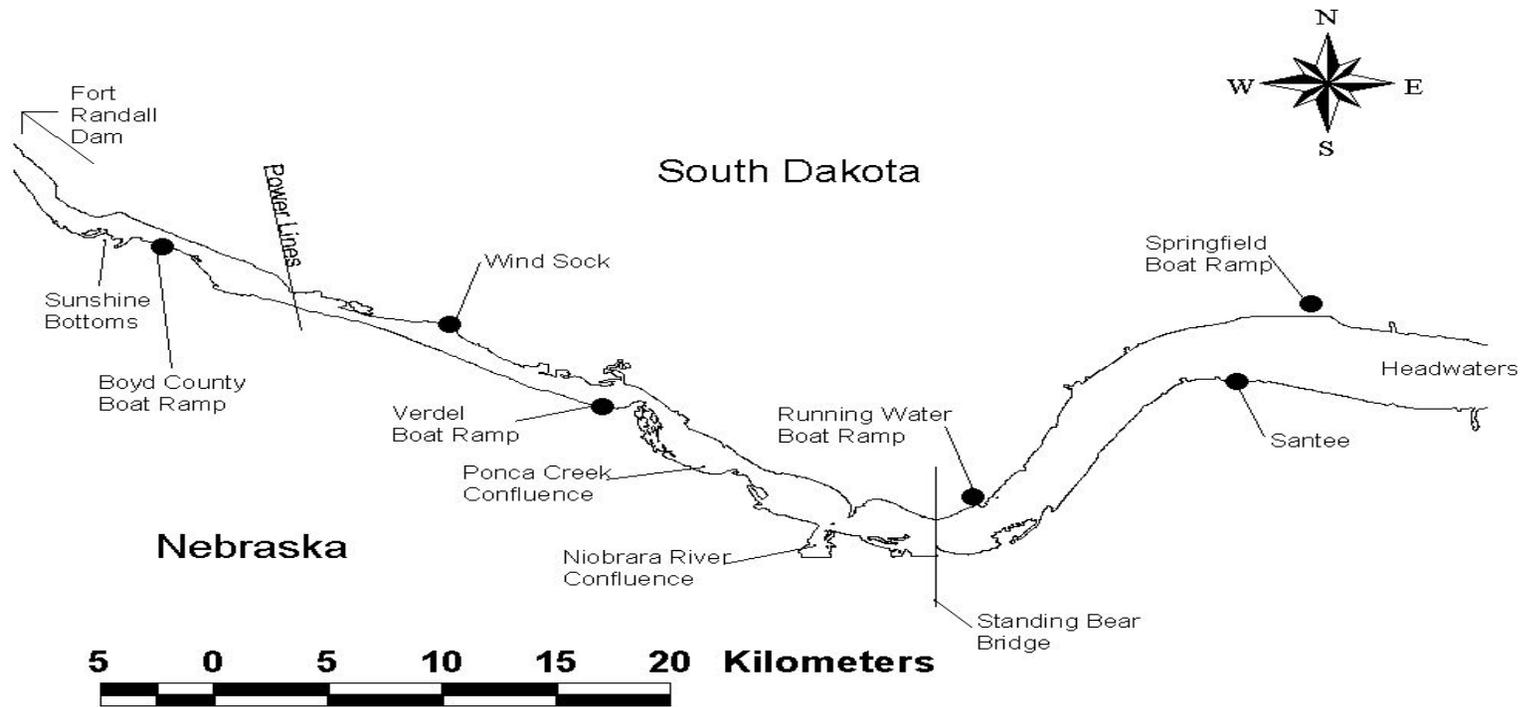


Figure 2. Map of the riverine portion of Lewis and Clark Lake with common landmarks. Segment five for the long term monitoring program encompasses the area between Ft Randall Dam to the Niobrara River Confluence. Segment six for the long term monitoring plan encompasses the area between the Niobrara River Confluence to the headwaters of Lewis and Clark Lake.

## METHODS

Our sampling protocol followed the guidelines identified in the Long Term Pallid Sturgeon and Associated Fish Community Assessment for the Missouri River Guidelines and Standardized Guidelines for Sampling and Data Collection developed by the Pallid Sturgeon Population Assessment Team. A general summary of those guidelines follow.

### Sampling Gear

We deployed sampling gear every two weeks from April through November 2003. Our four standard assessment gears include static and active gears. The standard static gears include over-night gill net and hoop net sets. Our active gear included drifting trammel nets and bottom trawling with a benthic beam trawl. In addition to the standard gear, we use set lines baited with minnows and leaches to target shovelnose sturgeon and juvenile pallid sturgeon.

We set gill nets from ice out until that time that water temperatures reached 12 EC. Our gill nets are set overnight for a maximum of 18 hours. We use multi-filament gill nets that are 1.8 m deep X 38 m in length consisting of five 8 m long panels with bar mesh sizes of 2.54 cm, 3.81 cm, 5.08 cm, 7.62 cm, and 10.16 cm, float lines of 1.27 cm poly-foam core, and lead line of 22.7 kg lead core. Our gill net unit of effort is the number of fish per over night gill net set.

We drift trammel nets on the river bottom for a minimum distance of 75 m and a maximum distance of 300 m. We use a global positioning system (GPS) to quantify the distance sampled. Our trammel nets are 1.8 m deep X 38 m with outside wall panels of 15.24 cm bar mesh and an inside wall panel of 2.54 cm bar mesh with a float line of 1.27 cm poly-foam

core and lead line of 22.7 kg lead core. Our trammel net unit of effort is fish per 100 m of drift.

We use a 0.5 m deep by 2 m wide benthic beam trawl to assess the midwater fish community. The trawl's outer chafing mesh consisted of 0.635 cm bar mesh, an inner bar mesh of 0.318 cm, and a 2 m long cod end. As with trammel nets, the targeted towing distance for each beam trawl is 300 m. The minimum distance for trawling is 75 m and the maximum distance is 300 m. We use a global positioning system (GPS) quantify the distance sampled. Our trawling unit of effort is number of fish per 100 m of trawl.

We use hoop nets (1.2 m diameter hoop; 4.8 m in length with 3.81 cm bar mesh) in areas where flow velocities are sufficient to maintain the net in a deployed position. Hoop nets are set overnight for a maximum of 18 h. Our hoop net unit of effort is number of fish per overnight set.

Set lines are the only wild gear that we use consistently throughout the sampling periods. Each set line contains two Mustad Tuna Circle hooks (sizes 10/0 and 12/0). Each set line is 2m in length and anchored with a 3-pound weight to keep the bait near the bottom of the river. We use #60 braided nylon twine with barrel swivels with hooks staged at 1m intervals from the anchor. The set lines are marked with a float attached to a 40-ft line attached to the anchor with snap hooks. Set lines are set overnight for a maximum of 18h. From May through August, we bait each set line with earthworms and leeches. For the remainder of the sampling period we bait all of the hooks with earthworms.

## RESULTS

### Segment 5

#### Sturgeon Sampling Season

##### *Sampling effort – standard gear*

We sampled segment 5 during the sturgeon sampling season using 87 gill net nights and 40 hoop net nights. We completed 136 trammel net drifts covering a distance of 39,032 m for a trammel net effort of 390.3 100-m drifts. We completed 56 bottom trawls covering a distance of 17,080 m for a total of 170.8 100-m trawls.

##### Blue sucker

We collected 1 blue sucker (865mm) in a trammel net drift through a channel cross over.

No blue suckers were collected with the other gears.

##### Bigmouth buffalo

We collected 4 bigmouth buffalo in hoop nets set in the outside bends. Our bigmouth buffalo catch per unit effort in hoop nets is 0.1 fish per net night. These fish ranged from 550 to 570 mm. No bigmouth buffalo were collected with the trawl.

##### Common carp

We collected seven common carp in hoop nets ranging from 390 to 640 mm for a hoop net catch per unit effort of 0.18 common carp per hoop net night. Common carp were collected with hoop nets in channel cross over, outside bend and side channel connected macrohabitats. No carp were collected with the other gears.

### Channel catfish

We collected 56 channel catfish with hoop nets in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats with a combined catch per unit effort of 1.40 channel catfish per hoop net night (Table 1). Channel catfish collected in hoop nets ranged from 345 to 675 mm (Figure 3). We collected two channel catfish ranging from 395 to 415 mm with setlines. We collected 53 channel catfish with drifting trammel net for a 0.136 fish per 100-m drift catch per unit effort (Table 2). Channel catfish collected with trammel nets ranged from 240 to 445 mm (Figure 4). No channel catfish were collected with gill nets or the bottom trawl.

Macrohabitat	N (hoop nets)	N (CNCF)	CPUE	Std. Dev.
CHXO	2	19	9.50	
CONF	0			
ISB	11	10	0.909	
OSB	22	26	1.182	
SCCL	5	1	0.200	
SCCS	0			
TRML	0			
<b>TOTAL</b>	40	56	1.400	

# Channel catfish in hoop nets

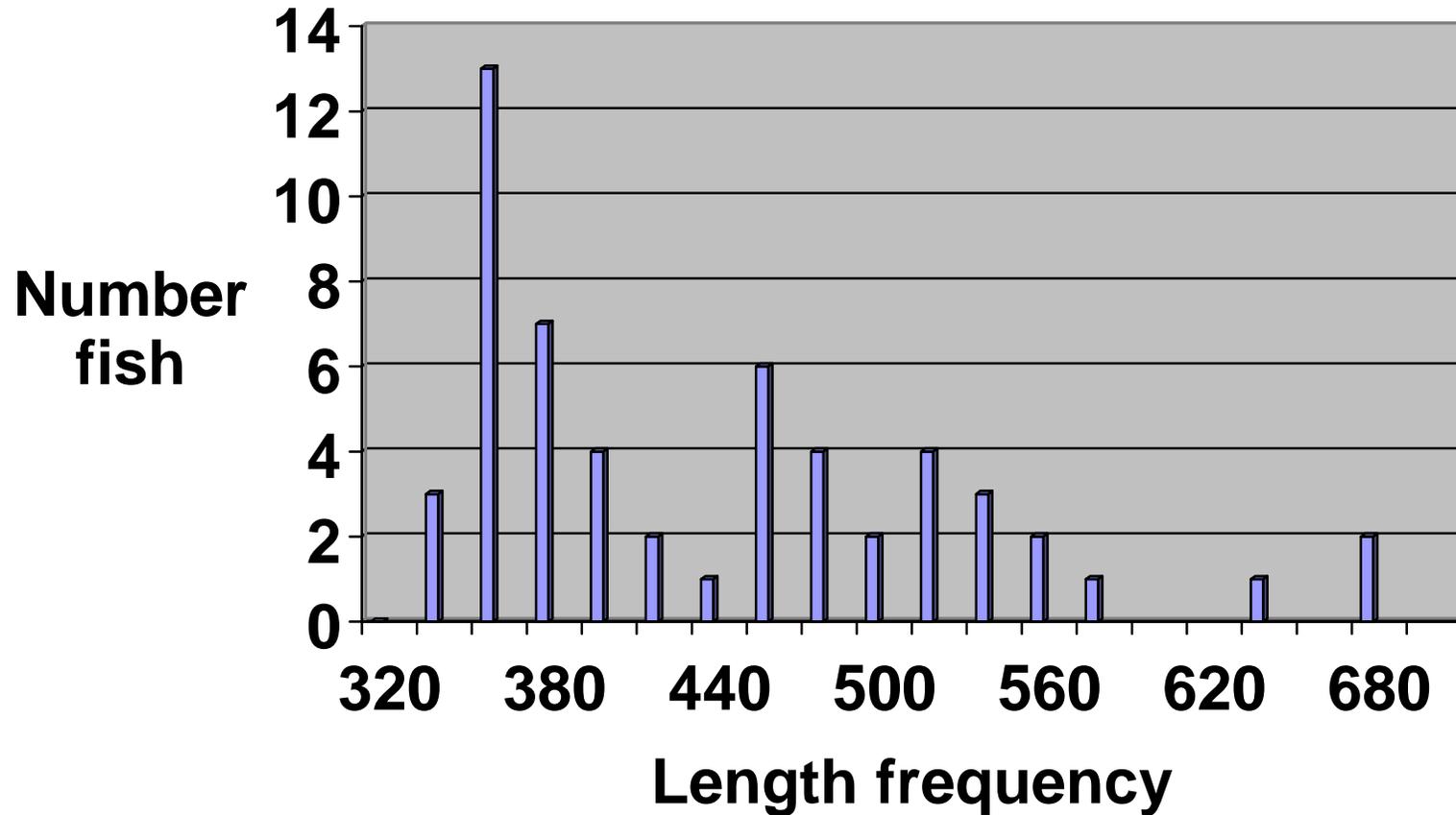


Figure 3. Length frequency graph for channel catfish caught in hoop nets, sturgeon sampling season, Segment 5, 2003.

Table 2. Channel catfish (CNCF) catch per unit effort for 100 m trammel net drifts in Segment 5, Ft Randall Dam to Niobrara River confluence by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and large tributary mouth (TRML).

