Pallid Sturgeon Population Assessment and Associated Fish Community Monitoring for the Missouri River: Segment 7

Prepared for the U.S. Army Corps of Engineers – Missouri River Recovery Program
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EXECUTIVE SUMMARY

South Dakota Game, Fish, and Parks biologists sampled the 59-mile stretch of unchannelized Missouri River between Gavin's Point Dam and Ponca, Nebraska (Recovery Priority Management Area number 4 [RPMA]) to assess pallid sturgeon *Scaphirhynchus albus* and other native fish populations. This was the second full year of sampling in Segment 7.

A total of 83 pallid sturgeon (78 of known hatchery origin and 5 unknown) were captured in 2007. This is a large increase over the number caught in 2005 (n=1) and 2006 (n=9). No confirmed wild fish were captured in 2007. The known hatchery fish originated from 6 different year classes (1999, 2001, 2003, 2004, 2005, and 2006) with the majority being from 2005 (n=20) and 2006 (n=40). Both of these year classes were recently stocked into Segment 7 (610 fish from 2005 and 1,857 fish from 2006). Two of the fish captured in 2007 were originally stocked above Gavins Point Dam. The fish that originated farthest downstream was stocked at Bellevue, NE in 2003. No young-of-year sturgeon were captured in 2007. Pallid sturgeon lengths ranged from 220mm to 718mm. The 718mm fish was 8 years old and was originally stocked at Bellevue NE. Two suspected pallid/shovelnose sturgeon hybrids were captured in 2007. None were observed in prior years. The ratio of shovelnose to pallid sturgeon was 23:1.

Standard gears captured 45 pallid sturgeon and wild gears (angling and dyed gill nets) captured 38. Number of fish per gear included; angling (n=37), drifted trammel nets (n=37), otter trawls (n=6), and gill nets (n=3). Trammel net CPUE for 2007 was 0.08 fish / 100m compared to 0.02 in 2006. In total, sampling occurred at 25 of 32 bends. The total number of gear deployments was 1,217. This includes 403 trammel net drifts, 354 otter trawl deployments, 291 gill net sets, 101 mini-fyke net sets, 50 push trawl deployments, and 32 hours of angling effort. Pallid sturgeon were captured in 7 macro habitats, but most of them (54%) either came from the mouth of the James River (n=11) or the James/Missouri River confluence (n=34). Other than this obvious concentration, the fish seemed uniformly distributed. Mean pallid sturgeon relative condition (by year class) ranged from 0.65-1.01 and mean growth rate was 0.16 mm/day.

A total of 1,873 shovelnose sturgeon were caught in 2007. This was up from 1,143 fish in 2006. Gill nets captured 886, trammel nets 668, otter trawls 242, and wild gears 77

fish. Gill net catch rates increased the most dramatically between 2006 and 2007 (1.1 fish / net night vs. 3.1). Shovelnose sturgeon lengths ranged from 301-798mm.

Eight other native species were targeted for assessment as part of this project. Six of those were captured in Segment 7 during 2007. A total of 428 blue suckers *Cycleptus elongates* were sampled. Most of them were captured in gill nets (n= 191). Thirteen saugers *Sander canadense* were sampled. Otter trawls captured 5 speckled chubs *Macrohybopsis aestivalis*, 3 sicklefin chubs *M. meeki,* and 2 sturgeon chubs *M. gelida.* Sand shiners *Notropis stramineus* were common in mini fyke nets (n=405). No silvery minnows *Hybognathus argyritis* or plains minnows *H. placitus* were captured in 2007.

A total of 50 fish species and 3 hybrids were caught in segment 7 during 2007. A total of 16,331 individual fish were sampled. Several Asian carp were captured during 2007 including 5 bighead *Hypopthalmichthys nobilis* and 5 grass carp *Ctenopharyngodon idella*. No silver carp *Hypopthalmichthys molitrix* were captured but many were observed jumping near the boat, mostly at the mouths of the James and Vermillion Rivers.

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Introduction

The pallid sturgeon *Scaphirhynchus albus* is a fish dependent on large, turbid river systems. It is a top-level predator considered to be an indicator of the ecological health of such rivers. Manipulations to the Missouri and Mississippi Rivers have negatively affected pallid sturgeon populations. This species now only inhabits a fraction of its historical range. Due to dramatic population declines, the pallid sturgeon was listed as an endangered species in 1990. It is believed that only hatchery-produced fish will be found in the wild beyond 2016 (Pallid Sturgeon Propagation Committee, 2004).

The Pallid Sturgeon Population Assessment Team was assembled to initiate a comprehensive monitoring plan designed to assess survival, movement, distribution, and habitat use, of wild and hatchery reared (stocked) juvenile pallid sturgeon (Drobish 2007a). The Population Assessment Team consists of field crews from several different state and federal agencies. The Missouri River was divided into 14 sampling segments for this project. These segments were designated by commonalities in habitat conditions. Each field crew is responsible for sampling one or two segments of the river using standardized methods. Habitat classification, gear deployment, and reporting are all guided by a set of standard operation procedures produced by the Team (Drobish 2007).

All fish sampled are measured and recorded. In addition to the pallid sturgeon, more detailed information is collected from a set of 9 native Missouri River fishes (Appendix A). These include: sand shiner *Notropis stramineus*, sicklefin chub *Macrhybopsis meeki*, sauger

Zander canadense, shovelnose sturgeon *Scaphirhynchus platorynchus*, plains minnow *Hybognathus placitus,* Western silvery minnow *Hybognathus argyritis*, speckled chub *Macrhybopsis aestivalis*, sturgeon chub *Macrhybopsis gelid,and* blue sucker *Cycleptus elongatus,*. Information on age, growth, and body condition of these species will be collected to further monitor the fish community of the Missouri River. Some of these species (e.g., chubs) are potential prey for the pallid sturgeon. Others may serve as a surrogate to detect native community responses to environmental changes.

This study utilizes river bends as study units. Each segment of the river is broken into many smaller parts based on river morphology. Each time the main channel crosses from one bank to the other; a new study unit (bend) is designated. A number of these bends (typically 12) are randomly selected to be thoroughly studied within each of the 14 River segments. The available habitats within each of the chosen bends are identified and sampled with appropriate gears as directed by the protocols (Drobish 2007).

Each sampling year is broken into 2 seasons based on water temperature and sampling focus. These seasons include a Sturgeon Season that focuses on the assessment of sturgeon species, and a Fish Community Season that continues to assess sturgeon but places an additional emphasis on native Missouri River species. The Sturgeon Season encompasses the cool-water season (fall and spring) and the Fish Community season stretches from July 1 to October 31. Gillnets are unique to the Sturgeon season and shallow-water gears (bag seines and mini-fykes) are unique to the Community Season. Trammel nets and otter trawls are deployed in both seasons.

Study Objectives (Drobish 2007a)

In response to the 2000 Missouri River Biological Opinion, the COE is developing monitoring and restoration projects to avoid jeopardizing pallid sturgeon populations. As part of their Implementation Plan, the COE is working with the U. S. Fish and Wildlife Service (USFWS) and State Resource Agencies to develop and conduct a pallid sturgeon monitoring and assessment program. The objectives of this program are as follows:

1. Document annual results and long-term trends in pallid sturgeon population abundance and geographic distribution throughout the Missouri River System.
2. Document annual results and long-term trends of habitat use of wild pallid sturgeon and hatchery stocked pallid sturgeon by season and life stage.
3. Document population structure and dynamics of pallid sturgeon in the Missouri River System.
4. Evaluate annual results and long-term trends in native target species population abundance and geographic distribution throughout the Missouri River system.
5. Document annual results and long-term trends of habitat usage of the native target species by season and life stage.
6. Document annual results and long-term trends of all non-target species population abundance and geographic distribution throughout the Missouri River system, where sample size is greater than fifty individuals.
7. Document annual results and long-term trends in pallid sturgeon population abundance and geographic distribution throughout the Missouri River System.
8. Document annual results and long-term trends of habitat use of wild pallid sturgeon and hatchery stocked pallid sturgeon by season and life stage.
9. Document population structure and dynamics of pallid sturgeon in the Missouri River System.
10. Evaluate annual results and long-term trends in native target species population abundance and geographic distribution throughout the Missouri River system.
11. Document annual results and long-term trends of habitat usage of the native target species by season and life stage.
12. Document annual results and long-term trends of all non-target species population abundance and geographic distribution throughout the Missouri River system, where sample size is greater than fifty individuals.

Study Area

The South Dakota Game, Fish, and Parks Sturgeon crew monitored segment 7 of 14 on the Missouri River. This segment is located between Gavins Point Dam and Ponca State Park (miles 811 to 752). Segment 7 coincides with the lower (59-mile) reach of Missouri National Recreational River. A multitude of habitats are found here, including sandbars, backwaters, secondary channels, and wooded islands. Bank stabilization is sporadic, allowing some erosion to occur as the channel meanders from bank to bank.

This reach of the River was isolated from upstream reaches when Gavins Point Dam was closed in 1955. Controlled releases from Gavins Point continue to influence the morphology and ecology of segment 7 today. The U.S. Army Corps of Engineers uses the dam to provide stable releases to downstream areas, thus allowing for reliable navigation and water supplies. The dam blocks natural sediment transport causing incision and decreased turbidity. These facts, combined with an altered hydrograph, have created conditions that are quite different from the pre-dam era.

Discharge from Gavins Point Dam typically peaks in late summer at about 30,000 cfs and declines to near 12,000 cfs during the winter (http://www.nwd-mr.usace.army.mil/rcc/reports/pdfs/aopfinal2006.pdf). Diel variations are not as significant as those found upriver (segments 5 and 6). Much of the river in segment 7 is less than 2 m deep, but holes deeper than 15 m exist. River width varies from over 1,400 m to less than 300 m. The James River (mile 798) and Vermillion River (mile 772) are major tributaries contributing to flows in this reach.

Methods

Sampling methods used in segment 7 are consistent with those used by all of the assessment teams. Methodology was developed by the Pallid Sturgeon Population Assessment Team and is detailed in Drobish 2007.

Sample site selection and description

River bends comprise sampling units in this study. Each bend is further broken down based on a three tiered hierarchical habitat classification system that was inspired by the Benthic Fishes Study (Berry and Young 2001). With this system, analysis is possible at the macro, meso, and microhabitat levels.

The meandering of the main channel defines a river bend. A standard bend consists of a relatively deep and swift outside bend, inside bend (shallower depositional zone), and channel crossover. These three bend components are classified as macrohabitats. Other macrohabitats include: braided channels, dendritic channels, deranged channels, secondary channels (large, small, and non-connected), tributary mouths (large and small), and confluence areas. For further habitat descriptions, reference Drobish 2007. Macrohabitats are further subdivided into a set of mesohabitats. Channel borders, island tips, pools, and bars comprise the mesohabitats categories. In certain cases, mesohabitats are subdivided even further – into microhabitats. Classification at this level provides great detail about the sampling site. Using a set of 6 microhabitat coded digits, one can record (for example) a particular sandbar's state of submersion, its size, and where the particular sampling gear was deployed. Codes and definitions for all levels of habitat classification can be found in Appendix B.

Given the dynamic nature of the river in segment 7, habitat is in a constant state of flux. Entire river bends may change from one sampling season to the next. Habitat conditions were recorded as they appeared on the day of sampling.

Sampling gear

The 33 bends in segment 7 were ordered randomly for standardized sampling (Table 1). As many bends were sampled as time would allow. These bends were sampled with a package of gears (described below). Additional non-random bends were sampled with partial gear sets at the crew leader's discretion. Non-random sampling was done as time allowed. Sampling was based upon habitat. Each macro/meso habitat combination had sampling requirements. Each gear had to be deployed twice for each macro/meso combination in a given bend. Basic habitat data (turbidity & velocity) was also typically recorded once per macro/meso combination. These measurements were also taken any time a pallid sturgeon was captured. Temperature and depth were measured at every gear deployment site. For more information on habitat analysis see Drobish (2007).

A sampling year was broken into a warm and a cool-water season. Capturing pallid sturgeon and other large fishes was the primary objective of the cool-water season (Sturgeon Season). Gillnets, otter trawls, and 1" trammel nets were used during the Sturgeon season. During the warmer months (Fish Community Season), effort was focused on catching young/smaller fishes in shallow water. Mini-fyke nets, 1" trammel nets, a push trawl, and otter trawls were used during the Fish Community Season. The Sturgeon Season ran from November 1 to June 30, and the Fish Community season spanned from July 1 October 31.

Four standardized gears were deployed at each randomly selected bend: stationary gill nets, drifted trammel nets, otter trawls, and mini-fyke nets. For detailed information about each gear, see Drobish (2007). This package of gears allowed for the sampling of a variety of depths, and targeting various species.

Four-panel (3.81cm, 5.08 cm, 7.62 cm, and 10.16 cm) experimental gill nets were deployed during the sturgeon season. These 1.8 m deep by 30 m long, multifilament nets were set in a variety of habitats > 1.2 m deep. These nets have been standard since the population assessment started in 2003. A total of 291 net/nights of effort were expended in Segment 7 during 2007.

Small-mesh trammel nets (1.8 m deep X 38 m wide with a 6" outer mesh and 1" inner mesh) were used during both the Sturgeon and Fish Community season. These nets were drifted in habitats >1.2 m deep. Trammel net drifts ranged from 75 m to 300 m, depending on prevalence of snags. Very few drifts exceeded 200 m, before ending in a snag. A total of

403 small-mesh drifts were completed in 2007, resulting in over 40,000 m of drift sampling. Small-mesh trammel nets have been a standard gear since 2003.

Otter trawls (4.8 m wide X 0.91 m deep) were used to sample for all sizes of fish in deeper water (> 1.2 m). The trawl was 7.6 m long with 38 mm chafing mesh and size 110 mesh around the cod end. A flat bottom boat was used to pull the trawl (bow trawling) downstream. Trawling runs ranged in length from 75 m to 300 m. The large-mesh trawl was used during both sampling. The large-mesh otter trawl has been utilized since project inception in. A total of 354 large-mesh otter trawl samples were collected in 2007.