Macrohabitat	N (trammel drifts)	N (CNCF)	CPUE	Std. Dev.
CHXO	91.2	7	0.076	
CONF	0			
ISB	130.7	27	0.207	
OSB	124.7	17	0.136	
SCCL	43.5	2	0.046	
SCCS	0			
TRML	0			
<b>TOTAL</b>	390.5	53	0.136	

# Channel catfish in trammel nets

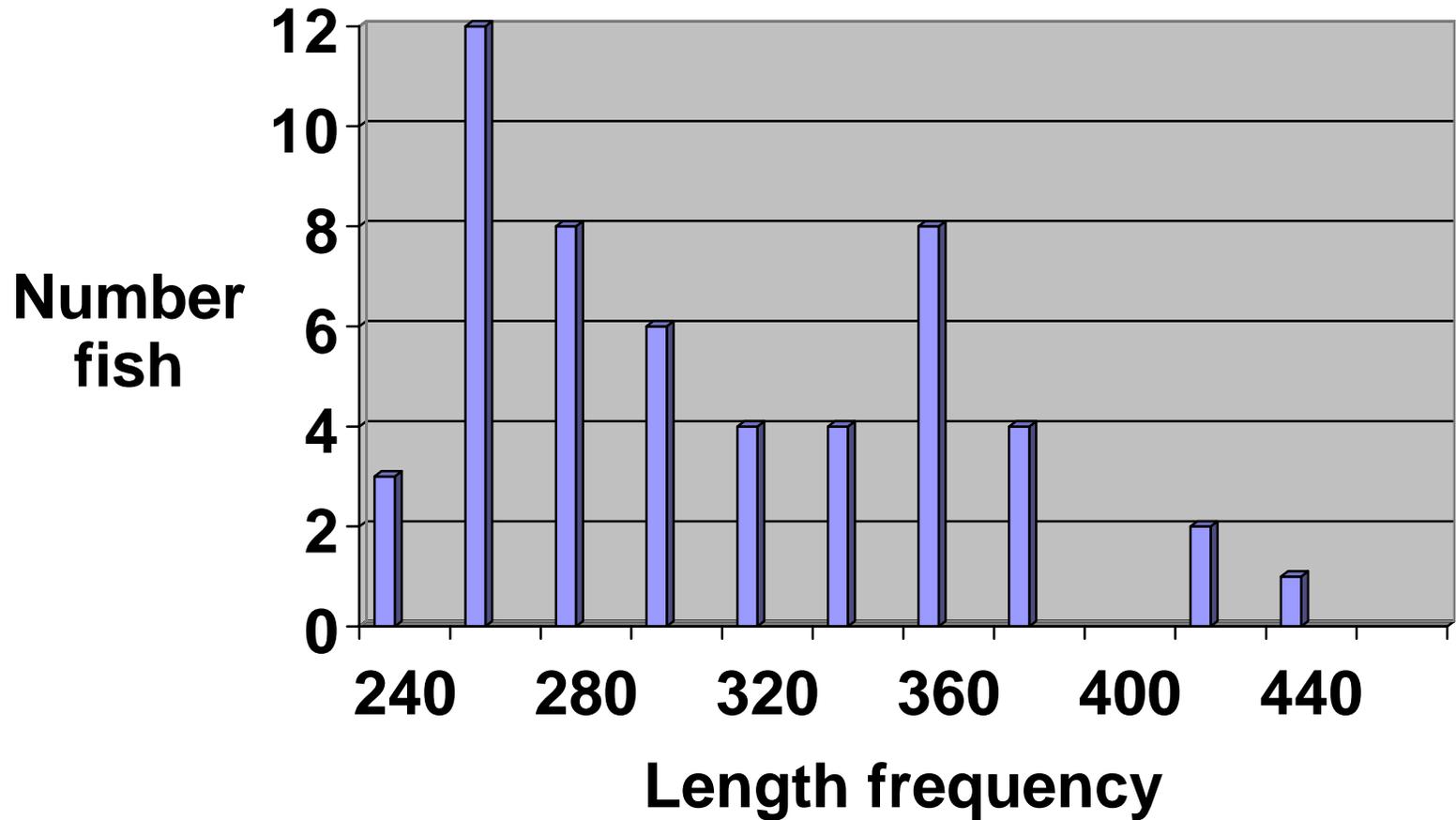


Figure 4. Length frequency for channel catfish caught in trammel net drifts, sturgeon sampling season, Segment 5, 2003.

### Flathead catfish

We collected one 910 mm flathead catfish with a hoop net in an outside bend .

### Pallid sturgeon

We collected 10 pallid sturgeon with gill nets for a catch per unit effort of 0.115 pallid sturgeon per gill net night (Table 3). Pallid sturgeon were collected in channel cross over, inside bend, and outside bend macrohabitats with gill nets that ranged in size from 533 to 670 mm. We collected 3 pallid sturgeon with drifting trammel nets in channel cross over and side channel connected large macrohabitats. Our pallid sturgeon catch per unit effort for trammel nets was 0.007 fish per 100-m drift.

Table 3. Pallid sturgeon (PLDS) catch per unit effort for 33.3 m overnight gill net sets in Segment 5, Ft Randall Dam to Niobrara River confluence by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and tributary mouth large (TRML).

Macrohabitat	N (net nights)	N (PLDS)	CPUE	Std. Dev.
CHXO	5	1	0.200	
CONF	0			
ISB	39	6	0.154	
OSB	33	3	0.091	
SCCL	10	0	0.000	
SCCS	0			
TRML	0			
<b>TOTAL</b>	87	10	0.115	

## River carpsucker

We collected 18 river carpsucker with gill nets in inside bend, outside bend, and side channel connected large macrohabitats for a total gill net catch per unit effort of 0.207 fish per gill net night (Table 4). River carpsucker collected with gill nets ranged from 182 to 435 mm. We collected 9 river carpsucker with hoop nets in inside bend, outside bend, and side channel connected large macrohabitats. Our river carpsucker catch per unit effort for hoop nets was 0.23 fish per hoop net night. We collected 10 river carpsucker with drifting trammel nets in channel cross over, inside bend, and outside bend macrohabitats. Our river carpsucker catch per unit effort for drifting trammel nets was 0.03 fish per 100-m drift.

Table 4. River carpsucker (RVCS) catch per unit effort for 33.3 m overnight gill net sets in Segment 5, Ft Randall Dam to Niobrara River confluence by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS) ), and large tributary mouth (TRML).

Macrohabitat	N (net nights)	N (RVCS)	CPUE	Std. Dev.
CHXO	5	0	0.000	
CONF	0			
ISB	39	10	0.256	
OSB	33	7	0.212	
SCCL	10	1	0.100	
SCCS	0			
TRML	0			
<b>TOTAL</b>	87	18	0.207	

## Sauger

We collected 24 sauger in channel cross over, inside bend, and outside bend macrohabitats with gill nets (Table 5). Our total sauger gill net catch per unit effort was 0.276 fish per gill net night (Table 5). Sauger collected in gill nets ranged from 330 to 451 mm. We collected 3 sauger with drifting trammel nets in channel cross over and inside bend macrohabitats. No sauger were collected with hoop nets or the trawl.

Table 5. Sauger (SGER) catch per unit effort for 33.3 m overnight gill net sets in Segment 5, Ft Randall Dam to Niobrara River confluence by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and large tributary mouth (TRML).				
Macrohabitat	N (net nights)	N (SGER)	CPUE	Std. Dev.
CHXO	5	2	0.400	
CONF	0	0	0.000	
ISB	39	10	0.256	
OSB	33	11	0.333	
SCCL	10	0	0.000	
SCCS	0	0	0.000	
TRML	0			
<b>TOTAL</b>	87	24	0.276	

### Shorthead redhorse

We collected 27 shorthead redhorse with gill nets in inside bend, outside bend, and side channel connected large macrohabitats . Our total shorthead redhorse gill net catch per unit effort was 0.310 fish per gill net night (Table 6). Shorthead redhorse caught in gill nets ranged from 218 to 425 mm. We collected 12 shorthead redhorse with hoop nets in outside bend and side channel connected large macrohabitats (Table 7). Our total shorthead redhorse catch per unit effort was 0.30 fish per hoop net night. Shorthead redhorse collected in hoop nets ranged from 313 to 410 mm. We collected 19 shorthead redhorse with drifting trammel nets in inside bend, outside bend, and side channel connected large macrohabitats that ranged in size from 225 to 425 mm. Our drifting trammel net catch per unit effort for shorthead redhorse was 0.05 fish per 100-m drift (Table 8). No shorthead redhorse were collected with the trawl.

Macrohabitat	N (net nights)	N (SHRH)	CPUE	Std. Dev.
CHXO	5	0	0.0	
CONF	0	0	0.000	
ISB	39	13	0.333	
OSB	33	11	0.333	
SCCL	10	3	0.300	
SCCS	0	0	0.000	
TRML	0			
<b>TOTAL</b>	87	27	0.310	

Table 7. Shorthead redhorse (SHRH) catch per unit effort for hoop net nights in Segment 5, Ft Randall Dam to Niobrara River confluence by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and tributary mouth large (TRML).

Macrohabitat	N (hoop nets)	N (SHRH)	CPUE	Std. Dev.
CHXO	2	0	0.00	
CONF	0			
ISB	11	0	0.00	
OSB	22	11	0.50	
SCCL	5	1	0.20	
SCCS	0			
TRML	0			
<b>TOTAL</b>	40	12	0.30	

Table 8. Shorthead redhorse (SHRH) catch per unit effort for 100 m trammel net drifts in Segment 5, Ft Randall Dam to Niobrara River confluence by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and large tributary mouth (TRML).

Macrohabitat	N (trammel drifts)	N (SHRH)	CPUE	Std. Dev.
CHXO	91.2	0	0.00	
CONF	0			
ISB	130.7	5	0.04	
OSB	124.7	10	0.08	
SCCL	43.5	4	0.09	
SCCS	0			
TRML	0			
<b>TOTAL</b>	390.5	19	0.05	

### Shovelnose sturgeon

We collected 27 shovelnose sturgeon with gill nets in inside bend, outside bend, side channel connected large, and channel cross over macrohabitats (Table 9). Our total gill net catch per unit effort for shovelnose sturgeon was 0.310 fish per gill net night (Table 9). Shovelnose sturgeon collected in gill nets ranged in size from 383 to 715 mm. We collected 29 shovelnose sturgeon with drifting trammel nets in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats (Table 10). Our shovelnose sturgeon catch per unit effort for drifting trammel nets was 0.07 fish per 100-m drift (Table 10). Shovelnose sturgeon collected with drifting trammel nets ranged from 558 to 668 mm. No shovelnose sturgeon were collected with the bottom trawl.

Table 9. Shovelnose sturgeon (SNSG) catch per unit effort for 33.3 m overnight gill net sets in Segment 5, Ft Randall Dam to Niobrara River confluence by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and large tributary mouth (TRML).				
Macrohabitat	N (net nights)	N (SNSG)	CPUE	Std. Dev.
CHXO	5	3	0.600	
CONF	0	0	0.000	
ISB	39	14	0.359	
OSB	33	8	0.242	
SCCL	10	2	0.200	
SCCS	0	0	0.000	
TRML	0			
<b>TOTAL</b>	87	27	0.310	

Table 10. Shovelnose sturgeon (SNSG) catch per unit effort for 100 m trammel net drifts in Segment 5, Ft Randall Dam to Niobrara River confluence by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and large tributary mouth (TRML).

Macrohabitat	N (trammel drifts)	N (SNSG)	CPUE	Std. Dev.
CHXO	91.2	11	0.12	
CONF	0			
ISB	130.7	7	0.05	
OSB	124.7	9	0.07	
SCCL	43.5	2	0.05	
SCCS	0			
<b>TOTAL</b>	390.5	29	0.07	

#### Smallmouth buffalo

We collected 6 smallmouth buffalo in hoop nets with a hoop net catch per unit effort of 0.15 fish per hoop net night. Smallmouth buffalo were collected in inside bend outside bend, and side channel connected large macrohabitats with hoop nets. Smallmouth buffalo were not collected with gill nets, drifting trammel nets, or trawling.

#### Sampling effort – wild gear

We sampled segment 5 during the sturgeon sampling season with 204 setline hook nights.

Two hooks (10/0 and 12/0) were attached to each set line and each of the hooks was alternately baited with leeches and night crawlers.

#### Pallid sturgeon

We collected 3 pallid sturgeon that ranged from 400 to 630mm in the inside bend macrohabitat with setlines. Our pallid sturgeon setline catch per unit effort was 0.015 fish per hook night.

## **Fish Community Sampling Season**

### *Sampling effort – standard gear*

We sampled segment 5 during the fish community sampling season using 58 hoop net nights.

We completed 185 trammel drifts covering a distance of 51,060 m for a trammel net effort of 510.6

100-m drifts. We completed 124 bottom trawls covering a distance of 35,464 m for a total of 354.6 100-m trawls.

### Blue sucker

We collected 1 434 mm blue sucker with a hoop net in an outside bend macrohabitat. Our total blue sucker hoop net catch per unit effort was 0.172 fish per hoop net night. We

collected 3 blue suckers in the outside bend macrohabitat with drifting trammel nets for a total blue sucker trammel net catch per unit effort of 0.006 fish per 100-m trammel drift.

Blue sucker length frequencies in trammel nets ranged from 755 to 840 mm. No blue suckers were caught with the trawl.

### Bigmouth buffalo

We collected one 434 mm bigmouth buffalo in the inside bend macrohabitat with a hoop net and one 476 mm bigmouth buffalo in the inside bend macrohabitat with a drifting trammel net. No bigmouth buffalo were collected with the trawl.

### Common carp

We collected 34 common carp with hoop nets in channel cross over, inside bend, outside bend and side channel connected macrohabitats (Table 11). Our common carp hoop net catch per unit effort was 0.586 fish per net night (Table 11). Common carp collected in

hoop nets ranged from 405 to 597mm. We collected one 486mm common carp in an outside bend with a trammel net drift. No common carp were collected with the trawl.

Table 11. Common carp (CARP) catch per unit effort for hoop net nights in Segment 5, Ft Randall Dam to Niobrara River confluence by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and tributary mouth large (TRML).				
Macrohabitat	N (hoop nets)	N (CARP)	CPUE	Std. Dev.
CHXO	4	5	0.800	
CONF	0			
ISB	16	5	0.313	
OSB	28	9	0.321	
SCCL	10	15	1.500	
SCCS	0			
TRML	0			
<b>TOTAL</b>	58	34	0.586	

### Channel catfish

We collected 113 channel catfish in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats with hoop nets (Table 12). Our channel catfish catch per unit effort with hoop nets was 1.948 fish per hoop net night (Table 12). Channel catfish collected in hoop nets ranged from 340 to 760 mm (Figure 5). We collected 119 channel catfish in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats with drifting trammel nets (Table 13). Our channel catfish catch per unit effort with drifting trammel nets was 0.233 fish per 100-m of trammel drift (Table 13). Channel catfish collected with drifting trammel nets ranged in size from 231 to 372 mm (Figure 6). No channel catfish were collected with the trawl.

Table 12. Channel catfish (CNCF) catch per unit effort for hoop net nights in Segment 5, Ft Randall Dam to Niobrara River confluence by macro habitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and tributary mouth large (TRML).				
Macrohabitat	N (hoop nets)	N (CNCF)	CPUE	Std. Dev.
CHXO	4	5	1.250	
CONF	0			
ISB	16	40	2.500	
OSB	28	56	2.000	
SCCL	10	12	1.200	
SCCS	0			
TRML	0			
<b>TOTAL</b>	58	113	1.948	

# Channel catfish in hoop nets

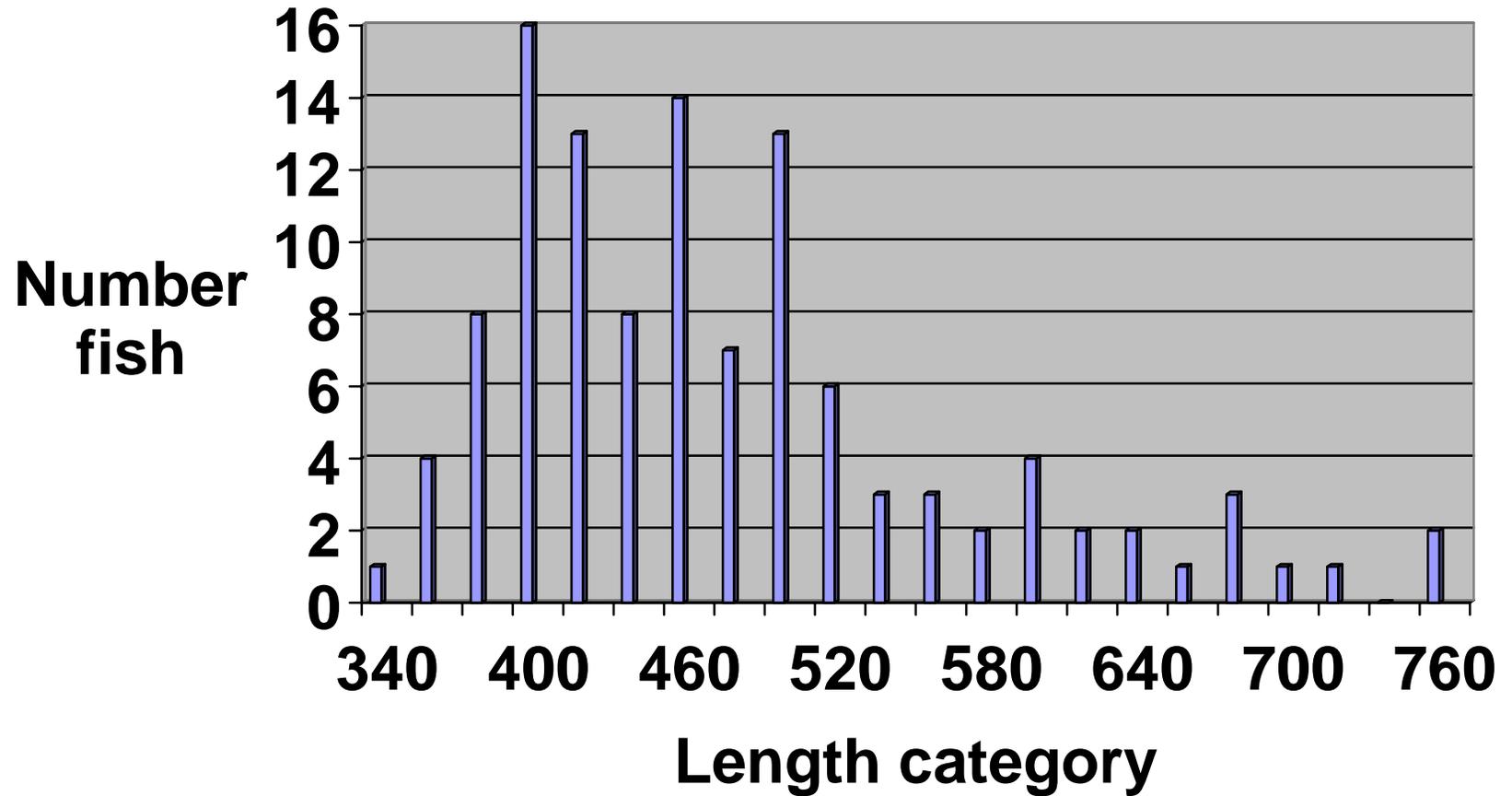


Figure 5. Length frequency graph for channel catfish in hoop nets, community fish sampling season, segment 5, 2003.

Table 13. Channel catfish (CNCF) catch per unit effort for 100 m trammel net drifts in Segment 5, Ft Randall Dam to Niobrara River confluence by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and tributary mouth large (TRML).

Macrohabitat	N (trammel drifts)	N (CNCF)	CPUE	Std. Dev.
CHXO	145.6	33	0.227	
CONF	0			
ISB	157.6	31	0.209	
OSB	150.1	34	0.226	
SCCL	57.4	21	0.366	
SCCS	0			
TRML	0			
<b>TOTAL</b>	510.6	119	0.233	

# Channel catfish in drifting trammel nets

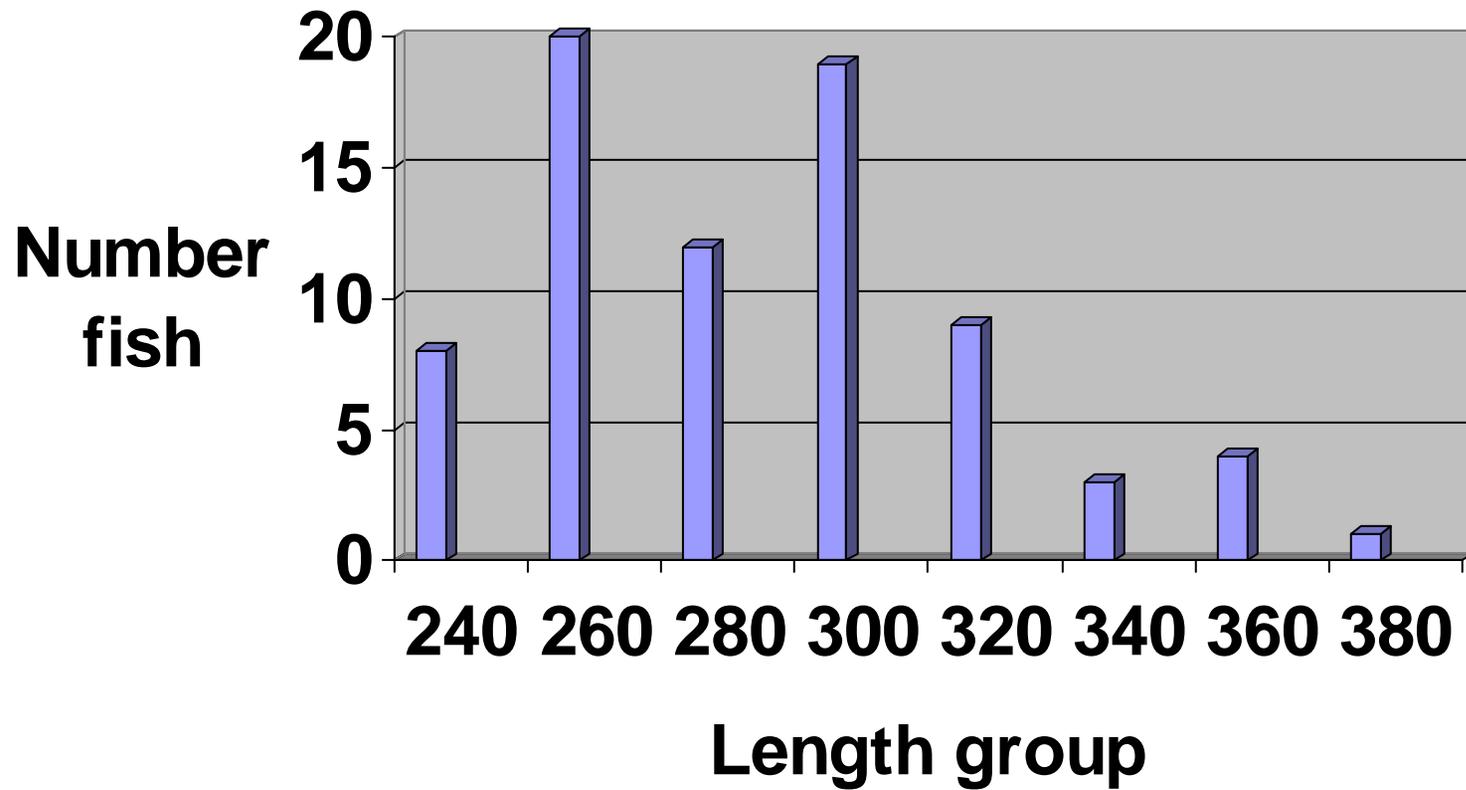


Figure 6. Length frequency graph for channel catfish, drifting trammel nets, community fish sampling season, Segment 5, 2003.

### Flathead catfish

We collected 4 flathead catfish in channel cross over, outside bend, and side channel connected large macrohabitats with hoop nets. Flathead catfish collected in hoop nets ranged from 635 to 1040 mm. No flathead catfish were collected with drifting trammel nets, or the bottom trawl.

### Freshwater drum

We collected 4 freshwater drum in outside bend and side channel connected macrohabitats with hoopnets ranging in size from 375 to 403 mm. No freshwater drum were collected with setlines or drifting trammel nets.

### River carpsucker

We collected one 445 mm river carpsucker in an outside bend macrohabitat with a hoop net. We collected nine river carpsucker in channel cross over, inside bend, outside bend, and side channel connected large macrohabitat with a drifting trammel nets. Our river carp sucker catch per unit effort for trammel nets was 0.176 fish per 100-m drift. River carp sucker collected with trammel nets ranged from 378 to 445 mm. No river carpsucker were collected with the benthic trawl.

Pallid sturgeon

We collected 22 pallid sturgeon with drifting trammel nets in inside bend, outside bend, and side channel connected large macrohabitats (Table 14). Our trammel net catch per unit effort for pallid sturgeon was 0.043 fish per 100-m drift (Table 14). Pallid sturgeon collected with drifting trammel nets ranged from 355 to 696 mm. No pallid sturgeon were collected with hoop nets or with the benthic trawl.

Macrohabitat	N (trammel drifts)	N (PDSG)	CPUE	Std. Dev.
CHXO	145.6	0	0	
CONF	0			
ISB	157.6	4	0.025	
OSB	150.1	15	0.100	
SCCL	57.4	3	0.052	
SCCS	0			
TRML	0			
<b>TOTAL</b>	510.6	22	0.043	

### Sauger

We collected 29 sauger with drifting trammel nets in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats (Table 15). Our sauger catch per unit effort with trammel nets was 0.057 fish per 100-m drift. Sauger collected with trammel nets ranged from 257 to 435 mm. No sauger were collected with hoop nets or the trawl.

Macrohabitat	N (trammel drifts)	N (SGER)	CPUE	Std. Dev.
CHXO	145.6	2	0.014	
CONF	0			
ISB	157.6	6	0.038	
OSB	150.1	18	0.120	
SCCL	57.4	3	0.052	
SCCS	0			
TRML	0			
<b>TOTAL</b>	510.6	29	0.057	

### Smallmouth buffalo

We collected 4 smallmouth buffalo with hoop nets in channel cross over, inside bend, and outside bend macrohabitats ranging in size from 540 to 580 mm. Our smallmouth buffalo catch per unit effort with hoop nets was 0.069 fish per hoop net night. We collected one 560mm smallmouth buffalo in a drifting trammel net. No smallmouth buffalo were collected with the trawl.