Mini-fyke nets were also used in shallow water. The 4.5 m long x 0.6 m high lead was staked to the bankline. The rest of the net consisted of 2 1.2 m wide x 0.6 m high steel frames (cab) and two 0.6 m diameter hoops with 3 mm "ACE" type mesh. Mini-fykes were only used during the Fish Community Season. Mini-Fykes were set for a total of 101 net/nights. Mini-fykes have been standard gears since 2003.

Passive gears (mini-fykes and gill nets) were set for a maximum of 24 hours and catch-per-unit-effort (CPUE) was calculated as the number of fish per net night. CPUE was calculated as number of fish per 100 m deployed for trammel nets and the otter trawl. Distances were measured using a Garmin GPS unit.

A small mesh otter trawl had been previously used as part of this project. The Pallid Sturgeon Population Assessment Team made a decision to eliminate this trawl as a standard gear for 2007 because of inefficiency in some reaches of the river. Likewise, a large mesh trammel net (2.5" inner mesh) was also eliminated for 2007 due to inefficiency in some reaches of the river.

Angling was utilized as a non-standard (wild) sampling technique in 2007. This effort was conducted on 9 different days from June 14-29. All of the angling occurred very near the Missouri/James River confluence. Worms were the only baits utilized and up to 3 anglers fished out of a single, anchored boat.

Calculations

Relative abundance was assessed using CPUE. This was done at several levels. An overall segment 7 CPUE was calculated for each species (by gear). This was derived by

figuring the CPUE for all sub-samples within the 12 random bends. That provided a mean CPUE for each of the bends. These "bend means" were then averaged to calculate the overall segment 7 CPUE. Catches within each habitat type were also analyzed to calculate a CPUE (for each gear). To assess CPUE variability, we calculated standard errors (SE). Two SE approximate a 95% confidence interval around the mean.

Fish condition was assessed for shovelnose sturgeon. The relative weight (Wr) index was the metric used for condition assessment. The equation for calculating Wr is found in Anderson and Newman (1996). Condition was not calculated for pallid sturgeon because of low sample size.

Population size structure for shovelnose sturgeon and sauger is described using incremental relative stock density (RSD). This method (proposed by Gabelhouse 1984), allows us to express whether the population consists of mostly large fish, small fish, or something in between. Because of the low sample size (n=1), RSD was not calculated for pallid sturgeon. Length categories have been proposed for pallid sturgeon (Shuman 2006), shovelnose sturgeon (Quist et al. 1998), and sauger (Gabelhouse 1984). For these species we calculated the percent of fish that were < stock length, stock length, and > stock length. RSD equations can be found in Anderson and Newman (1996).

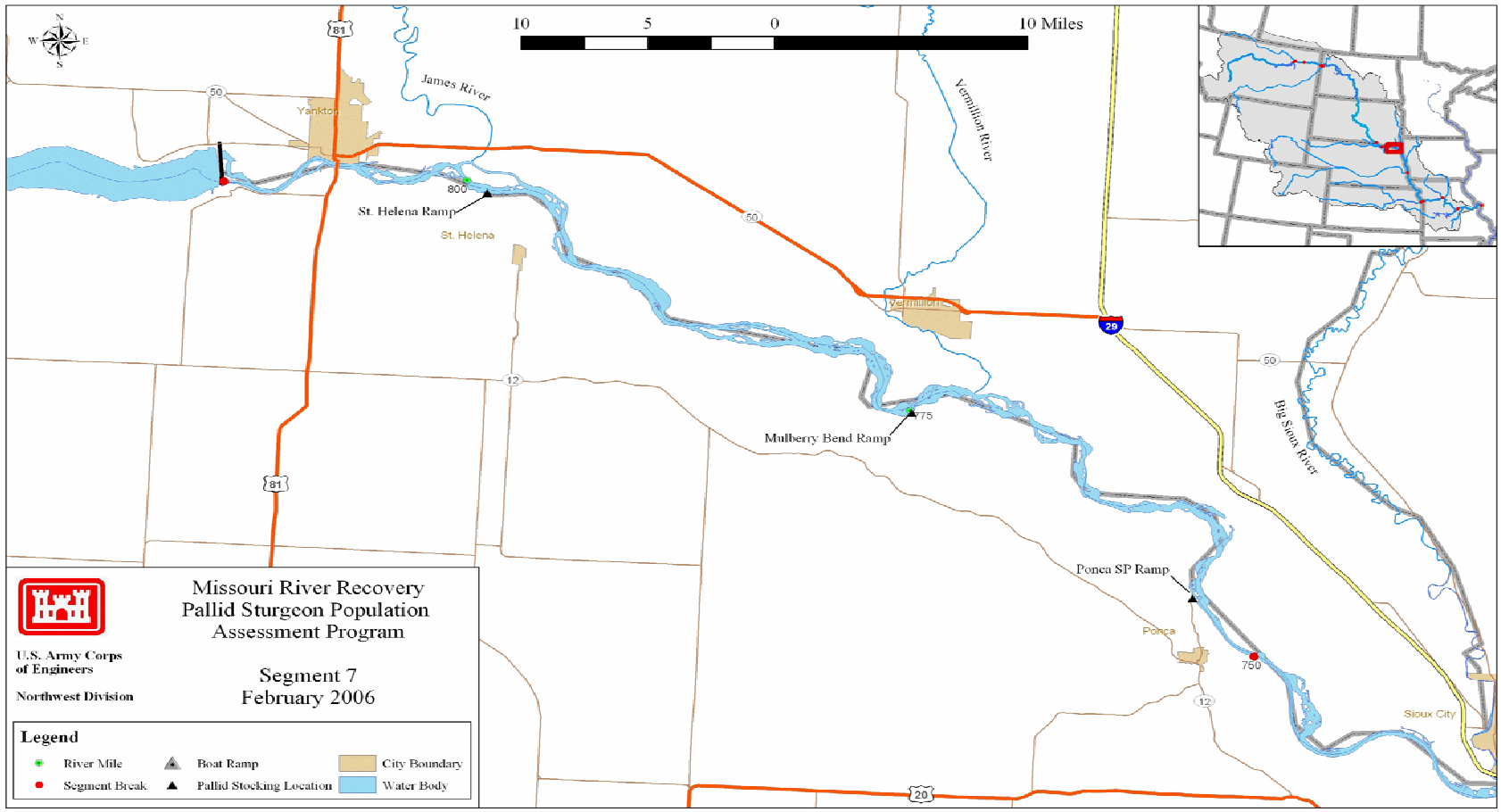

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Figure 1a. Map of segment 7 of the Missouri River with major tributaries, common landmarks, and historic stocking locations for pallid sturgeon. Segment 7 encompasses the Missouri River from Gavins Point Dam (River Mile 811) to Ponca State Park (River Mile 753)

Results

Pallid Sturgeon

A total of 83 pallid sturgeon were captured in Segment 7 during 2007. That is a dramatic increase over catches from 2005 (n=1) and 2006 (n=9). Seventy-eight of the 2007 pallid sturgeon were of known hatchery origin. The remaining 5 fish were unmarked and ranged in length from 412 to 482mm. Genetic samples were taken from the unmarked fish. No results were available at the time of this writing. Two likely pallid/shovelnose sturgeon hybrids were caught in 2007. No hybrids were observed in 2005 or 2006 sampling.

The 78 known hatchery fish were from 6 different year classes (1999, 2001, 2003, 2004, 2005, and 2006). A majority of these fish came from the 2006 (48%) and 2005 (24%) year classes. The 2007 known hatchery catch originated from 6 different stocking sites including Bellevue NE, Sioux City IA, Mulberry Bend NE, St. Helena NE, Running Water SD (above Gavins Point Dam), and Sunshine Bottoms (above Gavins Point Dam). The pallid sturgeon that had been stocked at Bellevue (11/01/02) had moved 204 miles upriver to its capture point (04/23/07). This 718mm fish was from the 1999 year class. One representative of this from this same Bellevue stocking was caught in 2006 as well. The Sunshine Bottoms and Running Water fish are the second and third entrained fish that have been captured in Segment 7 by the SD GF&P crew.

Pallid sturgeon were captured in 7 different macro habitats. Confluences produced the most fish by far (n=34). All of those fish were caught at the Missouri/James River confluence. Trammel net catch rates in confluence macro habitats were 0.48 fish per /100m. Outside bends produced 18 fish (trammel net CPUE = 0.17 fish / 100m). Pallid sturgeon were caught in 3 meso habitats, including channel border (n=79), pool (n=3), and island tip (n=1). Bottom velocities associated with pallid sturgeon catches ranged from 0.01 to 1.02 mps. Turbidity at the capture points ranged from 11 to 169. Temperatures at capture ranged from 4.9 to 26.7 degrees Celsius.

Thirty seven pallid sturgeon were caught in drifted trammel nets during 2007; 37 were captured by angling, 6 in otter trawls, and 3 in gill nets. Gill net CPUE was 0.01 fish

per net night and trammel net CPUE was 0.08 fish /100m. Fifty one of the 83 fish were captured during the sturgeon season.

Two shovelnose sturgeon/pallid sturgeon hybrids were captured during 2007. The ratio of pallid sturgeon to shovelnose sturgeon was 1:23. There was no evidence of natural recruitment found in 2007.

Table 1. Number of bends sampled, mean effort per bend (mean number of deployments), and total effort by macrohabitat (total number of deployments) for segment 07 on the Missouri River during fall through spring (sturgeon season) and summer (fish community season) in 2006 – 2007. N-E indicates the habitat is non-existent in the segment.

Gear	Number of Bends	Mean Effort	Macrohabitat													
			BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Fall through Spring - Sturgeon Season																
1 Inch Trammel Net	21	8.43	69	20	6	N-E	N-E	32	32	8	2	0	N-E	0	0	8
Gill Net	12	20.08	89	30	10	N-E	N-E	51	45	8	4	0	N-E	4	0	0
Otter Trawl	20	8.70	56	22	6	N-E	N-E	35	31	16	0	0	N-E	0	0	8
Summer – Fish Community Season																
1 Inch Trammel Net	24	9.42	54	38	8	N-E	N-E	52	55	11	0	0	N-E	0	0	8
Mini-Fyke Net	12	8.42	13	0	2	N-E	N-E	24	15	15	22	4	N-E	4	2	0
Otter Trawl	21	8.57	63	23	2	N-E	N-E	38	33	13	0	0	N-E	0	0	8

Table 2. Number of bends sampled, mean effort per bend (mean number of deployments), and total effort by mesohabitat (total number of deployments) for segment 07 on the Missouri River during fall through spring (sturgeon season) and summer (fish community season) in 2006 – 2007. N-E indicates the habitat is non-existent in the segment.

Gear	Number of bends	Mean Effort	Mesohabitat					
			BAR	CHNB	DTWT	ITIP	POOL	TLWG
Fall through Spring – Sturgeon Season								
1 Inch Trammel Net	21	8.43	0	161	8	8	0	N-E
Gill Net	12	20.08	0	181	0	10	50	N-E
Otter Trawl	20	8.70	0	160	8	6	0	N-E
Summer – Fish Community Season								
1 Inch Trammel Net	24	9.42	0	218	8	0	0	N-E
Mini-Fyke Net	12	8.42	96	2	0	0	0	N-E
Otter Trawl	21	8.57	0	172	8	0	0	N-E

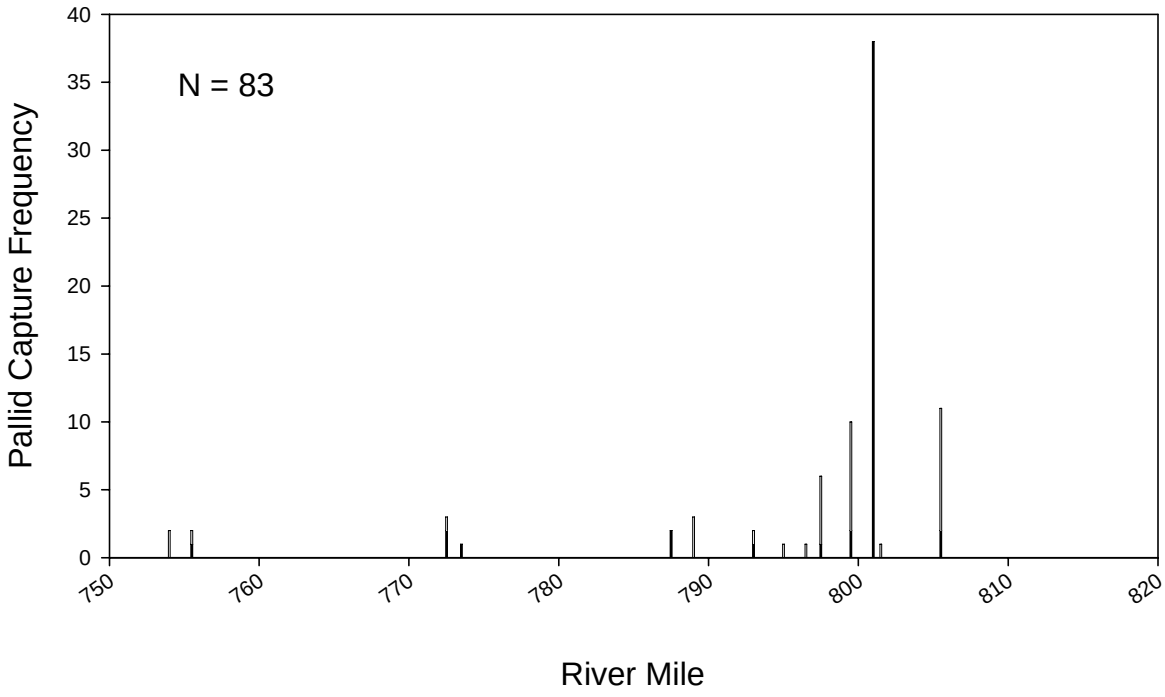

Figure 1b. Distribution of pallid sturgeon captures by river mile for segment 7 of the Missouri River during 2006-2007. Black bars represent pallid captures during Sturgeon Season and white bars during Fish Community Season. Figure includeds all pallid captures including non-random and wild samples.

Table 3. Pallid sturgeon (PDSG) capture summaries for all gears relative to habitat type and environmental variables on the Missouri River during 2006-2007. Means (minimum and maximum) are presented. Habitat definitions and codes presented in Appendix B. N-E indicates the habitat is non-existent in the segment.