### Shorthead redhorse

We collected 14 shorthead redhorse with hoop nets in inside bend, outside bend, and side channel connected large macrohabitats. Our shorthead redhorse catch per unit effort for hoop nets was 0.241 fish per hoop net night (Table 16). Shorthead redhorse collected with hoop nets ranged from 302 to 462 mm. We collected 29 shorthead redhorse with drifting trammel nets in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats (Table 17). Our shorthead redhorse catch per unit effort for drifting trammel nets was 0.057 fish per 100-m drift (Table 17). Shorthead redhorse collected with drifting trammel nets ranged from 223 to 461 mm. No shorthead redhorse were collected with the trawl.

Table 16. Shorthead redhorse (SHRH) catch per unit effort for hoop net nights in Segment 5, Ft Randall Dam to Niobrara River confluence by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and tributary mouth large (TRML).				
Macrohabitat	N (hoop nets)	N (SHRH)	CPUE	Std. Dev.
CHXO	4	0	0.000	
CONF	0			
ISB	16	2	0.125	
OSB	28	11	0.393	
SCCL	10	1	0.100	
SCCS	0			
TRML	0			
<b>TOTAL</b>	58	14	0.241	

Table 17. Shorthead redhorse (SHRH) catch per unit effort for 100 m trammel net drifts in Segment 5, Ft Randall Dam to Niobrara River confluence by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and tributary mouth large (TRML).

Macrohabitat	N (trammel drifts)	N (SHRH)	CPUE	Std. Dev.
CHXO	145.6	2	0.014	
CONF	0			
ISB	157.6	6	0.038	
OSB	150.1	18	0.120	
SCCL	57.4	3	0.052	
SCCS	0			
TRML	0			
<b>TOTAL</b>	510.6	29	0.057	

### Smallmouth bass

We collected 4 smallmouth bass in drifting trammel nets that ranged in size from 270 to 358 mm. We collected 9 smallmouth bass in hoop nets that ranged in size from 301 to 385 mm. Our smallmouth bass hoop net catch per unit effort was 0.155 fish per hoop net night.

### Walleye

We collected 2 walleye in the outside bend macrohabitat with hoop nets that ranged in size from 365 to 455 mm. We collected 5 walleye in inside bend, outside bend, and side channel connected large macrohabitats with drifting trammel nets that ranged in size from 273 to 500 mm.

### Shortnose gar

We collected one 675 mm shortnose gar in the inside bend macrohabitat with a drifting trammel net.

### Shovelnose sturgeon

We collected 1 695 mm shovelnose sturgeon in an outside bend macrohabitat with a hoop net. We collected 58 shovelnose sturgeon in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats with drifting trammel nets (Table 18). Our shovelnose sturgeon catch per unit effort with trammel nets was 0.114 fish per 100-m trammel net drift. Shovelnose sturgeon collected with drifting trammel nets ranged in size from 558 to 760 mm (Figure 7). No shovelnose sturgeon were collected with the trawl.

Table 18. Shovelnose sturgeon (SNSG) catch per unit effort for 100 m trammel net drifts in Segment 5, Ft Randall Dam to Niobrara River confluence by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and tributary mouth large (TRML).				
Macrohabitat	N (trammel drifts)	N (SNSG)	CPUE	Std. Dev.
CHXO	145.6	19	0.130	
CONF	0			
ISB	157.6	9	0.057	
OSB	150.1	21	0.140	
SCCL	57.4	9	0.157	
SCCS	0			
TRML	0			
<b>TOTAL</b>	510.6	58	0.114	

# Shovelnose sturgeon in drifting trammel nets

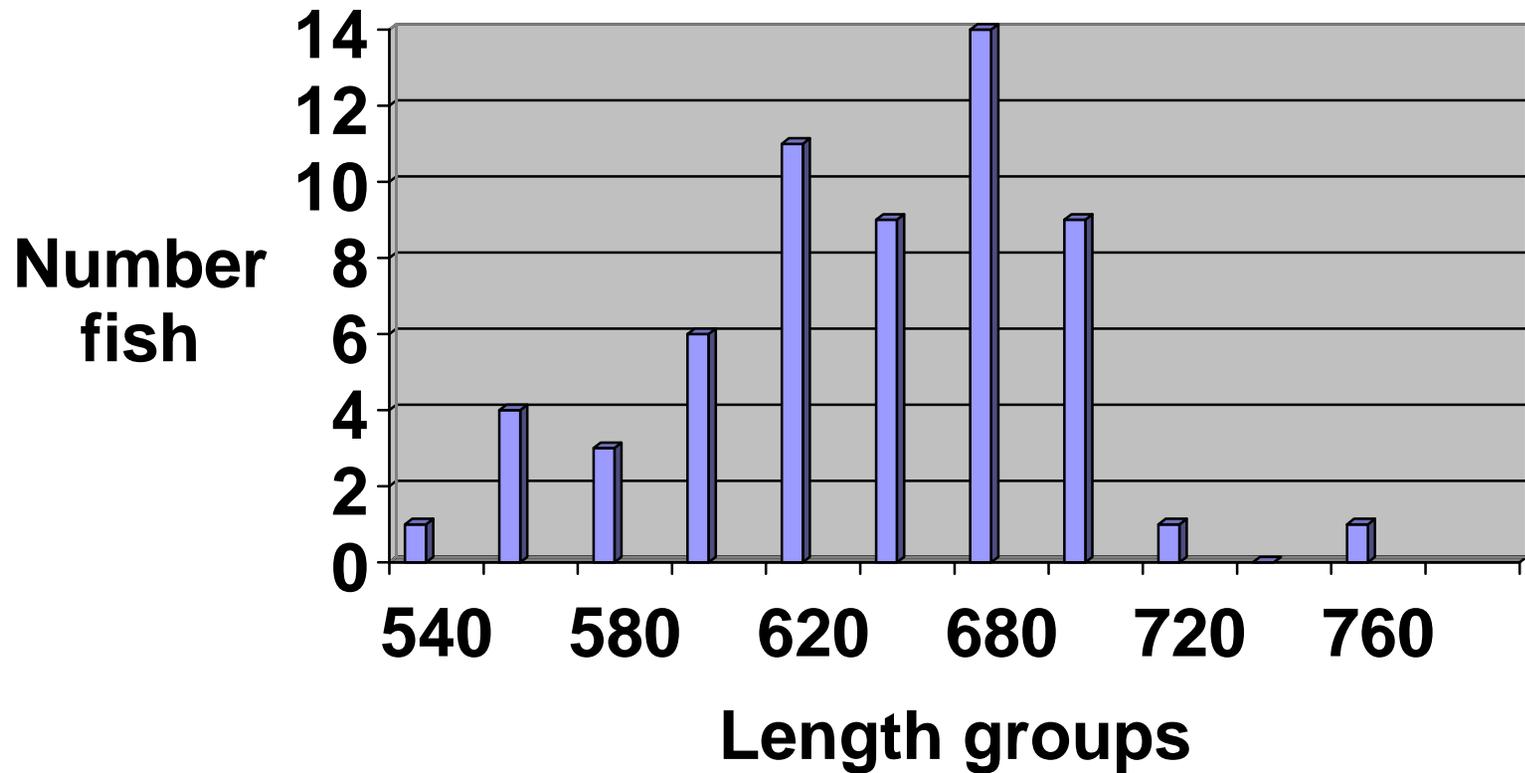


Figure 7. Length frequency graph for shovelnose sturgeon collected with drifting trammel nets, fish community sampling season, segment 5, 2003.

Wild Gear – sampling effort

We used 303 setline hook nights in segment 5 during the fish community sampling season.

Two hooks (10/0 and 12/0) were attached to each set line and each of the hooks was alternately baited with leeches and night crawlers.

Pallid sturgeon

All of the pallid sturgeon were collected on night crawlers, but leeches caught both smallmouth buffalo and channel catfish. Ten pallid sturgeon were collected with set lines in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats (Table 19). Our setline hook catch per unit effort for pallid sturgeon was 0.033 fish per hook night (Table 19).

Macrohabitat	N (hook nights)	N (PDSG)	CPUE	Std. Dev.
CHXO	52	2	0.039	
CONF	0			
ISB	112	1	0.009	
OSB	94	5	0.053	
SCCL	45	2	0.044	
SCCS	0			
TRML	0			
<b>TOTAL</b>	303	10	0.033	

Shovelnose sturgeon

We collected four shovelnose sturgeon with setlines in outside bend and side channel connected large macrohabitats that ranged in size from 551 to 756 mm. Our shovelnose sturgeon catch per unit effort for setlines was 0.0013 fish per hook night.

## RESULTS

### Segment 6

#### Sturgeon Sampling Season

##### *Sampling effort – standard gear*

We sampled segment six during the sturgeon sampling season with 50 gill net nights and 40 hoop net nights. We completed 118 trammel net drifts covering a distance of 36,934 m for a 100-m trammel net effort of 369.3. We completed 52 bottom trawls covering a distance of 16,588m for a 100-m trawling effort of 165.9.

#### Black crappie

We collected 6 black crappie ranging in size from 261 to 315 mm in inside bend and side channel connected large macrohabitats with hoop nets. Our black crappie hoop net catch per unit effort was 0.150 fish per hoop net night. No black crappie were collected with the trawl, drifting trammel nets, or gill nets.

#### Bigmouth buffalo

We collected 2 bigmouth buffalo ranging in size from 570 to 580 mm in the side channel connected large macrohabitat with hoop nets. Our bigmouth buffalo catch per unit effort with hoop nets was 0.040 fish per hoop net night. We collected 4 bigmouth buffalo ranging in size from 583 to 754 mm with drifting trammel nets in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats. Our bigmouth buffalo catch per unit effort in drifting trammel nets was 0.014 fish per 100-m drift.

### Blue sucker

We collected 3 blue sucker ranging in size from 695 to 780 mm with gill nets in inside bend and outside bend macrohabitats. Our blue sucker gill net catch per unit effort was 0.060 fish per gill net night. We collected 2 blue sucker ranging in size from 736 to 851 mm in the outside bend macrohabitat with drifting trammel nets. Our blue sucker catch per unit effort with drifting trammel nets was 0.005 fish per 100-m drift. No blue suckers were caught with hoop nets or the trawl.

### Common carp

We collected 1 common carp in a gill net set in the outside bend macrohabitat. We collected 9 common carp ranging in size from 471 to 585 mm in inside bend and side channel connected macrohabitats with hoop nets. Our common carp catch per unit effort with hoop nets was 0.225 fish per hoop net night. We collected 6 common carp in channel cross over and side channel connected macrohabitats with drifting trammel nets. Our common carp catch per unit effort for drifting trammel nets was 0.162 fish per 100-m drift.

### Channel catfish

We collected 14 channel catfish with gill nets in inside bend, outside bend, and side channel connected large macrohabitats (Table 1). Our channel catfish catch per unit effort with gill nets was 0.280 fish per gill net night (Table 1). Channel catfish collected with gill nets ranged in size from 305 to 555 mm. We collected 101 channel catfish with hoop nets in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats (Table 2). Channel catfish catch per unit effort with hoop nets was 2.525 fish per hoop net night (Table 2). Channel catfish collected with hoop nets ranged from 320 to 802 mm (Figure 1). We collected 50 channel catfish with drifting trammel nets in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats (Table 3). Our channel catfish catch per unit effort with drifting trammel nets was 0.135 fish per 100-m drift. Channel catfish collected with drifting trammel nets ranged in size from 120 to 601 mm (Figure 2). No channel catfish were collected with the trawl.

Macrohabitat	N (net nights)	N (CNCF)	CPUE	Std. Dev.
CHXO	2	0	0	
CONF	0			
ISB	12	2	0.167	
OSB	16	4	0.250	
SCCL	16	8	0.500	
SCCS	0			
TRML	0			
<b>TOTAL</b>	50	14	0.280	

Table 2. Channel catfish (CNCF) catch per unit effort for hoop net nights in Segment 6, Niobrara River to Lewis and Clark Lake headwaters by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and tributary mouth large (TRML).

Macrohabitat	N (hoop nets)	N (CNCF)	CPUE	Std. Dev.
CHXO	2	32	16.000	
CONF	0			
ISB	10	9	0.9000	
OSB	16	6	0.375	
SCCL	12	54	4.500	
SCCS	0			
TRML	0			
<b>TOTAL</b>	40	101	2.525	

Table 3. Channel catfish (CNCF) catch per unit effort for 100-m trammel net drifts in Segment 6, Niobrara River to Lewis and Clark Lake headwaters by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and large tributary mouth (TRML).

Macrohabitat	N (trammel drifts)	N (CNCF)	CPUE	Std. Dev.
CHXO	89.0	26	0.292	
CONF	0			
ISB	96.2	3	0.031	
OSB	107.8	10	0.093	
SCCL	76.3	11	0.144	
SCCS	0			
TRML	0			
<b>TOTAL</b>	369.3	50	0.135	

# Channel catfish in hoop nets

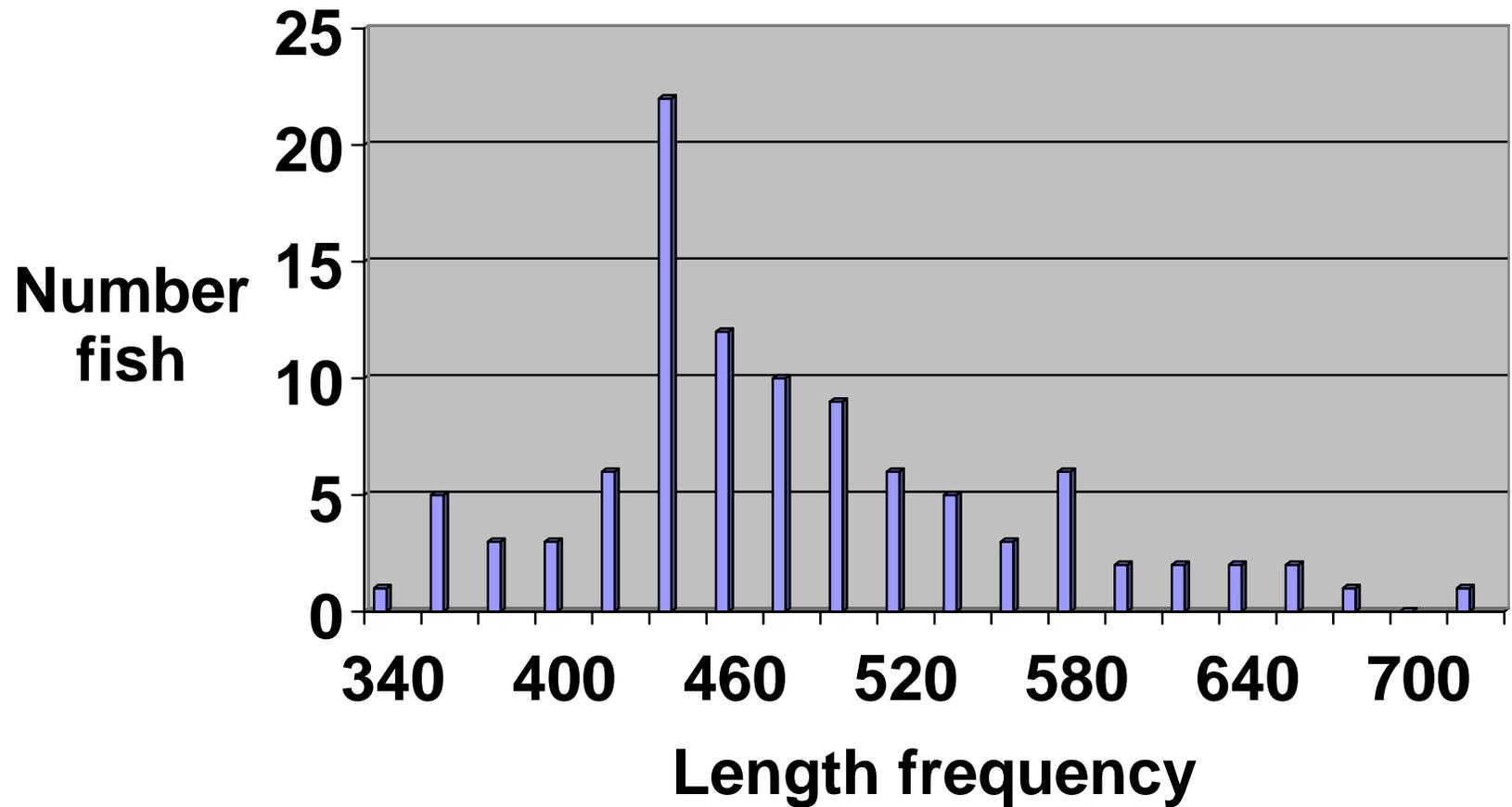


Figure 1. Length frequency for channel catfish collected with hoop nets, sturgeon sampling season, Segment 6, 2003.

# Channel catfish in drifting trammel nets

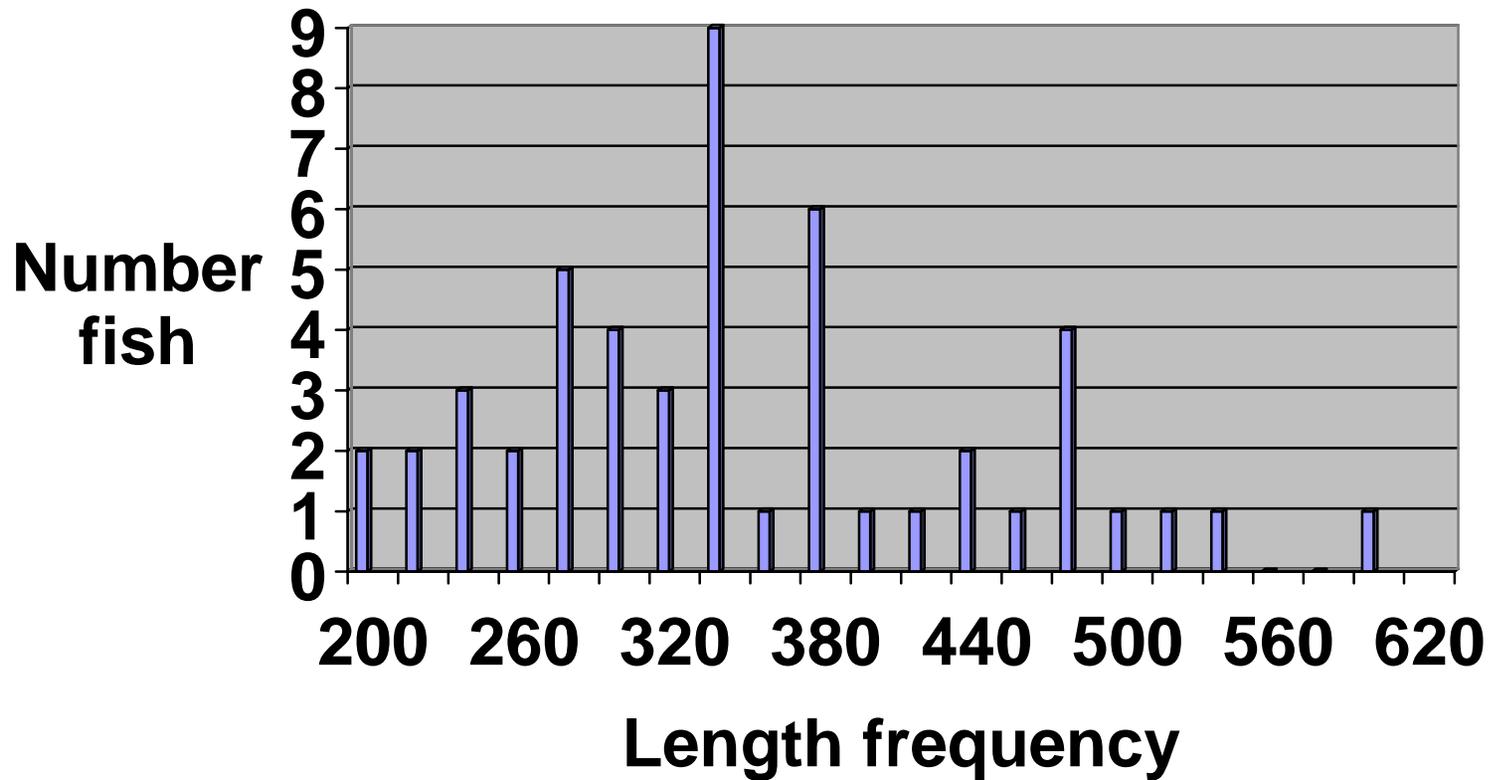


Figure 2. Length frequency for channel catfish collected with drifting trammel nets, sturgeon sampling season, segment 6, 2003.

### Freshwater drum

We collected one 488 mm freshwater drum in the side channel connected large macrohabitat with a drifting trammel net. We collected one 531 mm freshwater drum in the outside bend macrohabitat with a hoop net. No freshwater drum were collected in gill nets or with the trawl.

### Pallid sturgeon

We collected 2 pallid sturgeon (545 mm and 665 mm) in the side channel connected macrohabitat with gill nets. Our gill net catch per unit effort for pallid sturgeon was 0.024 fish per gill net night. We collected one 1430 mm pallid sturgeon with a drifting trammel net in the side channel connected large macrohabitat. Our pallid sturgeon catch per unit effort for drifting trammel nets was 0.003 fish per 100-m trammel drift. No pallid sturgeon were collected with hoop nets or the trawl.

### River carpsucker

We collected two river carpsucker (424 mm and 436mm) with gill nets in the side channel connected large macrohabitat. We collected 13 river carpsucker with hoop nets in outside bend and side channel connected macrohabitats (Table 4). Our river carpsucker catch per unit effort for hoop nets was 0.325 fish per hoop net night (Table 4). We collected 18 river carpsucker in inside bend, and side channel connected large macrohabitats (Table 5). Our river carpsucker catch per unit effort for drifting trammel nets was 0.049 fish per 100-m trammel drift (Table 5).

Table 4. River carpsucker (RVCS) catch per unit effort for hoop net nights in Segment 6, Niobrara River to Lewis and Clark Lake headwaters by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and tributary mouth large (TRML).

Macrohabitat	N (hoop nets)	N (RVCS)	CPUE	Std. Dev.
CHXO	2	0	0	
CONF	0			
ISB	10	0	0	
OSB	16	3	0.187	
SCCL	12	10	0.833	
SCCS	0			
TRML	0			
<b>TOTAL</b>	40	13	0.325	

Table 5. River carpsucker (RVCS) catch per unit effort for 100 m trammel net drifts in Segment 6, Niobrara River to Lewis and Clark Lake headwaters by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and large tributary mouth (TRML).

Macrohabitat	N (trammel drifts)	N (RVCS)	CPUE	Std. Dev.
CHXO	89.0	0	0	
CONF	0			
ISB	96.2	1	0.010	
OSB	107.8	0	0	
SCCL	76.3	17	0.223	
SCCS	0			
TRML	0			
<b>TOTAL</b>	369.3	18	0.049	

## Sauger

We collected 20 sauger in inside bend, outside bend, and side channel connected macrohabitats with gill nets (Table 7). Our sauger catch per unit effort for gill nets was 0.400 fish per gill net night (Table 7). Sauger collected with gill nets ranged in size from 285 to 441 mm. We collected 64 sauger with drifting trammel nets in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats (Table 8). Our sauger catch per unit effort with drifting trammel nets was 0.173 fish per 100-m trammel drift (Table 8). Sauger collected with trammel nets ranged in size from 264 to 465 mm (Figure 3).

Table 7. Sauger (SGER) catch per unit effort for 33.3 m overnight gill net sets in Segment 6, Niobrara River to Lewis and Clark Lake headwaters by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and tributary mouth large (TRML).				
Macrohabitat	N (net nights)	N (SGER)	CPUE	Std. Dev.
CHXO	2	0	0	
CONF	0			
ISB	12	6	0.500	
OSB	16	12	0.750	
SCCL	16	2	0.125	
SCCS	0			
TRML	0			
<b>TOTAL</b>	50	20	0.400	

Table 8. Sauger (SGER) catch per unit effort for 100 m trammel net drifts in Segment 6, Niobrara River to Lewis and Clark Lake headwaters by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and large tributary mouth (TRML).