Macro-	Meso-	Depth (m) (Effort)	Depth (m) (Catch)	Bottom Velocity (m/s) (Effort)	Bottom Velocity (m/s) (Catch)	Temp. °C (Effort)	Temp. °C (Catch)	Turbidity (ntu) (Effort)	Turbidity (ntu) (Catch)	Total Pallids caught
BRAD	BAR	0.6 (0.2-1.2)		0.17 (0.13-0.20)		23.4 (17.8-26.2)		27 (17-40)		.
	CHNB	2.2 (1.0-6.8)	2.1 (1.6-2.5)	0.61 (0.01-1.00)	0.60 (0.40-0.78)	17.1 (3.4-25.3)	20.1 (16.5-24.8)	56 (8-504)	59 (44-86)	6
	DTWT									.
	ITIP	1.9 (1.2-3.2)		0.44 (0.11-0.80)		10.6 (7.1-18.9)		53 (23-102)		.
	POOL	2.2 (1.2-9.6)	2.5 (1.3-3.7)	0.31 (0.00-0.75)	0.10 (0.01-0.18)	6.4 (4.3-10.3)	6.6 (4.9-8.3)	38 (9-100)	21 (11-31)	2
	TLWG									.
CHXO	BAR	0.9 (0.8-0.9)				25.9 (25.8-25.9)				.
	CHNB	2.0 (0.9-5.1)	2.4 (1.9-2.9)	0.65 (0.30-1.04)	0.71 (0.62-0.80)	17.3 (0.5-26.2)	21.4 (19.7-23.1)	41 (9-496)	48 (20-76)	2
	DTWT									.
	ITIP									.
	POOL									.
	TLWG									.
CONF	BAR	0.5 (0.4-0.5)		0.34 (0.34-0.34)		25.7 (25.6-25.7)		52 (52-52)		.

Macro-	Meso-	Depth (m) (Effort)	Depth (m) (Catch)	Bottom Velocity (m/s) (Effort)	Bottom Velocity (m/s) (Catch)	Temp. °C (Effort)	Temp. °C (Catch)	Turbidity (ntu) (Effort)	Turbidity (ntu) (Catch)	Total Pallids caught
	CHNB	2.2 (1.2-4.9)	2.1 (1.2-2.7)	0.59 (0.28-0.96)	0.51 (0.29-0.80)	17.6 (4.4-26.7)	24.7 (23.3-26.7)	122 (10-653)	116 (66-169)	34
	DTWT									.
	ITIP									.
	POOL									.
	TLWG									.
DEND	BAR									.
	CHNB									.
	DTWT									.
	ITIP									.
	POOL									.
	TLWG									.
DRNG	BAR									.
	CHNB									.
	DTWT									.
	ITIP									.
	POOL									.
	TLWG									.
ISB	BAR	0.6 (0.3-1.2)		0.19 (0.09-0.34)		24.1 (17.0-27.5)		32 (11-56)		.

Macro-	Meso-	Depth (m) (Effort)	Depth (m) (Catch)	Bottom Velocity (m/s) (Effort)	Bottom Velocity (m/s) (Catch)	Temp. °C (Effort)	Temp. °C (Catch)	Turbidity (ntu) (Effort)	Turbidity (ntu) (Catch)	Total Pallids caught
	CHNB	1.8 (1.2-4.4)	1.4 (1.2-1.7)	0.59 (0.18-1.02)	0.77 (0.60-1.02)	17.4 (0.6-26.2)	22.8 (17.6-26.2)	40 (9-435)	25 (17-31)	7
	DTWT									.
	ITIP									.
	POOL	1.7 (1.2-3.0)		0.25 (0.04-0.72)		4.8 (1.2-7.8)		49 (8-160)		.
	TLWG									.
OSB	BAR	0.6 (0.3-0.9)		0.21 (0.06-0.31)		21.3 (17.1-25.6)		28 (11-51)		.
	CHNB	3.1 (0.4-6.2)	3 (2.1-4.2)	0.63 (0.20-1.04)	0.60 (0.47-0.72)	17.5 (0.5-29.7)	21.9 (9.7-25.2)	35 (9-124)	31 (17-53)	17
	DTWT									.
	ITIP									.
	POOL	4.8 (3.1-8.1)	3.7 (3.7-3.7)	0.25 (0.05-0.41)	0.23 (0.23-0.23)	7.6 (2.6-9.5)	8.1 (8.1-8.1)	35 (11-105)	13 (13-13)	1
	TLWG									.
SCCL	BAR	0.6 (0.3-1.2)		0.20 (0.17-0.23)		23.8 (17.9-28.2)		35 (12-58)		.
	CHNB	1.9 (1.2-5.3)	3.8 (2.2-5.3)	0.47 (0.00-0.75)	0.52 (0.48-0.56)	18.2 (6.2-25.5)	18.4 (18.0-18.7)	61 (9-410)	60 (42-77)	2
	DTWT									.

Macro-	Meso-	Depth (m) (Effort)	Depth (m) (Catch)	Bottom Velocity (m/s) (Effort)	Bottom Velocity (m/s) (Catch)	Temp. °C (Effort)	Temp. °C (Catch)	Turbidity (ntu) (Effort)	Turbidity (ntu) (Catch)	Total Pallids caught
	ITIP	2.6 (1.9-2.9)	2.6 (2.6-2.6)	0.20 (0.20-0.20)	0.20 (0.20-0.20)	19.7 (19.4-19.9)	19.6 (19.6-19.6)	60 (60-60)	60 (60-60)	1
	POOL									.
	TLWG									.
SCCS	BAR	0.6 (0.3-1.2)		0.17 (0.07-0.27)		24.0 (17.0-28.3)		38 (9-81)		.
	CHNB									.
	DTWT									.
	ITIP	2.2 (1.5-2.7)		0.47 (0.34-0.61)		8.0 (3.8-9.5)		40 (8-86)		.
	POOL									.
	TLWG									.
SCN		0.7 (0.3-1.2)				24.9 (23.5-26.6)		47 (23-71)		.
	BAR	0.5 (0.5-0.5)				26.8 (26.8-26.8)		44 (44-44)		.
	DTWT									.
	ITIP									.
	POOL									.
	TLWG									.
TRIB	BAR									.

Macro-	Meso-	Depth (m) (Effort)	Depth (m) (Catch)	Bottom Velocity (m/s) (Effort)	Bottom Velocity (m/s) (Catch)	Temp. °C (Effort)	Temp. °C (Catch)	Turbidity (ntu) (Effort)	Turbidity (ntu) (Catch)	Total Pallids caught
	CHNB									.
	DTWT									.
	ITIP									.
	POOL									.
	TLWG									.
TRML	BAR	0.5 (0.4-0.6)		0.12 (0.12-0.12)		25.9 (25.3-26.6)		70 (60-81)		.
	CHNB	1.8 (1.4-2.4)	2.4 (2.3-2.4)	0.38 (0.27-0.58)	0.28 (0.27-0.30)	13.4 (4.7-25.0)	25 (24.9-25.0)	157 (112-244)	113 (112-114)	11
	DTWT									.
	ITIP									.
	POOL									.
	TLWG									.
TRMS	BAR	0.6 (0.6-0.6)				28.5 (27.5-29.5)		44 (44-44)		.
	CHNB									.
	DTWT									.
	ITIP									.
	POOL									.
	TLWG									.
WILD	BAR									.

Macro-	Meso-	Depth (m) (Effort)	Depth (m) (Catch)	Bottom Velocity (m/s) (Effort)	Bottom Velocity (m/s) (Catch)	Temp. °C (Effort)	Temp. °C (Catch)	Turbidity (ntu) (Effort)	Turbidity (ntu) (Catch)	Total Pallids caught
	CHNB									.
	DTWT	3.5 (1.9-5.5)		0.39 (0.17-0.60)		21.1 (18.1-23.8)		27 (10-47)		.
	ITIP									.
	POOL									.
	TLWG									.

Table 6. Mean fork length, weight, relative condition factor (Kn), growth rates, and water temperature for hatchery-reared pallid sturgeon captures by year class at the time of stocking and recapture during 2007 from segment 07 of the Missouri River. Relative condition factor was calculated using the equation in Keenlyne and Evanson (1993). Standard error (+/- 2SE) was calculated where N>1 and is represented on second line of each year.

Year class	N	Stock Data			Recapture Data			Growth Data	
		Length (mm)	Weight (g)	Kn	Length (mm)	Weight (g)	Kn	Length (mm/d)	Weight (g/d)
1999	1	424	227.0	0.820	718	1054.0	0.650	0.180	0.506
		.	.	.	.	.	.	.	.
2001	8	208	.	.	457	319.0	0.848	0.133	.
		20	.	.	43	107.2	0.044	0.025	.
2002	1	.	.	.	412	236.0	0.939	.	.
		.	.	.	.	.	.	.	.
2003	1	352	.	.	469	322.0	0.829	0.118	.
		.	.	.	.	.	.	.	.
2004	4	271	40.0	1.288	373	157.5	0.874	0.142	0.131
		100	.	.	26	25.0	0.069	0.059	.
2005	20	317	145.4	1.493	373	168.8	0.928	0.177	0.072
		16	15.8	0.391	11	17.2	0.037	0.045	0.043
2006	42	.	.	.	294	85.3	1.017	.	.
		.	.	.	14	12.7	0.057	.	.

Table 7. Relative stock density (RSD)[a] and relative condition factor (Kn) for all pallid sturgeon captured with all gear by a length category during 2006-2007 in the Missouri River. Length categories[b] determined using the methods proposed by Shuman et al. (2006). Relative condition factor was calculated using the equation in Keenlyne and Evanson (1993).

Length Category	N	RSD	Kn (+/- 2SE)
Sturgeon Season			
Sub-stock (0-199)	0	.	0
Sub-stock (200-329)	21	.	1.145 (0.058)
Stock	28	100	0.902 (0.034)
Quality	1	3	0.650
Preferred	0	.	0
Memorable	0	.	0
Trophy	0	.	.
Overall Kn	.	.	1.001 (0.048)
Fish Community Season			
Sub-stock (0-199)	0	.	0
Sub-stock (200-329)	15	.	0.910 (0.064)
Stock	18	100	0.865 (0.046)
Quality	0	.	0
Preferred	0	.	0
Memorable	0	.	0
Trophy			
Overall Kn	.	.	0.886 (0.038)

[a] RSD = (# of fish of a specified length class / # of fish ≥ minimum stock length fish) * 100.
[b] Length categories based on the percentage of the largest known pallid sturgeon: Sub-stock FL < 330 mm (20 %), Stock FL =330 - 629 mm (20 – 36 %), Quality FL = 630 – 839 mm (36 – 45 %), Preferred FL = 840 – 1039 mm (45 – 59 %), Memorable FL = 1040 – 1269 mm (59 – 74 %), Trophy FL ≥ 1270 mm (>74 %).

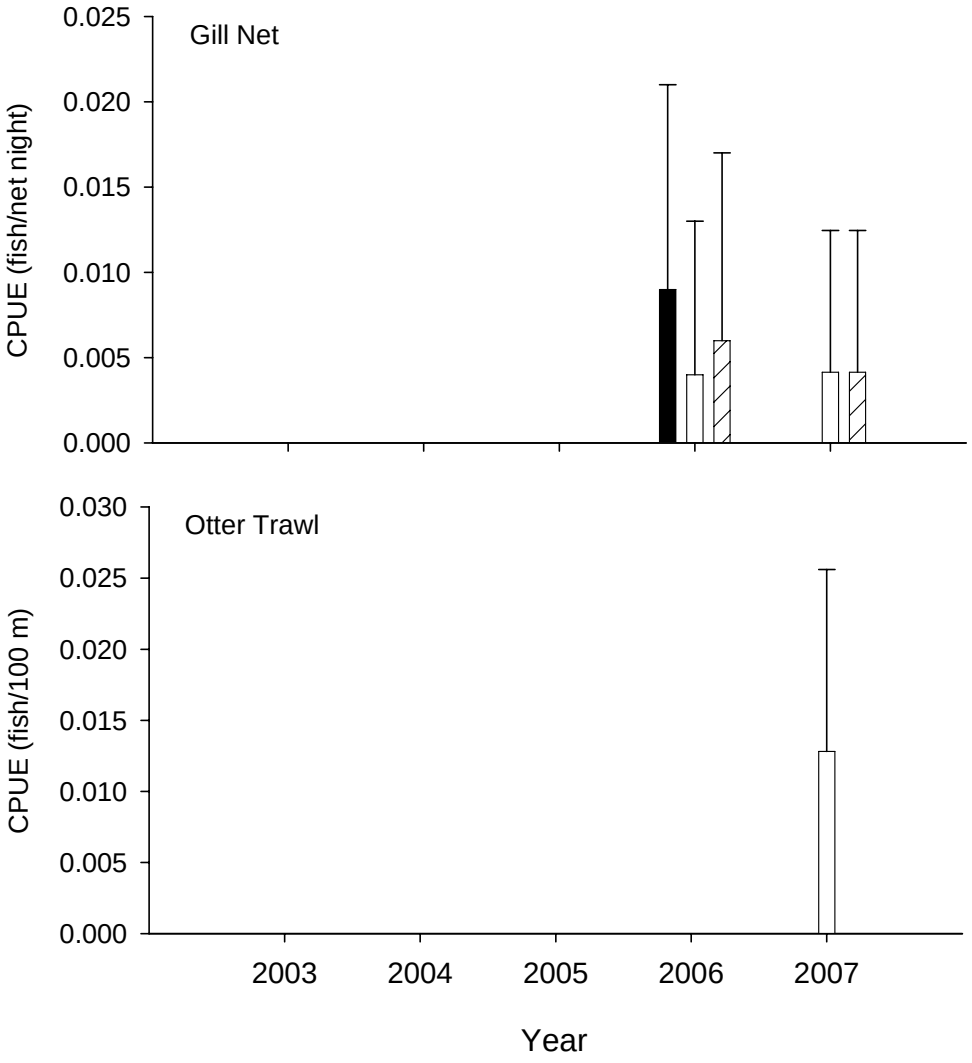

Figure 2. Mean annual catch-per-unit-effort (+/- 2 SE) of wild (black bars), hatchery reared (white bars), and unknown origin (cross-hatched bars) pallid sturgeon using gill nets and otter trawls in segment 7 of the Missouri River during sturgeon season 2006-2007. Unknown origin pallid sturgeon are awaiting genetic verification.