Macrohabitat	N (trammel drifts)	N (SGER)	CPUE	Std. Dev.
CHXO	89.0	26	0.292	
CONF	0			
ISB	96.2	13	0.135	
OSB	107.8	9	0.083	
SCCL	76.3	16	0.210	
SCCS	0			
TRML	0			
<b>TOTAL</b>	369.3	64	0.173	

# Sauger collected with drifting trammel nets

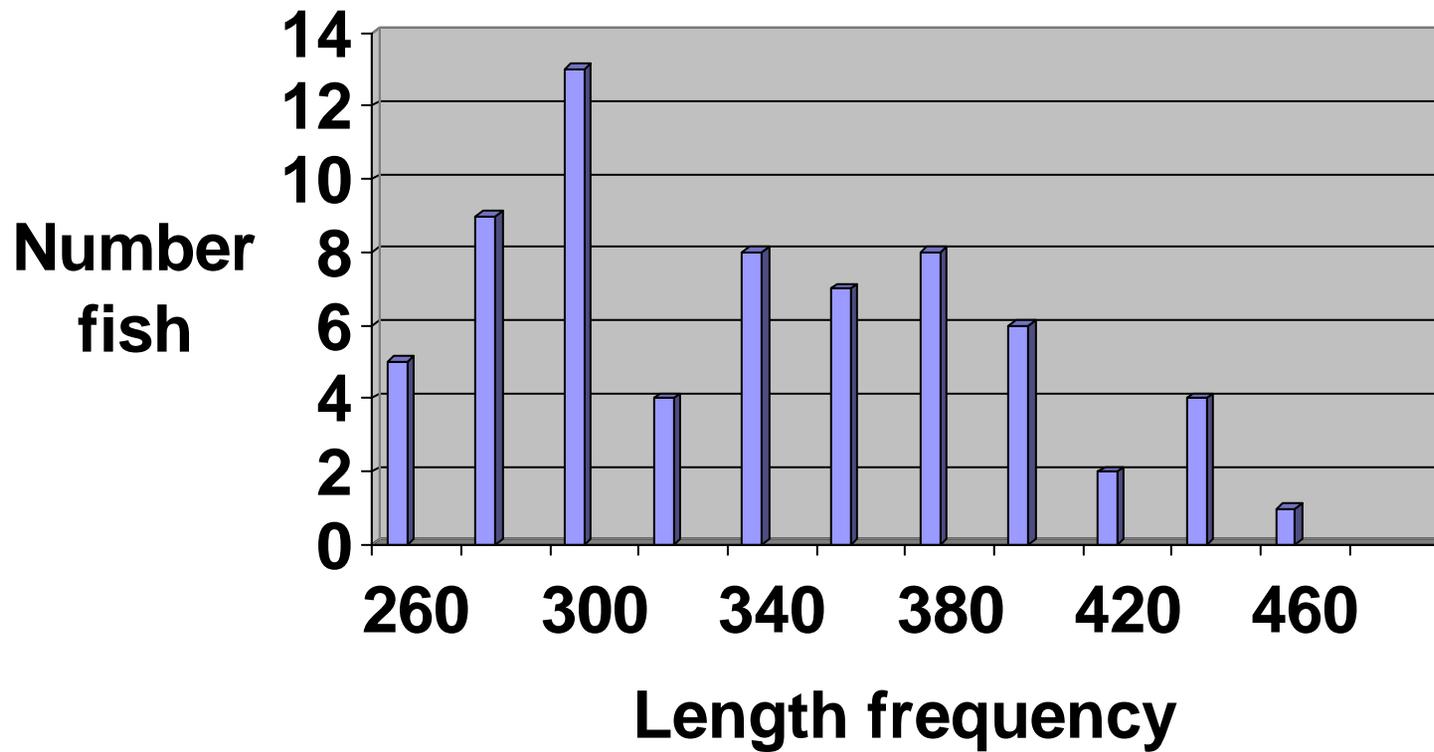


Figure 3. Sauger collected with drifting trammel nets during the sturgeon sampling season, segment 6, 2003.

### Shorthead redhorse

We collected 30 shorthead redhorse with gill nets in inside bend, outside bend, and side channel connected large macrohabitats (Table 9). Our shorthead redhorse gill net catch per unit effort was 0.600 fish per gill net night (Table 9). Shorthead redhorse collected with gill nets ranged in size from 220 to 415 mm. We collected 13 shorthead redhorse in outside bend and side channel connected macrohabitats using hoop nets. Our shorthead redhorse hoop net catch per unit effort was 0.260 fish per hoop net night. Shorthead redhorse collected in hoop nets ranged in size from 285 to 455 mm. We collected 11 shorthead redhorse with drifting trammel nets in channel cross over, outside bend, inside bend, and side channel connected macrohabitats. Our shorthead redhorse catch per unit effort for drifting trammel nets was 0.030 fish per 100-m trammel net drift. Shorthead redhorse collected with drifting trammel nets ranged in size from 226 to 416 mm.

Macrohabitat	N (net nights)	N (SHRH)	CPUE	Std. Dev.
CHXO	2	0	0	
CONF	0			
ISB	12	18	1.500	
OSB	16	10	0.625	
SCCL	16	2	0.125	
SCCS	0			
TRML	0			
<b>TOTAL</b>	50	30	0.600	

### Shortnose gar

We collected 14 shortnose gar in inside bend, outside bend, and side channel connected large macrohabitats with hoop nets (Table 10). Our shortnose gar catch per unit effort with hoop nets was 0.350 fish per hoop net night (Table 10). Shortnose gar collected with hoop nets ranged in size from 626 to 751 mm. No shortnose gar were collected with drifting trammel nets, gill nets, or the trawl.

Table 10. Shortnose gar (SNGR) catch per unit effort for hoop net nights in Segment 6, Niobrara River to Lewis and Clark Lake headwaters by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and tributary mouth large (TRML).				
Macrohabitat	N (hoop nets)	N (SNGR)	CPUE	Std. Dev.
CHXO	2	0	0.000	
CONF	0			
ISB	10	11	1.100	
OSB	16	2	0.125	
SCCL	12	1	0.083	
SCCS	0			
TRML	0			
<b>TOTAL</b>	40	14	0.350	

### Smallmouth buffalo

We collected 10 smallmouth buffalo in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats using gill nets. Our smallmouth buffalo catch per unit effort for gill nets was 0.240 fish per gill net night. Smallmouth buffalo collected with gill nets ranged in size from 488 to 650 mm. We collected 2 smallmouth buffalo (514 to 673 mm) in inside bend and outside bend macrohabitats using hoop nets. Our smallmouth buffalo catch per unit effort for hoop nets was 0.050 fish per hoop net night. We

collected 9 smallmouth buffalo in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats using drifting trammel nets. Our smallmouth buffalo catch per unit effort for drifting trammel nets was 0.249 fish per 100m trammel drift.

Smallmouth buffalo collected with drifting trammel nets ranged in size from 546 to 613 mm.

Shovelnose sturgeon

We collected 12 shovelnose sturgeon with gill nets in channel cross over, outside bend, and side channel connected large macrohabitats. Shovelnose sturgeon collected with gill nets ranged in size from 627 to 660 mm. Our shovelnose sturgeon catch per unit effort with gill nets was 0.240 fish per gill net night. We collected 24 shovelnose sturgeon with drifting trammel nets in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats (Table 11). Our shovelnose sturgeon catch per unit effort for drifting trammel nets was 0.065 fish per 100-m trammel net drift. Shovelnose sturgeon collected with drifting trammel nets ranged in size from 550 to 712 mm. No shovelnose sturgeon were collected with hoop nets or the trawl.

Table 11. Shovelnose sturgeon (SNSG) catch per unit effort for 100 m trammel net drifts in Segment 6, Niobrara River to Lewis and Clark Lake headwaters by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS), and large tributary mouth (TRML).				
Macrohabitat	N (trammel drifts)	N (SNSG)	CPUE	Std. Dev.
CHXO	89.0	9	0.101	
CONF	0			
ISB	96.2	0	0.000	
OSB	107.8	5	0.046	
SCCL	76.3	10	0.131	
SCCS	0			
TRML	0			
<b>TOTAL</b>	369.3	24	0.065	

## Walleye

We collected 6 walleye with gill nets in inside bend and outside bend macrohabitats. Our walleye gill net catch per unit effort was 0.120 fish per gill net night. Walleye collected with gill nets ranged in size from 430 to 514 mm. We collected 5 walleye with hoop nets in channel cross over, inside bend, and side channel connected large macrohabitats. Our hoop net catch per unit effort for walleye was 0.125 fish per hoop net night. Walleye collected with hoop nets ranged in size from 424 to 690 mm. We collected 8 walleye with drifting trammel nets in channel cross over, inside bend, and side channel connected large macrohabitats. Our walleye catch per unit effort for drifting trammel nets was 0.022 fish per 100-m trammel net drift. Walleye collected with drifting trammel nets ranged in size from 297 to 495 mm.

## White bass

We collected 3 white bass in outside bend and side channel connected large macrohabitats with hoop nets. White bass collected with hoop nets ranged in size from 253 to 370 mm. We collected one 375 mm white bass in the outside bend macrohabitat with a drifting trammel net.

## **Wild gear**

### *Wild Gear – sampling effort*

We used 290 setline hook nights in segment 6 during the sturgeon sampling season. Two hooks (10/0 and 12/0) were attached to each set line and each of the hooks was alternately baited with leeches and night crawlers.

### Pallid sturgeon

We collected one 612 mm pallid sturgeon in the side channel connected large macrohabitat on a worm baited 10/0 hook setline. Our pallid sturgeon catch per unit effort for setlines was 0.003 fish per hook night.

### Shovelnose sturgeon

We collected 4 shovelnose sturgeon in channel cross over, inside bend, and side channel connected large macrohabitats with setlines. Our shovelnose sturgeon catch per unit effort with setlines was 0.003 fish per hook night. Shovelnose sturgeon collected with setlines ranged from 557 to 685 mm.

### Channel catfish

We collected 2 channel catfish (330 mm and 465 mm) with setlines in the side channel connected large macrohabitat. Our channel catfish catch per unit effort with setlines was 0.007 fish per hook night.

## **Fish Community Sampling Season**

### Sampling effort – standard gear

We sampled segment 6 during the fish community sampling season using 59 hoop net nights. We completed 135 trammel drifts covering a distance of 39,960 m for a trammel net effort of 399.6 100-m drifts. We completed 121 benthic beam trawls covering a distance of 36,542 m for a total of 365.4 100-m trawls.

### Black crappie

We collected 2 black crappie (305 mm and 305 mm) with hoop nets set in the outside bend and side channel connected macrohabitats. No black crappie were collected with drifting trammel nets or with the trawl.

### Blue sucker

We collected one 742 mm blue sucker in the outside bend macrohabitat with a hoop net. We collected two blue sucker (740 mm and 795 mm) in the outside bend macrohabitat with drifting trammel nets. No blue sucker were collected with the trawl.

### Common carp

We collected 16 common carp with hoop nets in inside bend, outside bend, and side channel connected macrohabitats. Our common carp catch per unit effort was 0.320 fish per hoop net night. Common carp collected in hoop nets ranged in size from 441 to 628 mm. We collected 6 common carp in drifting trammel nets in channel cross over and outside bend macrohabitats. Common carp collected in drifting trammel nets ranged in size from 481 to 635 mm. No common carp were collected with the trawl.

### Channel catfish

We collected 22 channel catfish in inside bend, outside bend, and side channel connected large macrohabitats with hoop nets (Table 12). Our channel catfish catch per unit effort for hoop nets was 0.373 fish per hoop net night (Table 12). Channel catfish collected with hoop nets ranged in size from 391 to 686 mm. We collected 77 channel catfish in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats with drifting trammel nets (Table 13). Our channel catfish catch per unit effort with drifting trammel nets was 0.193 fish per 100-m trammel net drift (Table 13). Channel catfish collected with drifting trammel nets ranged in size from 220 to 545 mm (Figure 4). No channel catfish were collected with the trawl.

Macrohabitat	N (hoop nets)	N (CNCF)	CPUE	Std. Dev.
CHXO	3	0	0	
CONF	0			
ISB	14	5	0.357	
OSB	24	6	0.250	
SCCL	18	11	0.611	
SCCS	0			
TRML	0			
<b>TOTAL</b>	59	22	0.373	

Table . 13 Channel catfish (CNCF) catch per unit effort for 100 m trammel net drifts in Segment 6, Niobrara River to Lewis and Clark Lake headwaters by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS) ), and large tributary mouth (TRML).

Macrohabitat	N (trammel drifts)	N (CNCF)	CPUE	Std. Dev.
CHXO	95.9	18	0.189	
CONF	0			
ISB	104.3	18	0.173	
OSB	116.8	34	0.291	
SCCL	82.6	7	0.085	
SCCS	0			
TRML	0			
<b>TOTAL</b>	399.6	77	0.193	

# Channel catfish in drifting trammel nets

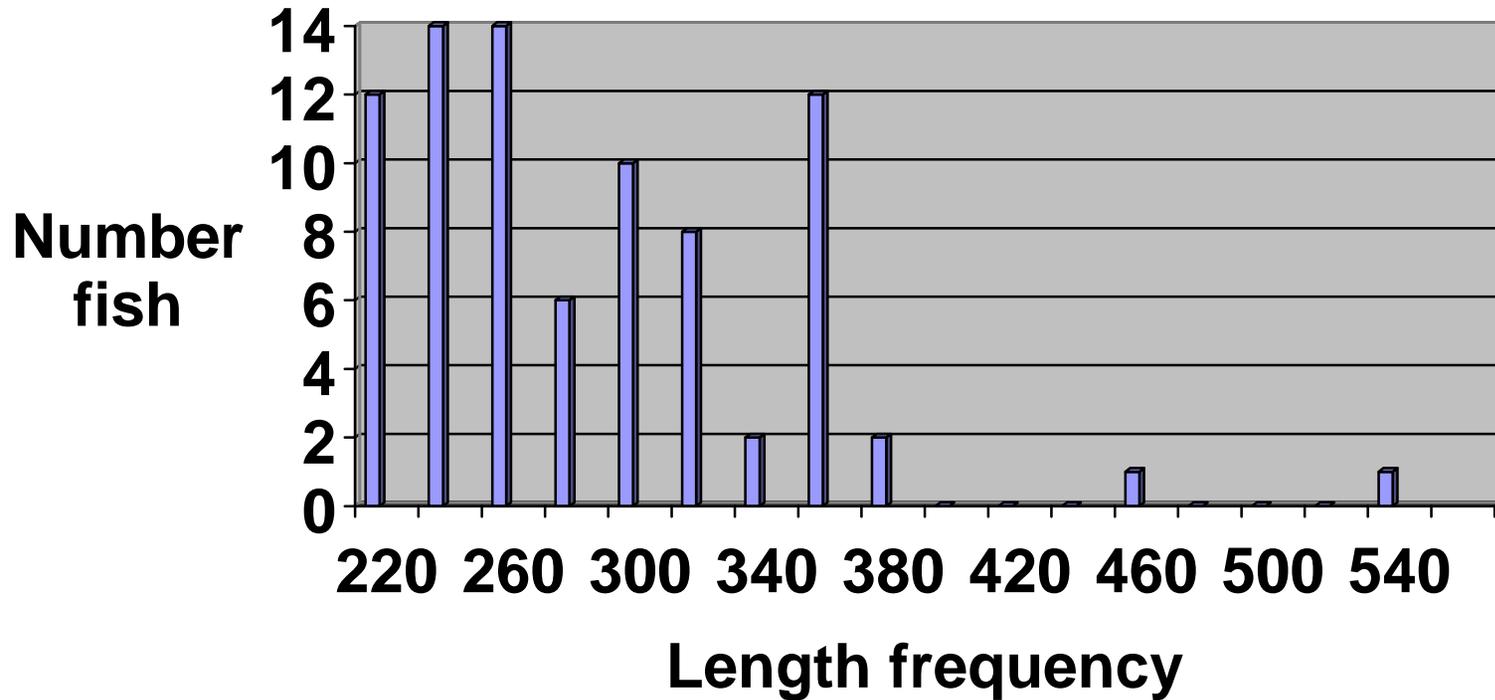


Figure 4. Channel catfish length frequency graph collected with drifting trammel nets, fish community sampling season, segment 6, 2003.