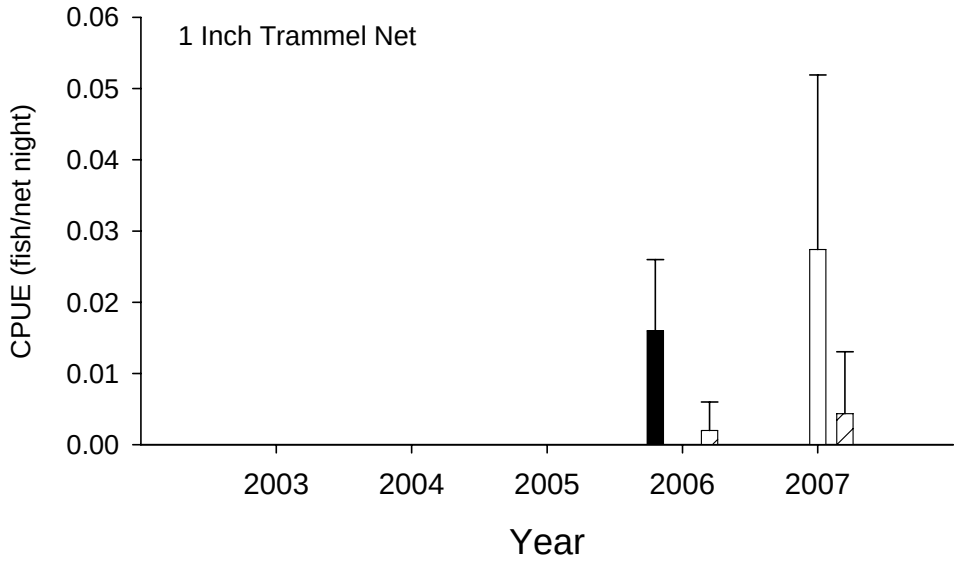

Figure 3. Mean annual catch-per-unit-effort (+/- 2 SE) of wild (black bars), hatchery reared (white bars), and unknown origin (cross-hatched bars) pallid sturgeon using 1 trammel nets in segment 7 of the Missouri River during sturgeon season 2006-2007. Unknown origin pallid sturgeon are awaiting genetic verification.

Segment 7 - Pallid Sturgeon / Fish Community Season

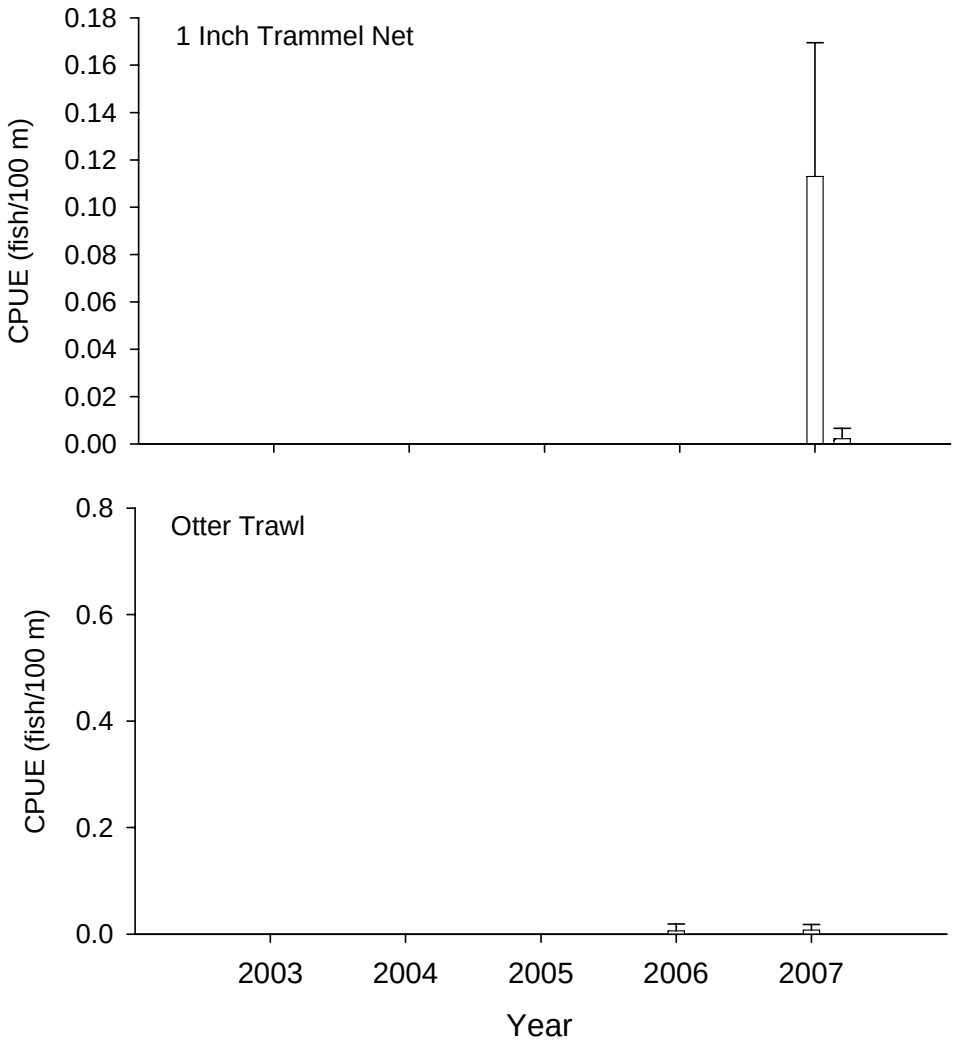

Figure 5. Mean annual catch-per-unit-effort (+/- 2 SE) of wild (black bars), hatchery reared (white bars), and unknown origin (cross-hatched bars) pallid sturgeon using 1 inch trammel nets and otter trawls in segment 7 of the Missouri River during fish community season 2006-2007. Unknown origin pallid sturgeon are awaiting genetic verification.

Segment 7 - Pallid Sturgeon / Fish Community Season

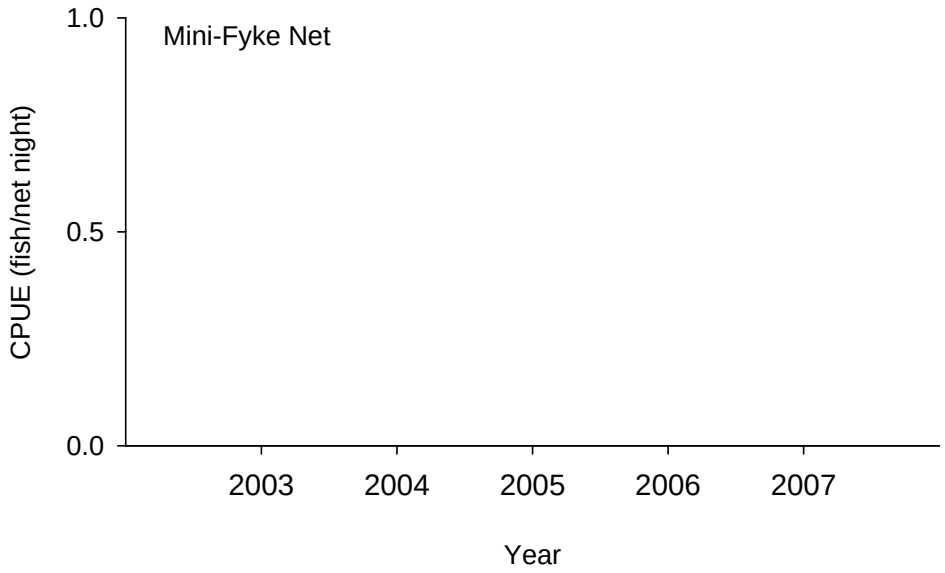

Figure 7. Mean annual catch-per-unit-effort (+/- 2 SE) of wild (black bars), hatchery reared (white bars), and unknown origin (cross-hatched bars) pallid sturgeon using mini-fyke nets in segment 7 of the Missouri River during fish community season 2006-2007. Unknown origin pallid sturgeon are awaiting genetic verification.

Table 9. Total number of sub-stock size (0-199 mm) pallid sturgeon captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 7. N-E indicates the habitat is non-existent in the segment.

Gear	N	Macrohabitat													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 10. Total number of sub-stock size (0-199 mm) pallid sturgeon captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 7. N-E indicates the habitat is non-existent in the segment.

Gear	N	**Mesohabitat**					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	92	4	4	0	0
Gill Net	0	0	0	0	0	0	0
	.	0	75	0	4	21	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	0	0	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	97	3	0	0	0

Table 11. Total number of sub-stock size (200-329 mm) pallid sturgeon captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 7. N-E indicates the habitat is non-existent in the segment.

Gear	N	Macrohabitat													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	1	100	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	15	0	0	53	0	0	0	47	0	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 12. Total number of sub-stock size (200-329 mm) pallid sturgeon captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 7. N-E indicates the habitat is non-existent in the segment.

Gear	N	Mesohabitat					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	1	0	100	0	0	0	0
	.	0	92	4	4	0	0
Gill Net	0	0	0	0	0	0	0
	.	0	75	0	4	21	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	15	0	100	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	0	0	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	97	3	0	0	0

Table 13. Total number of stock size (330-629 mm) pallid sturgeon captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 7. N-E indicates the habitat is non-existent in the segment.

Gear	N	Macrohabitat													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	4	50	25	0	0	0	0	25	0	0	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	2	50	0	0	0	0	0	50	0	0	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	4	50	0	0	0	0	0	0	50	0	0	0	0	0	0
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	16	6	6	0	0	0	38	50	0	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	2	0	0	0	0	0	50	0	50	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 14. Total number of stock size (330-629 mm) pallid sturgeon captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 7. N-E indicates the habitat is non-existent in the segment.

Gear	N	Mesohabitat					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	4	0	100	0	0	0	0
	.	0	92	4	4	0	0
Gill Net	2	0	0	0	0	100	0
	.	0	75	0	4	21	0
Otter Trawl	4	0	75	0	25	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	16	0	100	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	0	0	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	2	0	100	0	0	0	0
	.	0	97	3	0	0	0

Table 15. Total number of quality size and greater (≥630 mm) pallid sturgeon captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 7. N-E indicates the habitat is non-existent in the segment.

Gear	N	Macrohabitat													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	1	0	0	0	0	0	0	100	0	0	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 16. Total number of quality size and greater (≥630 mm) pallid sturgeon captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 7. N-E indicates the habitat is non-existent in the segment.

Gear	N	Mesohabitat					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	1	0	100	0	0	0	0
	.	0	92	4	4	0	0
Gill Net	0	0	0	0	0	0	0
	.	0	75	0	4	21	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	0	0	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	97	3	0	0	0

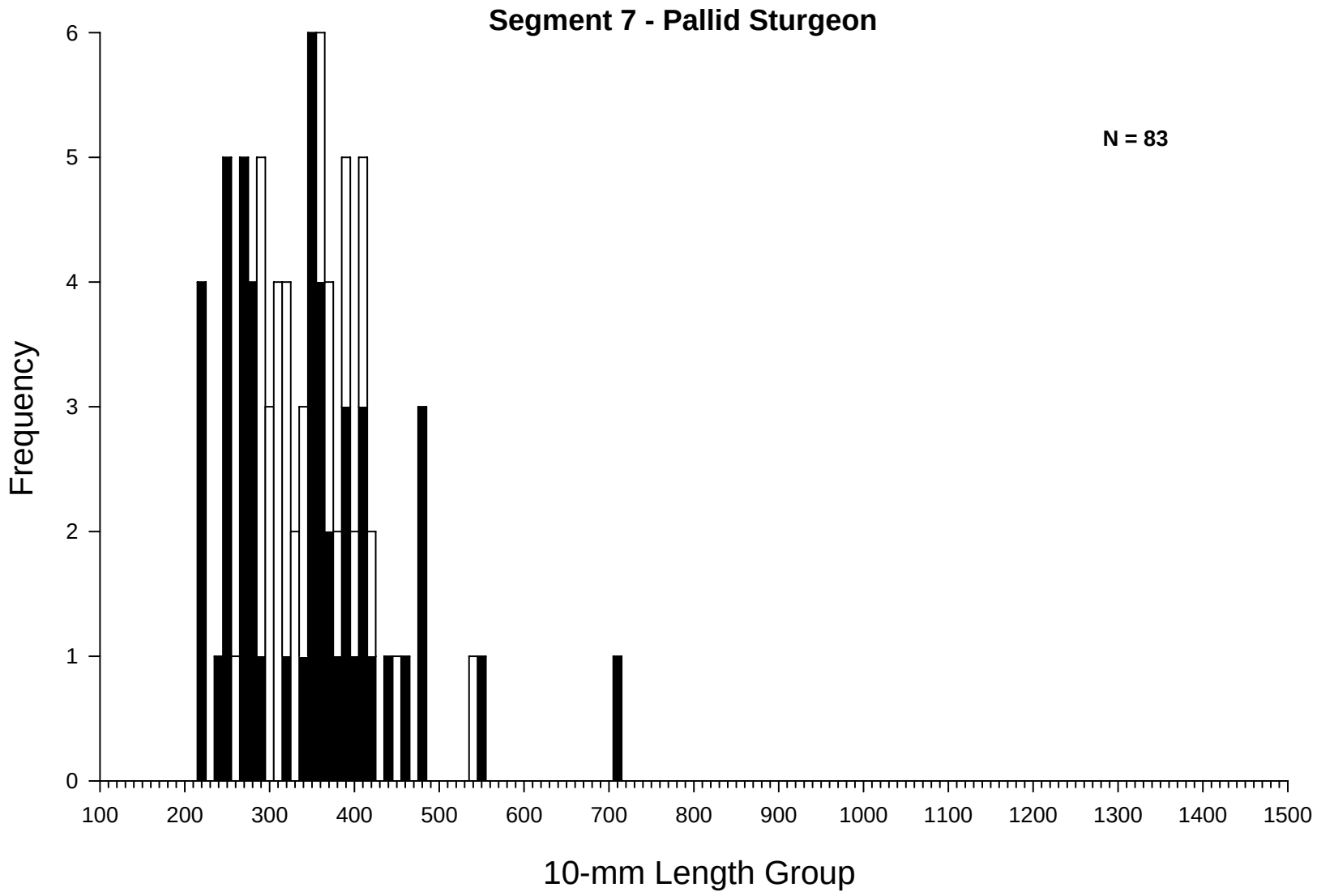

Figure 8. Length frequency of pallid sturgeon captured during fall through spring (sturgeon season, black bars) and summer (fish community season, white bars) in segment 7 of the Missouri River during 2006 - 2007 including non-random and wild samples.

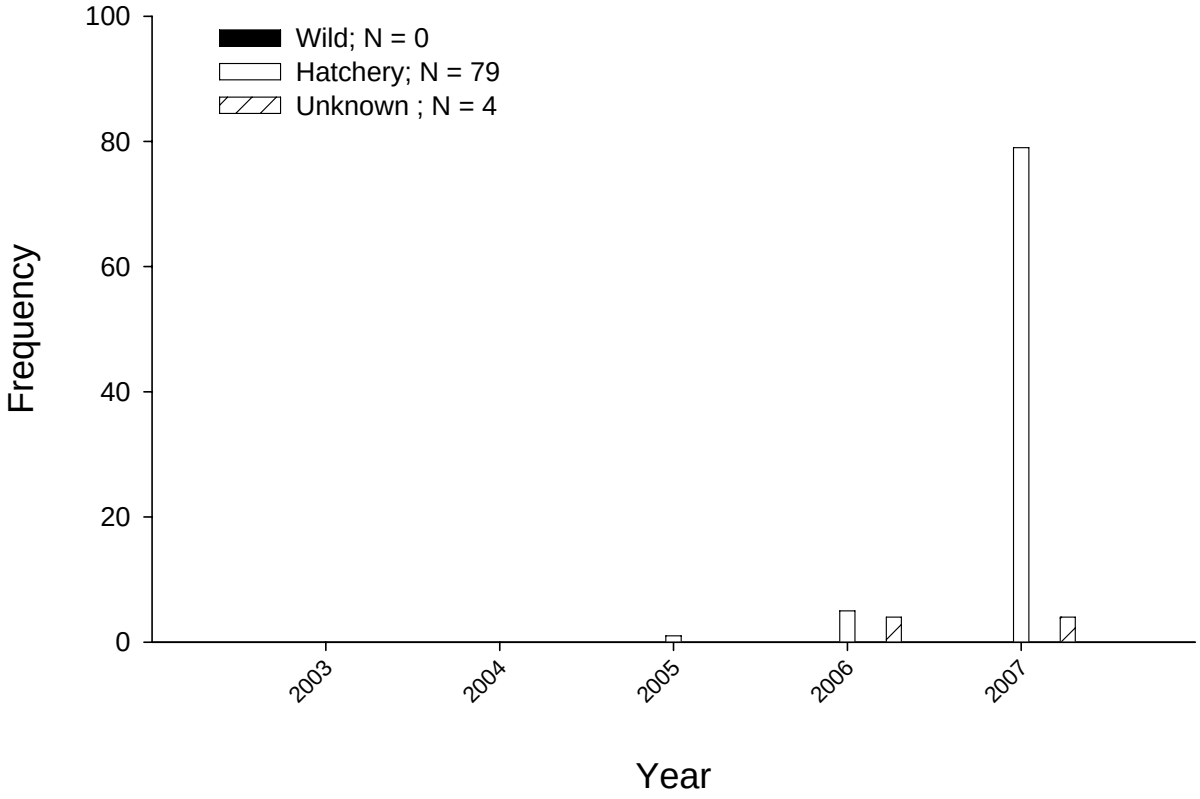

Figure 9. Annual capture history of wild (black bars), hatchery reared (white bars), and unknown origin (cross-hatched bars) pallid sturgeon collected in segment 7 of the Missouri River from 2006 to 2007. Figure is designed to compareoverall pallid sturgeon captures from year to year and may be biased by variable effort between years.

Shovelnose X Pallid Sturgeon Hybrids

Two hybrid sturgeon were captured during the 2007 season (one on 10/24/2006 and the other 3/22/2007). One was caught in a channel crossover macrohabitat and the other in a large secondary channel (both in gill nets). Their lengths were 696 and 607mm. These were the first hybrids documented by the SD crew in Segment 7.

Targeted Native River Species

Shovelnose Sturgeon

A total of 1,873 shovelnose sturgeon were captured in 2007. Active gears caught 953 fish and passive gears 920 fish. The majority of the sturgeon were captured in experimental gill nets (n= 886). Most of those (N=601) were sampled during the spring season and 285 were captured during the fall season. Overall gill net CPUE was 3.1 fish/net night which is a substantial increase over 2006 catch rates (CPUE = 1.14 fish/net night). Detailed catch-per-unit-effort data can be found in Figures 12 and 14. Trammel nets captured 668 fish resulting in a CPUE of 1.6 fish/ 100m. That is comparable to 2006 catch rates (1.3 fish/ 100m). Otter trawls captured 242 fish resulting in a CPUE of 0.444 fish/100m. Angling produced 43 fish. No shovelnose sturgeon were caught in mini-fyke nets.

Shovelnose sturgeon fork lengths ranged from 301 to 798 mm (figure 17). This is a wider length range than that observed in 2006 (370 -754 mm). Most of the fish (91%) were over 500 mm in length. That matches very closely with the 2006 catch, in which 92% were over 500mm long. Incremental RSD analysis yielded RSD-P values of 86 and 87 for the sturgeon and fish community season, respectively. The mean relative weights for shovelnose sturgeon were 81.1 and 82.7 for the sturgeon and fish community seasons.

Segment 7 - Shovelnose Sturgeon / Sturgeon Season

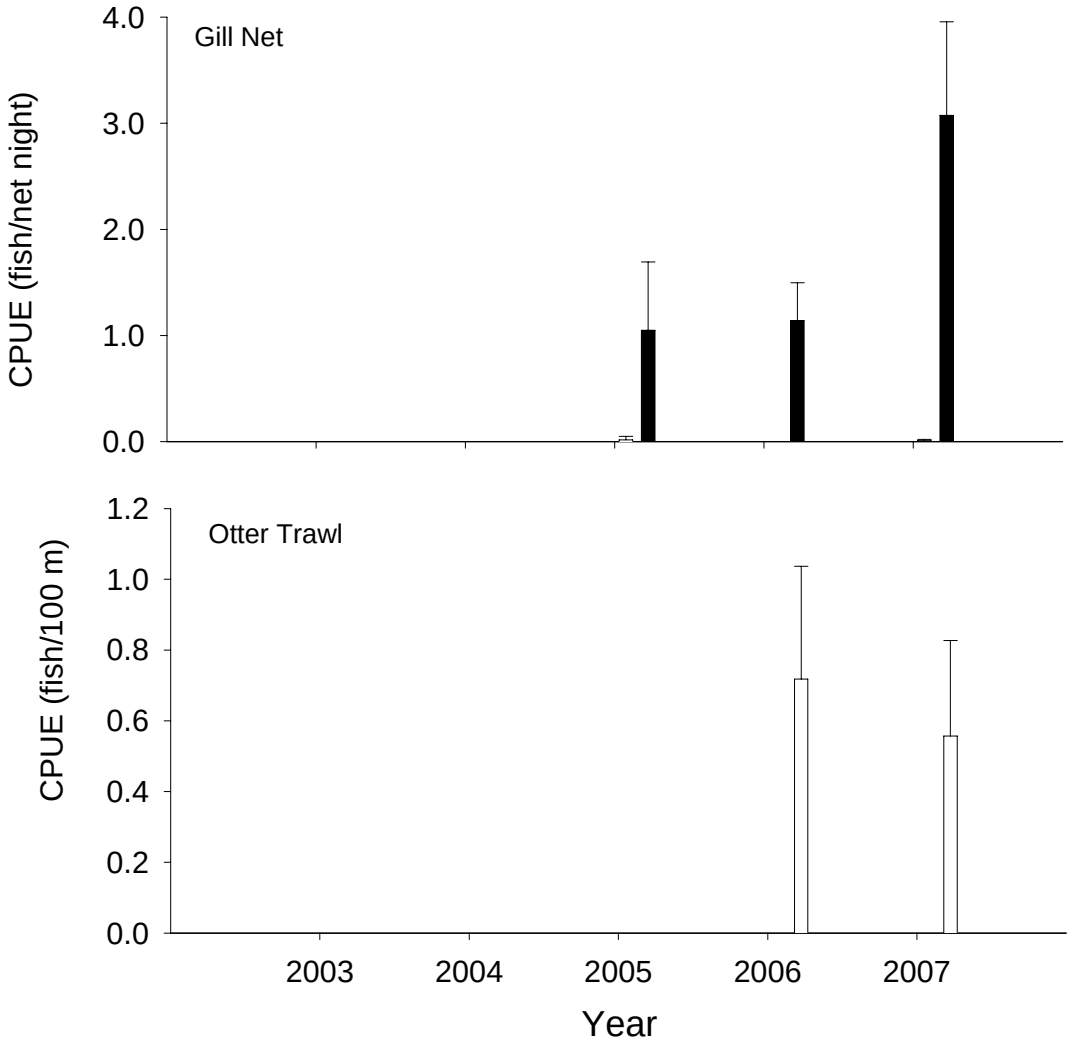

Figure 11. Mean annual catch-per-unit-effort (+/- 2SE) of sub-stock size (0-149 mm; white bars), sub-stock size (150-249; cross-hatched), stock size (250-379 mm; gray bars), and quality and above size (> 380 mm; black bars) shovelnose sturgeon using gill nets and otter trawls in segment 7 of the Missouri River during sturgeon season 2006 - 2007.

Segment 7 - Shovelnose Sturgeon / Sturgeon Season

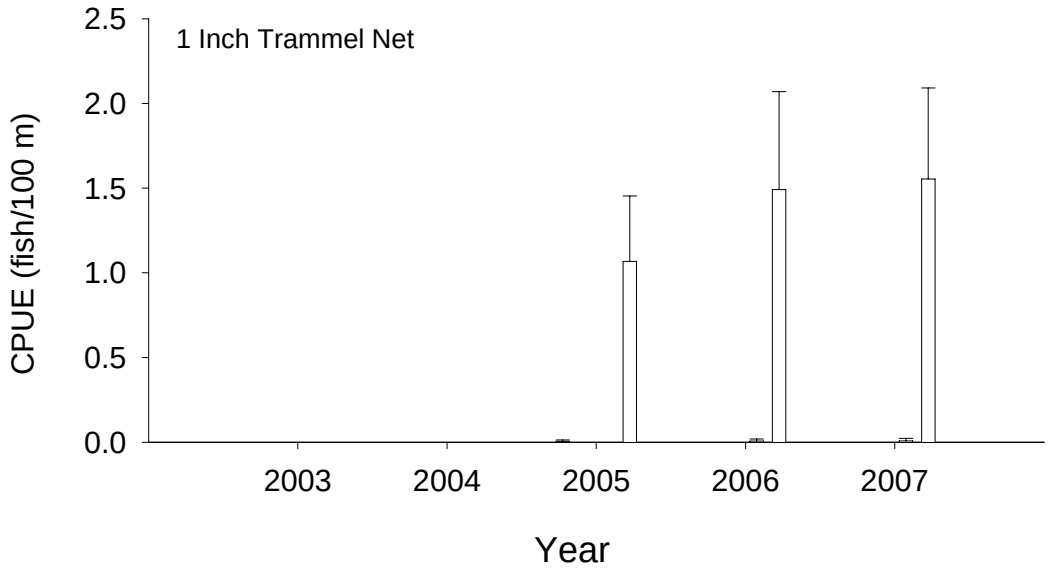

Figure 12. Mean annual catch-per-unit-effort (+/- 2SE) of sub-stock size (0-149 mm; white bars), sub-stock size (150-249; cross-hatched), stock size (250-379 mm; gray bars), and quality and above size (> 380 mm; black bars) shovelnose sturgeon using 1 inch trammel nets in segment 7 of the Missouri River during sturgeon season 2006 - 2007.