### Flathead catfish

We collected 12 flathead catfish in inside bend, outside bend, and side channel connected large macrohabitats with hoop nets. Our flathead catch per unit effort for flathead catfish with hoop nets was 0.203 fish per hoop net night. Flathead catfish collected with hoop nets ranged in size from 385 to 1080 mm. No flathead catfish were collected with drifting trammel nets or the trawl.

### Freshwater drum

We collected 11 freshwater drum in outside bend, inside bend, and side channel connected large macrohabitats with hoop nets. Our freshwater drum catch per unit effort with hoop nets was 0.186 fish per hoop net night. Freshwater drum collected with hoop nets ranged in size from 250 to 515 mm. No freshwater drum were collected with drifting trammel nets or the trawl.

### Pallid sturgeon

We collected 5 pallid sturgeon in inside bend, outside bend, and side channel connected macrohabitats with drifting trammel nets. Our pallid sturgeon catch per unit effort with drifting trammel nets was 0.013 fish per 100-m trammel net drift. Pallid sturgeon collected with drifting trammel nets ranged in size from 420 to 695 mm. No pallid sturgeon were collected with hoop nets or with the trawl.

### River carpsucker

We collected 4 river carp sucker in the side channel connected macrohabitat with hoop nets. Our river carp sucker catch per unit effort with hoop nets was 0.068 fish per hoop net night. River carpsucker collected with hoop nets ranged in size from 418 to 479 mm. We collected one 415 mm river carpsucker with a drifting trammel net in the channel cross over macrohabitat. No river carpsucker were collected with the trawl.

### Sauger

We collected one 485 mm sauger with a hoop net in the side channel connected large macrohabitat. We collected 30 sauger in channel cross over, inside bend, outside bend, and side channel connected large macrohabitats with drifting trammel nets (Table 14). Our sauger catch per unit effort with drifting trammel nets was 0.075 fish per 100-m trammel net drift (Table 14). Sauger collected with drifting trammel nets ranged in size from 294 to 526 mm. No sauger were collected with the benthic trawl.

Macrohabitat	N (trammel drifts)	N (SGER)	CPUE	Std. Dev.
CHXO	95.9	6	0.063	
CONF	0			
ISB	104.3	8	0.077	
OSB	116.8	8	0.068	
SCCL	82.6	6	0.073	
SCCS	0			
TRML	0			
<b>TOTAL</b>	399.6	30	0.075	

### Shorthead redhorse

We collected 5 shorthead redhorse with hoop nets in outside bend and side channel connected macrohabitats for a catch per unit effort with hoop nets of 0.085 fish per hoop net night. Shorthead redhorse collected with hoop nets ranged in size from 379 to 485 mm. We collected 6 shorthead redhorse with drifting trammel nets in outside bend, and side channel connected large macrohabitats. Shorthead redhorse collected with drifting trammel nets ranged in size from 243 to 415 mm.

### Smallmouth buffalo

We collected 5 smallmouth buffalo with hoop nets in outside bend and side channel connected macrohabitats. Our smallmouth buffalo catch per unit effort with hoop nets was 0.085 fish per hoop net night. Smallmouth buffalo catch per unit effort with hoop nets was 0.085 fish per hoop net night. We collected 5 smallmouth buffalo with drifting trammel nets in channel cross over, inside bend, and outside bend macrohabitats. Smallmouth buffalo collected with drifting trammel nets ranged in size from 490 to 650 mm. No smallmouth buffalo were collected with the benthic trawl.

### Shortnose gar

We collected 4 shortnose gar with hoop nets in outside bend and side channel connected large macrohabitats. Our shortnose gar catch per unit effort with hoop nets was 0.068 fish per hoop net night. We collected one 604 mm shortnose gar in the channel cross over macrohabitat with a drifting trammel net. No shortnose gar were collected with the benthic trawl.

### Walleye

We collected one 455 mm walleye in the side channel connected macrohabitat with a hoop net. We collected 9 walleye in the inside bend, outside bend, and side channel connected macrohabitats with drifting trammel nets. Walleye collected with drifting trammel nets ranged in size from 280 to 465 mm. No walleye were collected with the benthic trawl.

### White bass

We collected two white bass (280 mm and 373 mm) in the outside bend macrohabitat with hoop nets. We collected one 255 mm white bass in the side channel connected macrohabitat with a drifting trammel net. No white bass were collected with the trawl.

### White crappie

We collected two white crappie (240 mm and 260 mm) in the side channel connected and outside bend macrohabitats with hoop nets. No white crappie were collected with drifting trammel nets or the benthic trawl.

### Shovelnose sturgeon

We collected one 668 mm shovelnose sturgeon in the outside bend macrohabitat with a hoop net. We collected 79 shovelnose sturgeon with drifting trammel nets in the channel cross over, inside bend, outside bend, and side channel connected large macrohabitats (Table 15). Our shovelnose catch per unit effort for drifting trammel nets was 0.198 fish per 100-m trammel net drift (Table 15). Shovelnose sturgeon collected with drifting trammel nets ranged in size from 581 to 770 mm (Figure 5). No shovelnose sturgeon were collected with the trawl.

Table 15. Shovelnose sturgeon (SNSG) catch per unit effort for 100 m trammel net drifts in Segment 6, Niobrara River to Lewis and Clark Lake headwaters by macrohabitats. Macrohabitats include channel cross over (CHXO), confluence (CONF), inside bend (ISB), outside bend (OSB), side channel connected large (SCCL), side channel connected small (SCCS) , and large tributary mouth (TRML).

Macrohabitat	N (trammel drifts)	N (SNSG)	CPUE	Std. Dev.
CHXO	95.9	9	0.094	
CONF	0			
ISB	104.3	29	0.278	
OSB	116.8	36	0.308	
SCCL	82.6	5	0.061	
SCCS	0			
TRML	0			
<b>TOTAL</b>	399.6	79	0.198	

# Shovelnose sturgeon collected with drifting trammel nets

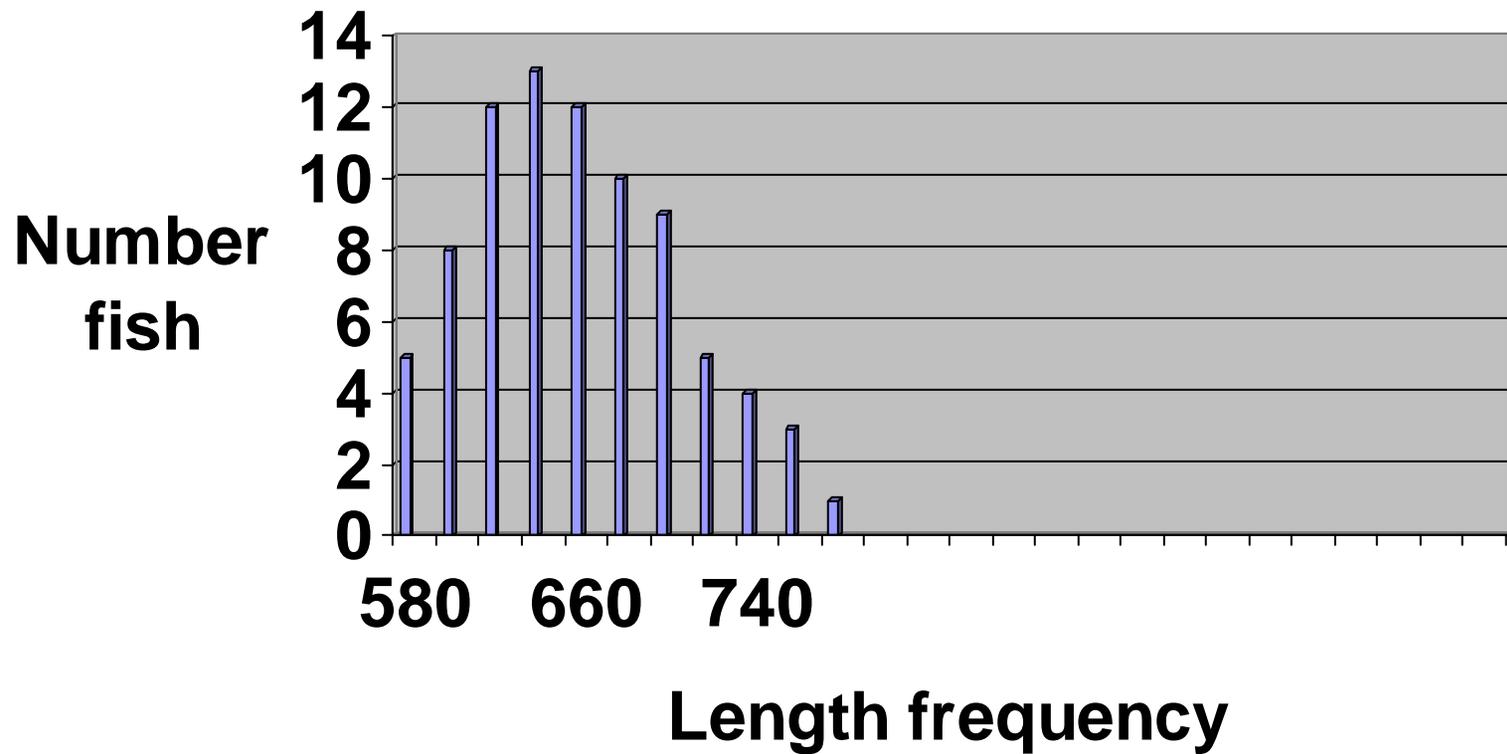


Figure 5. Shovelnose sturgeon collected with drifting trammel nets, fish community sampling season, segment 6, 2003.

## **Wild gear**

### *Wild gear – sampling effort*

We used 290 setline hook nights in segment 6 during the fish community sampling season.

Two hooks (10/0 and 12/0) were attached to each set line and each of the hooks was alternately baited with leeches and night crawlers.

### Pallid sturgeon

We collected 6 pallid sturgeon in the outside bend macrohabitat with setlines baited with night crawlers. Our pallid sturgeon catch per unit effort for setlines was 0.029 fish per hook night. Pallid sturgeon collected with setlines ranged in size from 581 to 635 mm.

### Shovelnose sturgeon

We collected 3 shovelnose sturgeon in the inside bend macrohabitat with setlines baited with night crawlers. Our shovelnose sturgeon catch per unit effort with setlines was 0.010 fish per hook night. Shovelnose sturgeon collected with setlines ranged in size from 650 to 724 mm.

## Pallid sturgeon supplementary information

### Food Habits

We used gastric lavage, similar to the techniques used by Foster (1977) and Brosse et al. (2002), to conduct food habitat studies on pallid and shovelnose sturgeon. We used a hand pumped pressurized garden sprayer tank to pump water into the fish's stomach. A polyethylene tube with an outside diameter of 6.4 mm was fitted on the end of the garden sprayer hose. With the sturgeon held dorsal side down at a 45-degree angle, the polyethylene tube was slowly inserted down the esophagus as far as the first stomach loop. Water was then lightly pulsed into the stomach to dislodge food items as the tube was slowly withdrawn from the stomach and esophagus. After the stomach was filled with water, the ventral side of the sturgeon, approximately where the stomach is, was lightly massaged to facilitate regurgitation. The food items were regurgitated onto a 500  $\Phi$ m-mesh sieve. This process was repeated until regurgitation ceased, assuming the stomach was emptied. This procedure lasted approximately 2-3 min for each fish, during which time the gills were constantly hosed with freshwater. The food items collected on the 500  $\Phi$ m-mesh sieve were then preserved in 10% formalin. The safety of the gastric lavage technique was evaluated on hatchery reared juvenile pallid sturgeon at the Bozeman Fish Technology Center **with no negative results** before being attempted on fish in the field.

Table 1. Mean lengths (standard error) and weights (standard error) of juvenile pallid and adult shovelnose sturgeon captured on setlines.