Segment 7 - Shovelnose Sturgeon / Fish Community Season

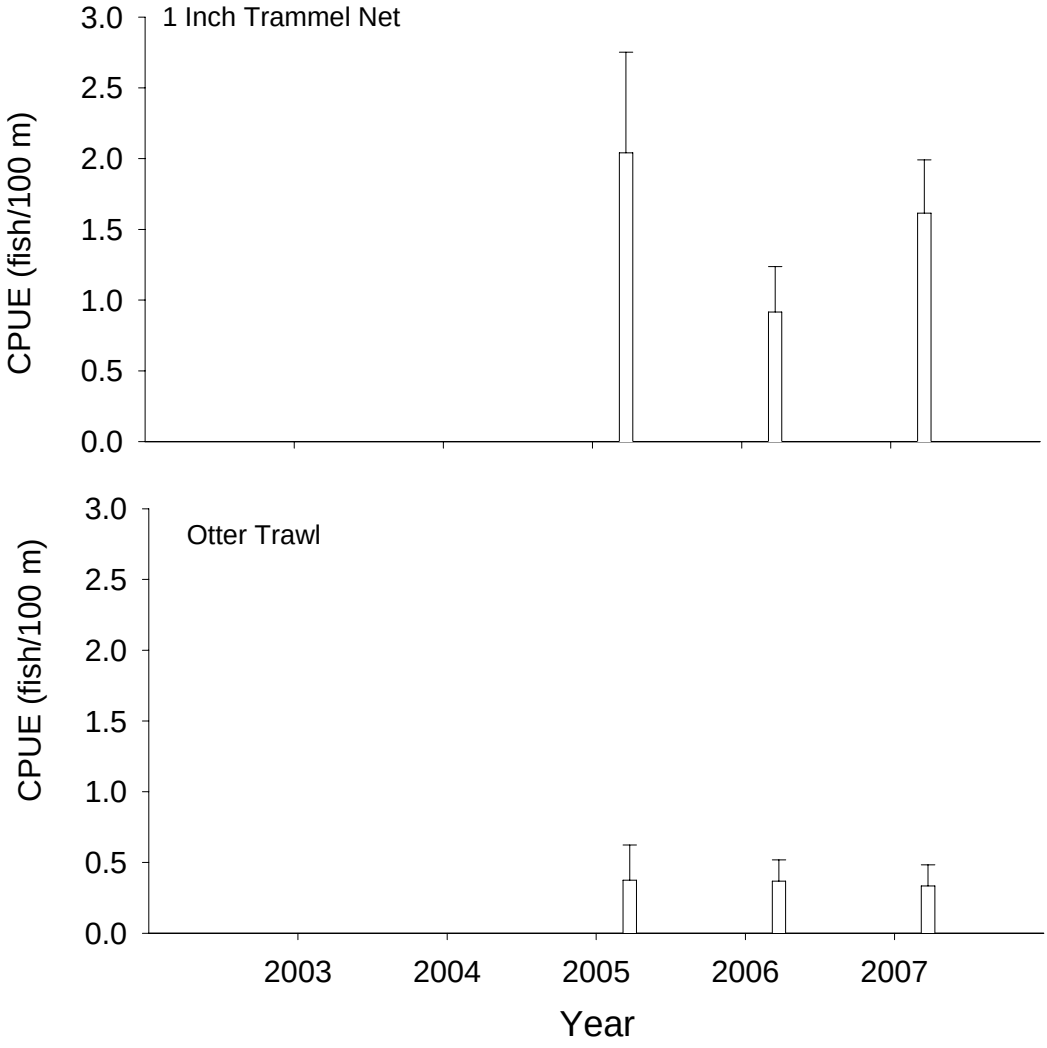

Figure 14. Mean annual catch-per-unit-effort (+/- 2SE) of sub-stock size (0-149 mm; white bars), sub-stock size (150-249; cross-hatched), stock size (250-379 mm; gray bars), and quality and above size (> 380 mm; black bars) shovelnose sturgeon using 1 inch trammel nets and otter trawls in segment 7 of the Missouri River during fish community season 2006 - 2007.

Segment 7 - Shovelnose Sturgeon / Fish Community Season

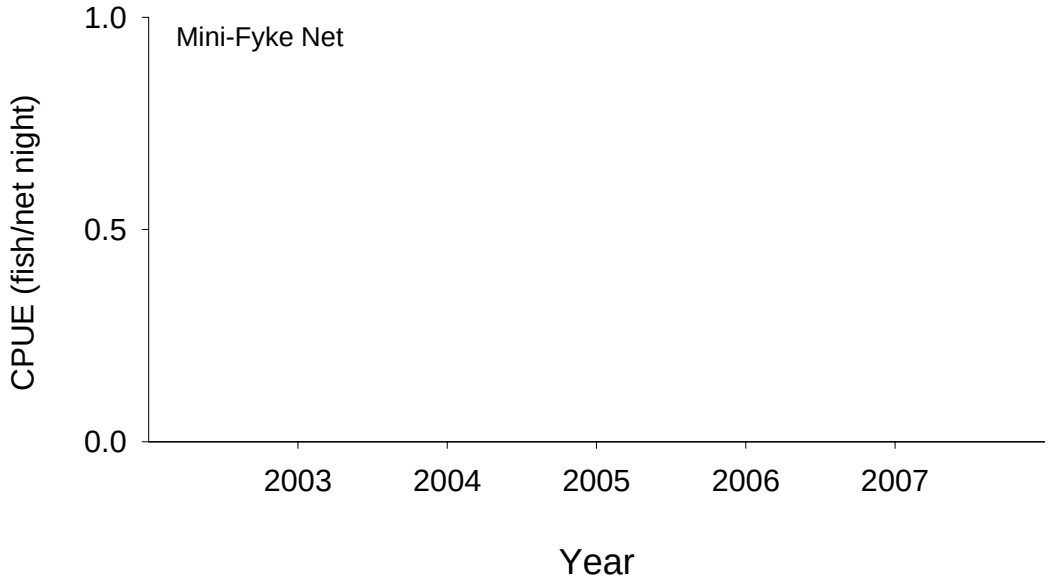

Figure 15. Mean annual catch-per-unit-effort (+/- 2SE) of sub-stock size (0-149 mm; white bars), sub-stock size (150-249; cross-hatched), stock size (250-379 mm; gray bars), and quality and above size (> 380 mm; black bars) shovelnose sturgeon using mini-fyke nets and bag seines in segment 7 of the Missouri River during fish community season 2006 - 2007.

Habitat Use

Eleven different macrohabitats were sampled in 2007. Shovelnose sturgeon were captured in 9 of them. Non-connected secondary channels and tributary mouths are the 2 habitats that did not produce. Braided macro habitats produced the most shovelnose sturgeon (n=732) followed by inside bends (376), outside bends (331), channel crossovers (138) and confluences (129). Trammel net catch rates were highest in confluence/channel border meso/macro habitat combinations (2.3 fish per 100m), followed by inside bend/channel border (1.75) and braided/channel border (1.74). Gill nets were clearly most effective in still-water, pool-type habitats. Catch rates were highest in small secondary channel/island tip habitats (13.3 fish/net night), followed by outside bend/pools (8.7), and braided/pools (7.8).

Table 17. Total number of sub-stock size (0-149 mm) shovelnose sturgeon captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 25. N-E indicates the habitat is non-existent in the segment.

Gear	N	Macrohabitat													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 18. Total number of sub-stock size (0-149 mm) shovelnose sturgeon captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 25. N-E indicates the habitat is non-existent in the segment.

Gear	N	Mesohabitat					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	92	4	4	0	0
Gill Net	0	0	0	0	0	0	0
	.	0	75	0	4	21	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	0	0	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	97	3	0	0	0

Table 19. Total number of sub-stock size (150-249 mm) shovelnose sturgeon captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 25. N-E indicates the habitat is non-existent in the segment.

Gear	N	Macrohabitat													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 20. Total number of sub-stock size (150-249 mm) shovelnose sturgeon captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 25. N-E indicates the habitat is non-existent in the segment.

Gear	N	Mesohabitat					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	92	4	4	0	0
Gill Net	0	0	0	0	0	0	0
	.	0	75	0	4	21	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	0	0	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	97	3	0	0	0

Table 21. Total number of stock size (250-379 mm) shovelnose sturgeon captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 25. N-E indicates the habitat is non-existent in the segment.

Gear	N	Macrohabitat													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	1	100	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	2	100	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 22. Total number of stock size (250-379 mm) shovelnose sturgeon captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 25. N-E indicates the habitat is non-existent in the segment.

Gear	N	Mesohabitat					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	1	0	100	0	0	0	0
	.	0	92	4	4	0	0
Gill Net	2	0	100	0	0	0	0
	.	0	75	0	4	21	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	0	0	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	97	3	0	0	0

Table 23. Total number of quality size and greater (≥380 mm) shovelnose sturgeon captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 25. N-E indicates the habitat is non-existent in the segment.

Gear	N	Macrohabitat													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	268	51	11	9	0	0	17	9	3	1	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	741	44	2	8	0	0	21	15	1	7	0	0	2	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	149	59	8	3	0	0	11	7	11	0	0	0	0	0	1
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	398	18	15	0	0	0	27	36	4	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	93	51	19	0	0	0	13	13	4	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 24. Total number of quality size and greater (≥380 mm) shovelnose sturgeon captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. Size categories described in Table 25. N-E indicates the habitat is non-existent in the segment.

Gear	N	Mesohabitat					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	268	0	98	0	2	0	0
	.	0	92	4	4	0	0
Gill Net	741	0	39	0	9	52	0
	.	0	75	0	4	21	0
Otter Trawl	149	0	93	1	7	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	398	0	100	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	0	0	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	93	0	100	0	0	0	0
	.	0	97	3	0	0	0

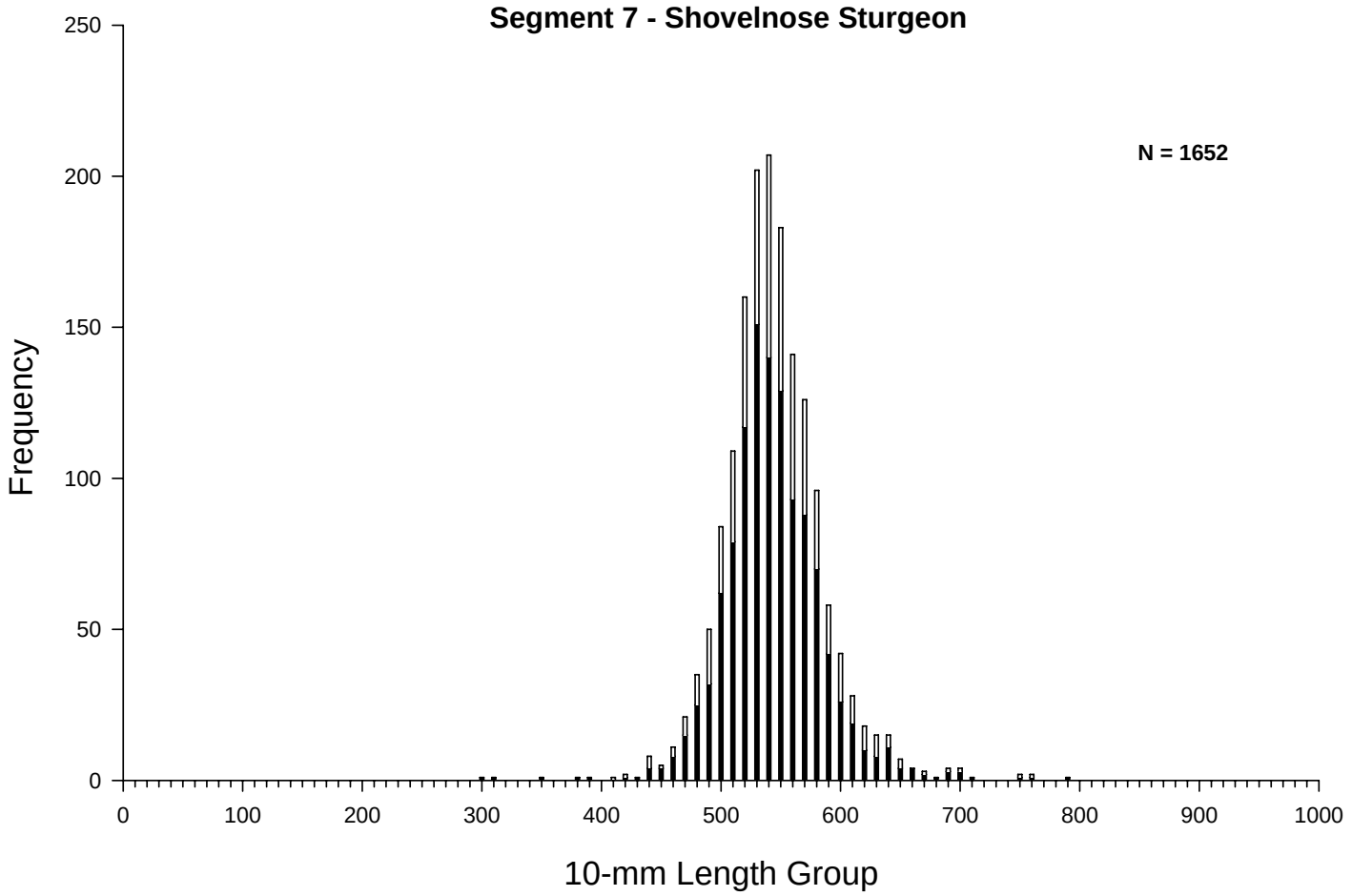

Figure 17. Length frequency of shovelnose sturgeon from fall through spring (sturgeon season, black bars) and summer (fish community season, white bars) in segment 7 of the Missouri River during 2006 - 2007.

Table 25. Relative stock density (RSD)[a] and mean relative weight (Wr) by a length category for shovelnose sturgeon in segment 07 of the Missouri River captured during 2006 – 2007. Length categories[b] determined using methods proposed by Quist (1998).

Length category	N	RSD	Wr (+/- 2SE)
Sturgeon Season			
Sub-stock (0-149 mm)	0	.	0
Sub-stock (150-249 mm)	0	.	0
Stock	3	100	350.4 (260.0)
Quality	154	100	83.55 (1.650)
Preferred	972	86	79.39 (0.758)
Memorable	32	3	82.26 (4.449)
Trophy	0	.	0
Overall Wr	.	.	81.08 (1.543)
Fish Community Season			
Sub-stock (0-149 mm)	0	.	0
Sub-stock (150-249 mm)	0	.	0
Stock	0	.	0
Quality	66	100	85.86 (2.769)
Preferred	413	87	81.93 (0.827)
Memorable	12	2	93.69 (15.07)
Trophy	0	.	0
Overall Wr	.	.	82.73 (0.886)

[a] RSD = (# of fish of a specified length class / # of fish ≥ minimum stock length fish) * 100.
[b] Length categories based on the percentage of the largest known shovelnose sturgeon: Sub-stock FL < 250 mm (20 %), Stock FL =250-379 mm (20 – 36 %), Quality FL = 380 – 509 mm (36 – 45 %), Preferred FL = 510 - 639 mm (45 – 59 %), Memorable FL = 640 – 809 mm (59 – 74 %), Trophy FL ≥ 810 mm (>74 %).

Sturgeon Chub

Two sturgeon chubs were captured in 2007. They were both caught on the same day (6/5/07) in otter trawls at mile 754.8 (near the engineered sandbars upstream from Ponca State Park). One was captured in the large secondary channel between the sandbars and the Nebraska shore, the other was caught in the inside bend habitat on the South Dakota side of the bars. No sturgeon chubs were caught in 2006 and 1 was captured in 2005.

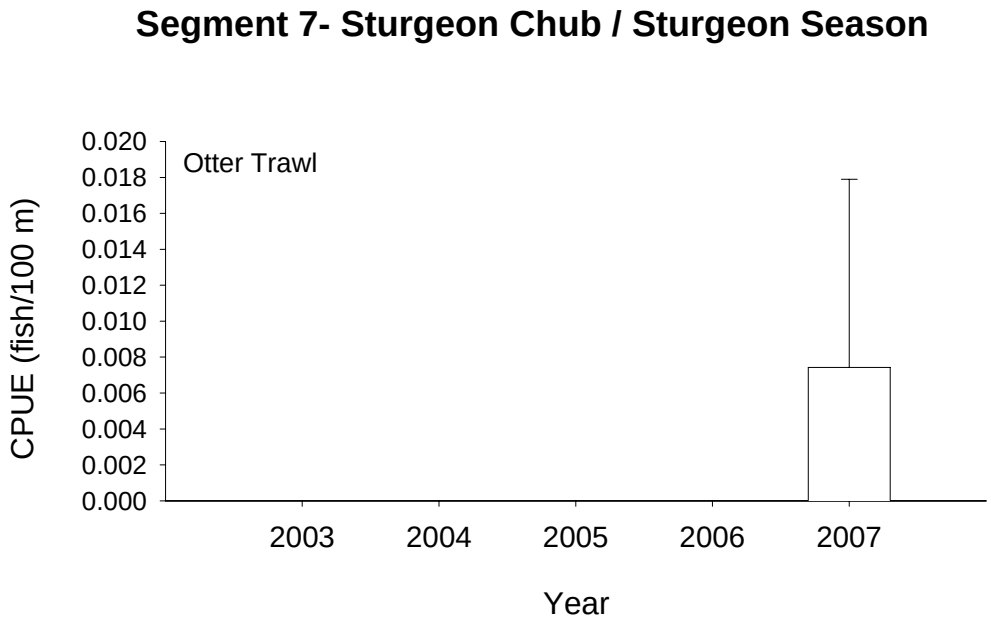

Figure 18. Mean annual catch-per-unit-effort (+/- 2SE) of sturgeon chub using otter trawls in segment 7 of the Missouri River during sturgeon season 2006-2007.

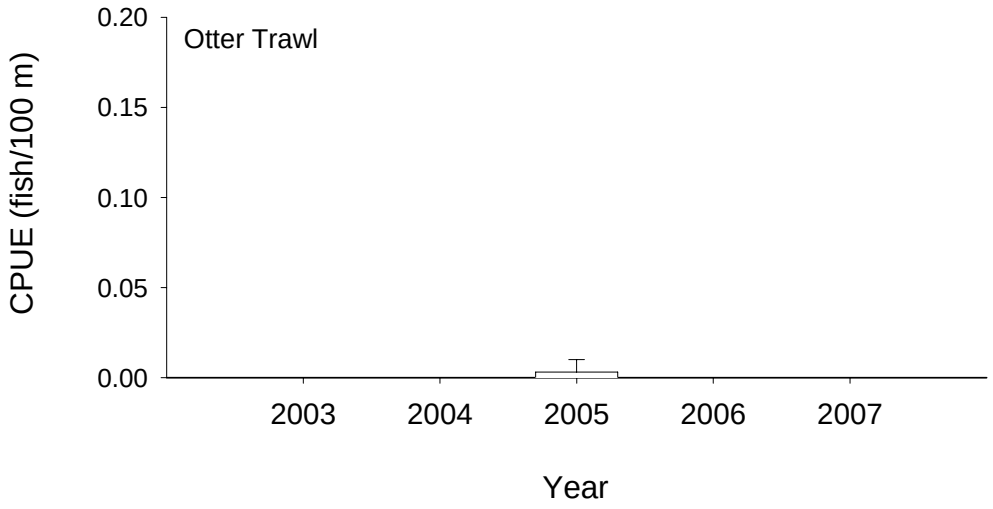

Figure 19. Mean annual catch-per-unit-effort (+/- 2SE) of sturgeon chub using otter trawls in segment 7 of the Missouri River during fish community season 2006-2007.

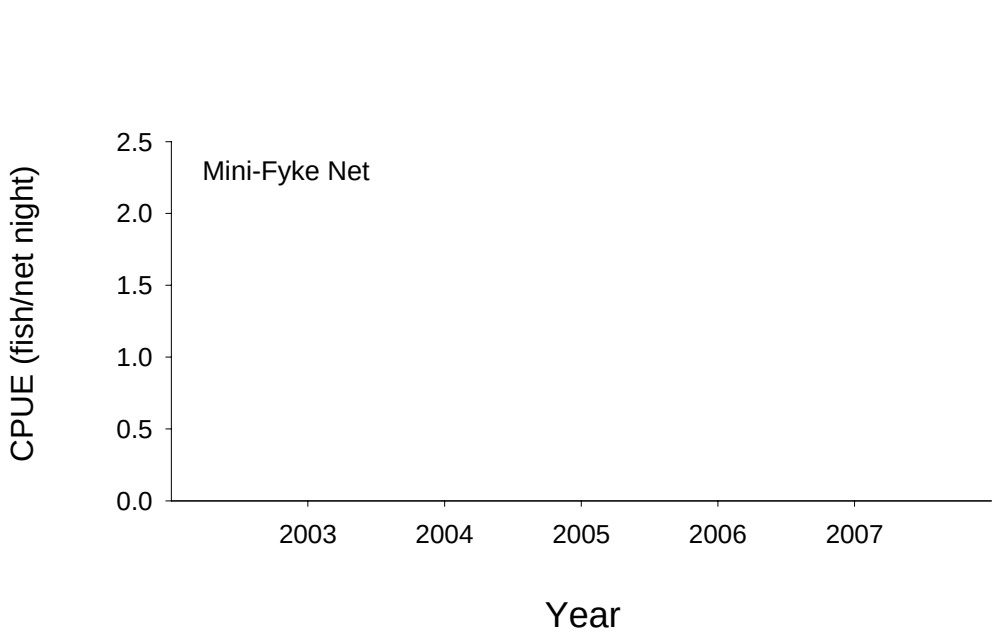

Figure 20. Mean annual catch-per-unit-effort (+/- 2SE) of sturgeon chub using mini-fyke nets and bag seines in segment 7 of the Missouri River during fish community season 2006-2007.

Table 26. Total number of sturgeon chubs captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	Macrohabitat													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	2	0	0	0	0	0	50	0	50	0	0	0	0	0	0
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 27. Total number of sturgeon chubs captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	Mesohabitat					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	92	4	4	0	0
Gill Net	0	0	0	0	0	0	0
	.	0	75	0	4	21	0
Otter Trawl	2	0	100	0	0	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	0	0	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	97	3	0	0	0

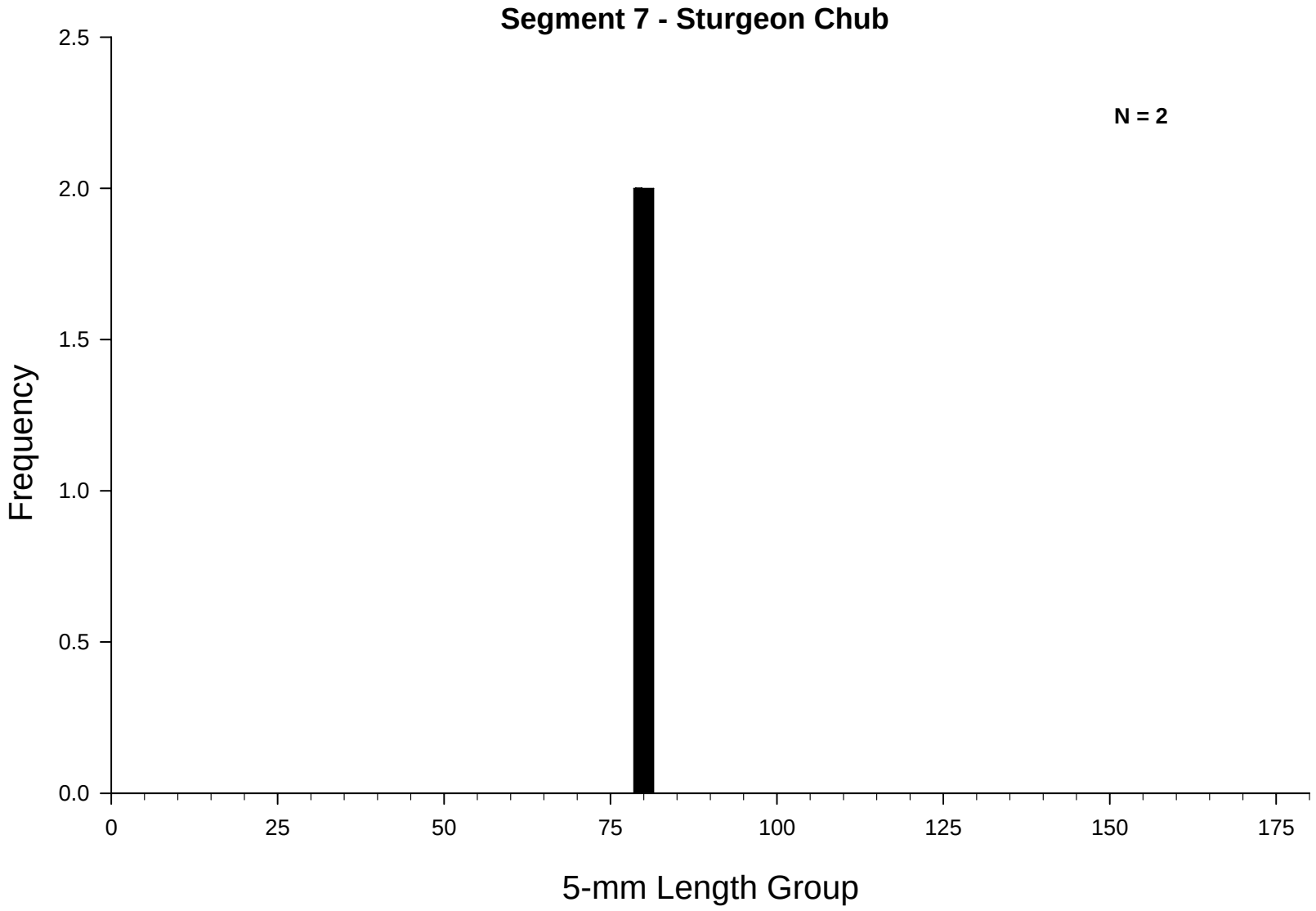

Figure 21. Length frequency of sturgeon chubs during fall through spring (sturgeon season, black bars) and summer (fish community season, white bars) in segment 7 of the Missouri River during 2006 - 2007.

Sicklefin Chub

Three sicklefin chubs were captured in 2007, all of them in otter trawls. Two of the chubs were caught on a single trawl deployment on 6/5/07 near river mile 754. The last chub was caught in on 6/11/07 near mile 769. The first 2 fish were caught in a channel crossover macro habitat and the last one in a braided habitat. All of the chubs were caught during the sturgeon season. Depths during both trawl deployments were 2 or greater. The 2005 season produced one sicklefin chub and 6 were caught in 2006.

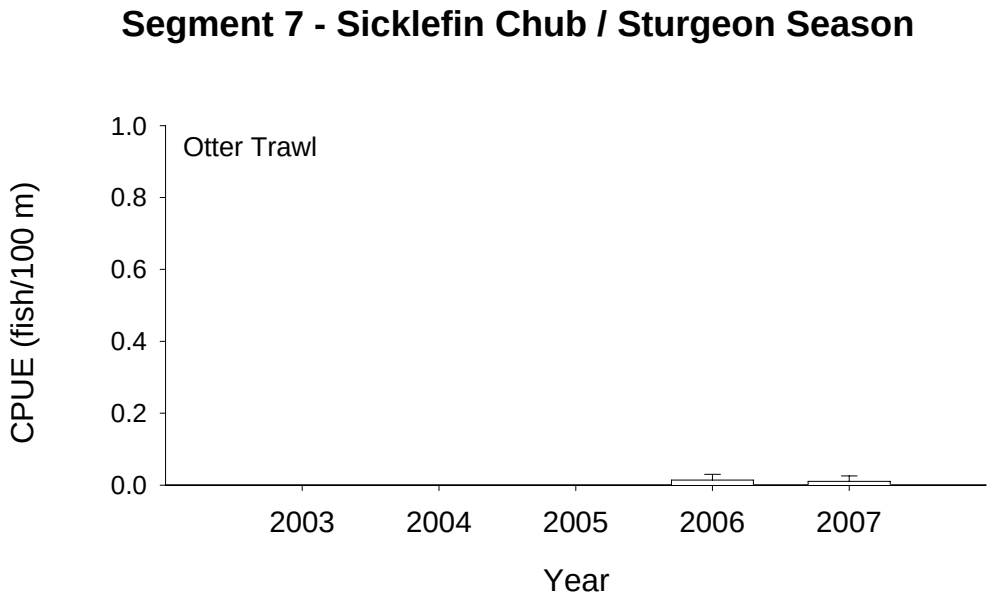

Figure 22. Mean annual catch-per-unit-effort (+/- 2SE) of sicklefin chub using otter trawls in segment 7 of the Missouri River during sturgeon season 2006-2007.

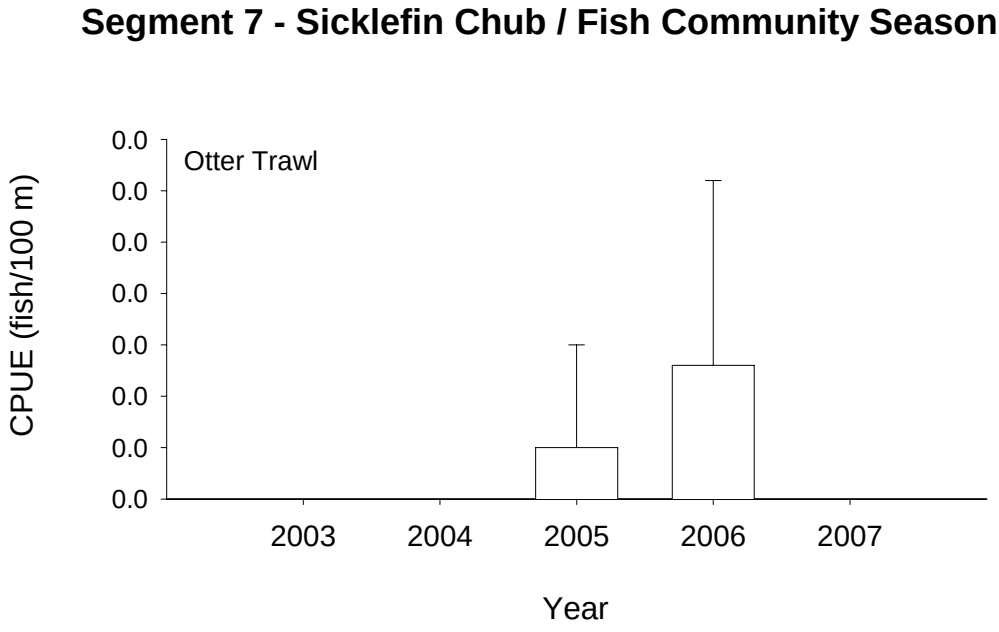

Figure 23. Mean annual catch-per-unit-effort (+/- 2SE) of sicklefin chub using otter trawls in segment 7 of the Missouri River during fish community season 2006-2007.