Species	Hook size	N	Length (mm)	Weight (g)
Pallid sturgeon	10/0	11	611.7 (25.8)	721.1 (78.6)
Pallid sturgeon	12/0	5	569.0 (38.7)	581.2 (106.0)
Shovelnose	10/0	8	650.8 (20.8)	1082.5 (88.5)
Shovelnose	12/0	8	671.5 (22.1)	1213.1 (87.5)

### Juvenile Pallid Sturgeon Relative Condition Factor (Kn)

Condition indices on juvenile pallid sturgeon were evaluated using the relative condition factor (Kn; Anderson and Neumann 1996). Relative condition factor is calculated as  $Kn = (W/W')$ , where  $W$  is weight of the individual and  $W'$  is the length-specific mean weight predicted by a weight-length equation calculated for that population. Keenlyne and Evanson (1993) provided a weight-length regression [ $\log_{10}W = -6.378 + 3.357 \log_{10}L$  ( $r^2 = 0.974$ )] for pallid sturgeon throughout its range.

Although all juvenile pallid sturgeon have declined in Kn, most appeared healthy at the time of recapture (Table 2).

Table 2. Mean length (SE), weight (SE), and Kn (SE) of juvenile pallid sturgeon by year class when stocked and recaptured.

Year Class	N	Stocked Length (mm)	Stocked Weight (g)	Stocked Kn	Recapture Length (mm)	Recapture Weight (g)	Recapture Kn
1997	25	529 (5.7)	650 (27.2)	1.12 (0.04)	647 (6.9)	822 (29.1)	0.71 (0.01)
1998	3	499 (34.4)	460 (111.1)	0.91 (0.04)	566 (37.3)	530 (128.3)	0.70 (0.04)
1999	6	465 (20.2)	426 (63.3)	1.09 (0.11)	514 (31.9)	429 (75.6)	0.77 (0.02)
2001	6	210 (8.2)			392 (12.4)	187 (18.8)	0.87 (0.02)
2002	1	294	91	1.12	385	143	0.71

Table 3. Pallid sturgeon recaptured in RPA 3 during 2003 with readable pit tags.

<u>FAM COLOR</u>	<u>PIT TAG</u>	<u>RECAP DATE</u>	<u>RECAP RM</u>	<u>RECAP LAT</u>	<u>RECAP LONG</u>
ORANGE	406E485365	4/11/2003	840	42.80813	98.10279
BLUE	411B4E4956	4/11/2003		42.80663	98.10925
BLUE	411B5F6F03	5/7/2003		42.80366	97.92831
RED	411A704B41	7/14/2003		42.79011	98.07011
RED	41102D3C77	8/4/2003		42.84115	97.86438
GREEN	411A747255	8/5/2003		42.84326	97.84568
YELLOW	406E527219	8/5/2003		42.84326	97.84568
BLUE	411B500C46	8/5/2003		42.84343	97.84299
YELLOW	406E52675E	8/6/2003		42.7905	98.06932
YELLOW	411B046827	8/6/2003	847	42.79934	98.08587
YELLOW	411B654B51	8/6/2003	847	42.79906	98.08553
ORANGE	406E673952	8/6/2003	847	42.79859	98.08498
YELLOW	406E6B6A19	8/7/2003	847	42.79915	98.08578
YELLOW	406E4E5714	8/7/2003	847	42.79915	98.08578
RED	411A744B4D	8/7/2003	847	42.79906	98.08556
YELLOW	41104A4105	8/7/2003		42.8326	98.13548
ORANGE	406E637804	8/7/2003	851	42.83476	98.14072
GREEN	411B4F4027	8/7/2003	851	42.83467	98.14107
BLUE	406E671C68	9/23/2003	831	42.85581	97.85841
	423A32184D	4/10/2003		42.90442	98.34881
	424D2B364A	4/10/2003		42.90407	98.34985
	425002081F	7/9/2003		42.92595	98.4257
	4313383748	8/4/2003		42.84461	97.85001
	423A447234	8/6/2003		42.79045	98.06927
	411B493D37	8/6/2003	847	42.79906	98.08553
	431B497735	8/6/2003	847	42.79859	98.08498
	411B4B7810	8/7/2003	847	42.79906	98.08556
	431A1B2A43	8/13/2003		42.88074	98.30464
	4313581509	8/12/2003		42.87937	98.29984
	411B73091B	9/20/2003	852	42.83855	98.1582

<b>Common name</b>	<b>Scientific name</b>
Common shiner	<i>Luxilus cornutus</i>
Creek chub	<i>Semotilus atromaculatus</i>
Crystal darter	<i>Ammocrypta asprella</i>
Cutthroat trout	<i>Salmo clarki</i>
Emerald shiner	<i>Notropis atherinoides</i>
Fantail darter	<i>Etheostoma flabellare</i>
Fathead minnow	<i>Pimephales promelas</i>
Finescale dace	<i>Phoxinus neogaeus</i>
Flathead catfish	<i>Pylodictus olivaris</i>
Flathead chub	<i>Platygobio gracilis</i>
Freckled madtom	<i>Noturus nocturnus</i>
Freshwater drum	<i>Aplodinotus grunniens</i>
Ghost shiner	<i>Notropis buchmanii</i>
Gilt darter	<i>Percina evides</i>
Gizzard shad	<i>Dorosoma cepedianum</i>
Golden redhorse	<i>Moxostoma erythrurum</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Golden trout	<i>Salmo aguabonita</i>
Goldeye	<i>Hiodon alosoides</i>
Goldfish	<i>Carassius auratus</i>
Grass carp	<i>Ctenopharyngodon idella</i>
Grass pickerel	<i>Esox americanus vermiculatus</i>
Gravel chub	<i>Erimystax punctatus</i>
Green sunfish	<i>Lepomis cyanellus</i>
Greenside darter	<i>Etheostoma blennioides</i>
Highfin carpsucker	<i>Carpionodes velifer</i>
Hornyhead chub	<i>Nocomis biguttatus</i>
Hybognathus spp.	<i>Hybognathus sp.</i>
Iowa darter	<i>Etheostoma exile</i>
Johnny darter	<i>Etheostoma nigrum</i>
Lake chub	<i>Couesius plumbeus</i>
Lake sturgeon	<i>Acipenser fulvescens</i>
Lake trout	<i>Salvelinus namaycush</i>
Lake whitefish	<i>Coregonus clupeaformis</i>
Largemouth bass	<i>Micropterus salmoides</i>
Largescale stoneroller	<i>Campostoma oligolepis</i>
Least darter	<i>Etheostoma microperca</i>
Logperch	<i>Percina caprodes</i>
Longear sunfish	<i>Lepomis megalotis</i>
Longnose dace	<i>Rhinichthys cataractae</i>
Longnose gar	<i>Lepisosteus osseus</i>
Longnose sucker	<i>Catostomus catostomus</i>
Mimic shiner	<i>Notropis volucellus</i>
Mississippi silvery minnow	<i>Hybognathus nuchalis</i>

<b>Common name</b>	<b>Scientific name</b>
Missouri saddled darter	<i>Etheostoma tetrazonum</i>
Mooneye	<i>Hiodon tergisus</i>
Mosquitofish	<i>Gambusia affinis</i>
Mottled sculpin	<i>Cottus bairdi</i>
Mountain sucker	<i>Catostomus platyrhincus</i>
Mountain whitefish	<i>Prosopium williamsoni</i>
Muskellunge	<i>Esox masquinongy</i>
Northern brook lamprey	<i>Ichthyomyzon fossor</i>
Northern hog sucker	<i>Hypentelium nigricans</i>
Northern pike	<i>Esox lucius</i>
Northern redbelly dace	<i>Phoxinus eos</i>
Northern studfish	<i>Fundulus catenatus</i>
Orangespotted sunfish	<i>Lepomis humilis</i>
Orangethroat darter	<i>Etheostoma spectabile</i>
Ozark minnow	<i>Notropis nubilus</i>
Paddlefish	<i>Polyodon spathula</i>
Pallid sturgeon	<i>Scaphirhynchus albus</i>
Peamouth	<i>Mylocheilus caurinus</i>
Pearl dace	<i>Margariscus margarita</i>
Plains killifish	<i>Fundulus zebrinus</i>
Plains minnow	<i>Hybognathus placitus</i>
Plains topminnow	<i>Fundulus sciadicus</i>
Pugnose minnow	<i>Opsopoeodus emiliae</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Quillback	<i>Carpionodes cyprinus</i>
Rainbow darter	<i>Etheostoma caeruleum</i>
Rainbow smelt	<i>Osmerus mordax</i>
Rainbow trout	<i>Oncorhynchus mykiss</i>
Red shiner	<i>Cyprinella lutrensis</i>
Redside shiner	<i>Richardsonius balteatus</i>
River carpsucker	<i>Carpionodes carpio</i>
River darter	<i>Percina shumardi</i>
River redhorse	<i>Moxostoma carinatum</i>
River shiner	<i>Notropis blennius</i>
Rock bass	<i>Ambloplites rupestris</i>
Rosyface shiner	<i>Notropis rubellus</i>
Rudd	<i>Scardinius erythrophthalmus</i>
Sand shiner	<i>Notropis stramineus</i>
Sauger	<i>Stizostedion canadense</i>
Sauger x Walleye	<i>Sizostedion canadense x vitrieum</i>
Shorthead redhorse	<i>Moxostoma macrolepidotum</i>
Shortnose gar	<i>Lepisosteus platostomus</i>
Shovelnose sturgeon	<i>Scaphirhynchus platyrhynchus</i>
Shovelnose x Pallid Hybrid	<i>Scaphirhynchus platyrhynchus x Scaphirhynchus albus</i>

<b>Common name</b>	<b>Scientific name</b>
Sicklefin chub	<i>Macrhybopsis meeki</i>
Silver carp	<i>Hypophthalmichthys molitrix</i>
Silver chub	<i>Macrhybopsis storeriana</i>
Silver lamprey	<i>Ichthyomyzon unicuspis</i>
Silver redhorse	<i>Moxostoma anisurum</i>
Silverband shiner	<i>Notropis shumardi</i>
Silverstripe shiner	<i>Notropis stilbius</i>
Skipjack herring	<i>Alosa chrysochloris</i>
Slender madtom	<i>Noturus exilis</i>
Slenderhead darter	<i>Percina phoxocephala</i>
Slough darter	<i>Etheostoma gracile</i>
Smallmouth bass	<i>Micropterus dolomieu</i>
Smallmouth buffalo	<i>Ictiobus bubalus</i>
Sockeye salmon	<i>Oncorhynchus nerka</i>
Southern brook lamprey	<i>Ichthyomyzon gagei</i>
Southern redbelly dace	<i>Phoxinus erythrogaster</i>
Speckled chub	<i>Macrhybopsis aestivalis</i>
Speckled chub x Sturgeon chub	<i>Macrhybopsis aestivalis x gelida</i>
Spotfin shiner	<i>Cyprinella spiloptera</i>
Spottail shiner	<i>Notropis hudsonius</i>
Spotted bass	<i>Micropterus punctulatus</i>
Spotted gar	<i>Lepisosteus oculatus</i>
Spotted sucker	<i>Minytrema melanops</i>
Stippled darter	<i>Etheostoma punctulatum</i>
Stonecat	<i>Noturus flavus</i>
Striped bass	<i>Morone saxatilis</i>
Striped bass x White bass	<i>Morone saxatilis x chrysops</i>
Striped shiner	<i>Luxilus chrysocephalus</i>
Sturgeon chub	<i>Macrhybopsis gelida</i>
Sturgeon chub x Sticklefin chub	<i>Macrhybopsis gelida x meeki</i>
Suckermouth minnow	<i>Phenacobius mirabilis</i>
Threadfin shad	<i>Dorosoma petenense</i>
Topeka shiner	<i>Notropis topeka</i>
Troutperch	<i>Percopsis omiscomaycus</i>
Tadpole madtom	<i>Noturus gyrinus</i>
Walleye	<i>Stizostedion vitreum</i>
Warmouth	<i>Lepomis gulosus</i>
Wedgespot shiner	<i>Notropis greenei</i>
Western redbfin shiner	<i>Lythrurus umbratilis</i>
Western silvery minnow	<i>Hybognathus argyritis</i>
White bass	<i>Morone chrysops</i>
White crappie	<i>Pomoxis annularis</i>
White perch	<i>Morone americana</i>
White sucker	<i>Catostomus commersoni</i>
Yellow bass	<i>Morone mississippiensis</i>

<b>Common name</b>	<b>Scientific name</b>
Yellow bullhead	<i>Ameiurus natalis</i>
Yellow perch	<i>Perca flavescens</i>
Gizzard shad x Threadfin shad	<i>Dorosoma cepedianum</i> x <i>petenense</i>
Flathead chub x sicklefin chub	<i>Platygobio gracilis</i> x <i>Macrhybopsis meeki</i>
Blue catfish x Channel catfish	<i>Ictalurus furcatus</i> x <i>punctatus</i>
Green sunfish x Bluegill	<i>Lepomis cyanellus</i> x <i>macrochirus</i>
Green sunfish x Orangespotted	<i>Lepomis cyanellus</i> x <i>L. humilis</i>