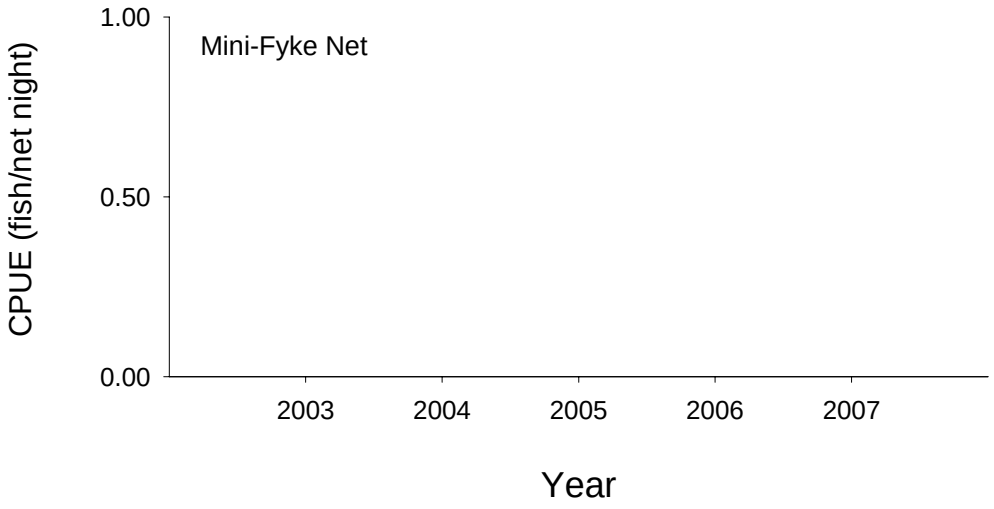

Figure 24. Mean annual catch-per-unit-effort (+/- 2SE) of sicklefin chub using mini-fyke nets in segment 7 of the Missouri River during fish community season 2006-2007.

Table 28. Total number of sicklefin chubs captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	**Macrohabitat**													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	3	33	67	0	0	0	0	0	0	0	0	0	0	0	0
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 29. Total number of sicklefin chubs captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	Mesohabitat					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	92	4	4	0	0
Gill Net	0	0	0	0	0	0	0
	.	0	75	0	4	21	0
Otter Trawl	3	0	100	0	0	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	0	0	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	97	3	0	0	0

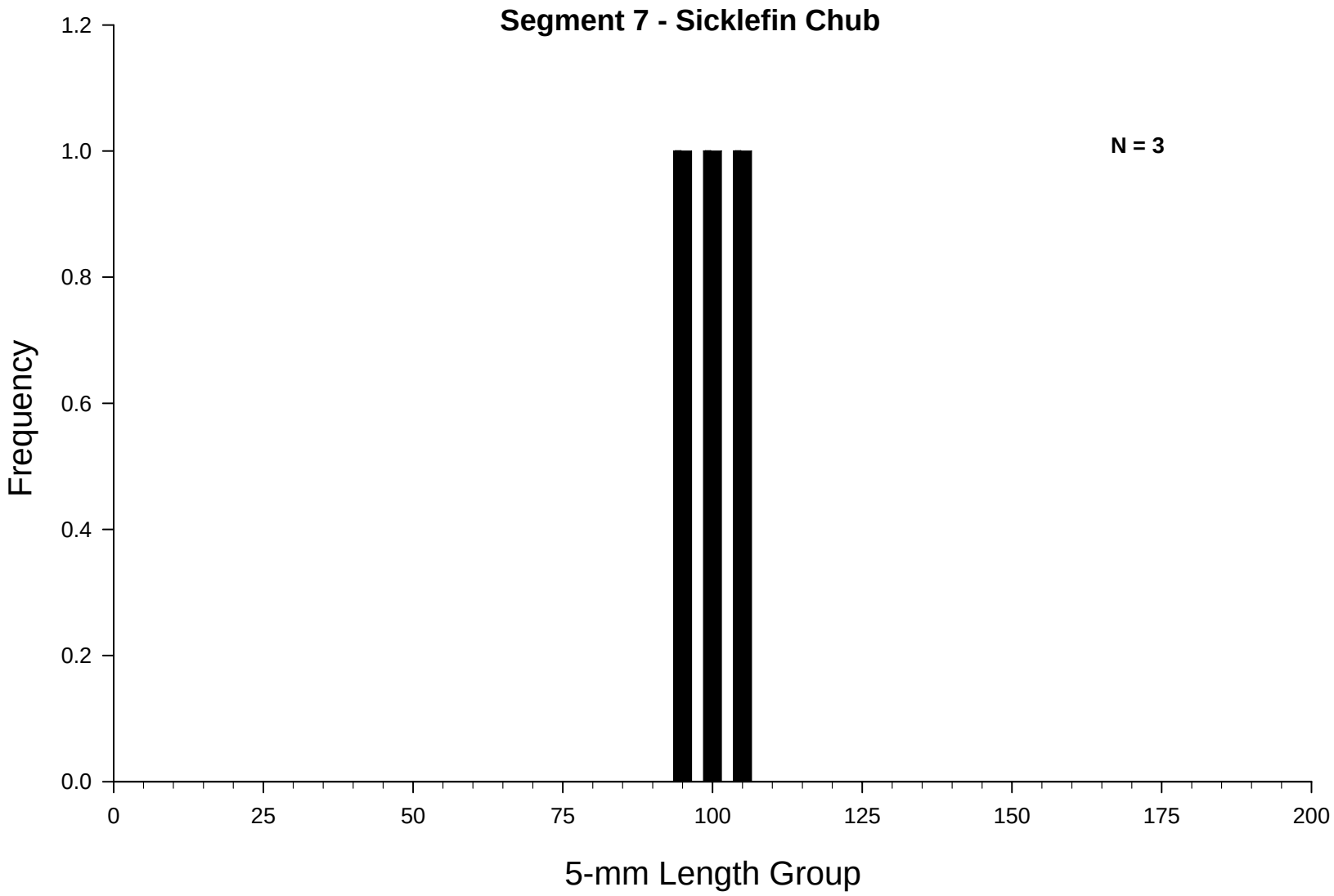

Figure 25. Length frequency of sicklefin chubs during fall through spring (sturgeon season, black bars) and summer (fish community season, white bars) in segment 7 of the Missouri River during 2006 - 2007.

Speckled Chub

Five speckled chubs were captured in 2007, all but 1 in the sturgeon season. The fish were all caught in otter trawl tows. River miles at capture points were 798, 798, 790, 789, and 785. These locations are found between the St. Helena and Brooky Bottom access points. Four of the fish were captured in braided macro habitats and the other in an inside bend. All of them were found in channel border meso habitats. One speckled chub was caught in 2005 and 2 in 2006.

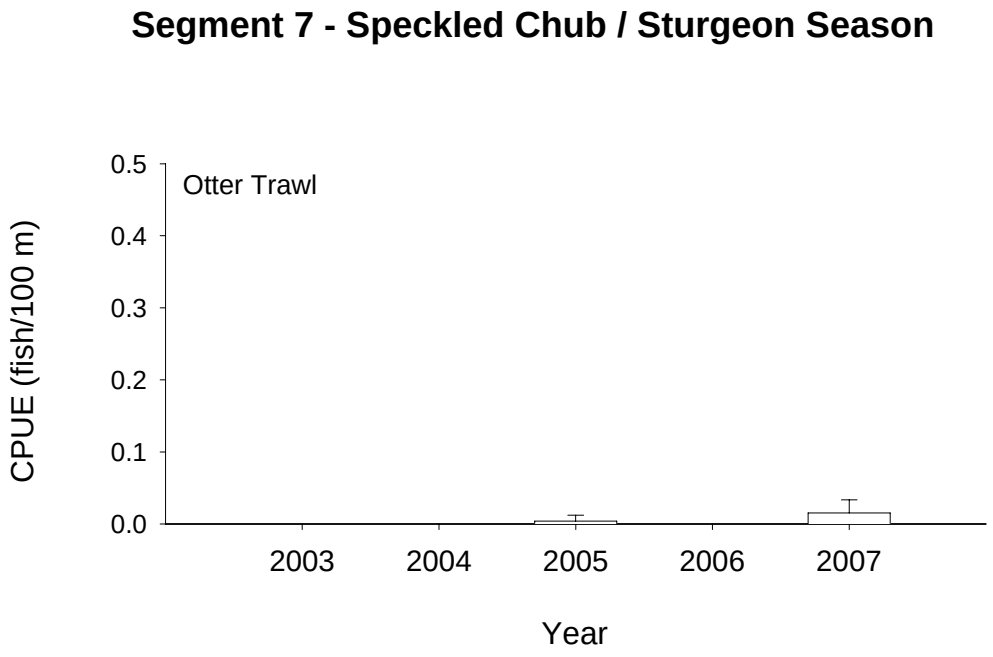

Figure 26. Mean annual catch-per-unit-effort (+/- 2SE) of speckled chub using otter trawls in segment 7 of the Missouri River during sturgeon season 2006 -2007.

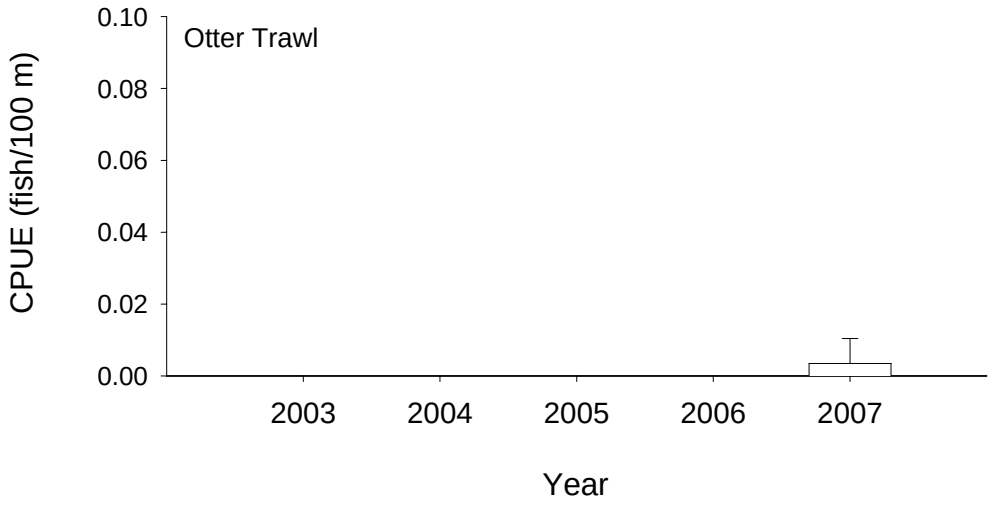

Figure 27. Mean annual catch-per-unit-effort (+/- 2SE) of speckled chub in segment 7 of the Missouri River during fish community season 2006 -2007.

Segment 7 - Speckled Chub / Fish Community Season

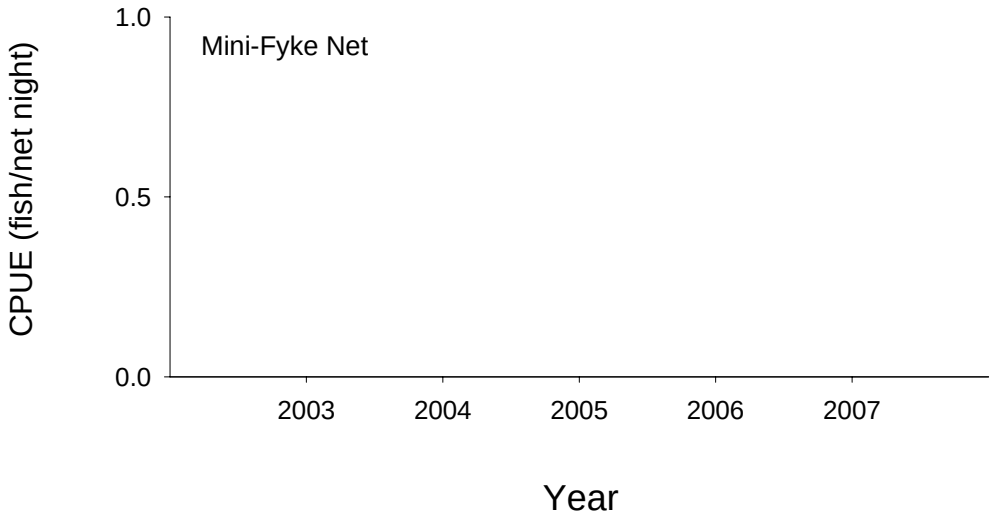

Figure 28. Mean annual catch-per-unit-effort (+/- 2SE) of speckled chub using mini-fyke nets in segment 7 of the Missouri River during fish community season 2006 -2007.

Table 30. Total number of speckled chubs captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	Macrohabitat													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	4	75	0	0	0	0	25	0	0	0	0	0	0	0	0
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	1	100	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 31. Total number of speckled chubs captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	Mesohabitat					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	92	4	4	0	0
Gill Net	0	0	0	0	0	0	0
	.	0	75	0	4	21	0
Otter Trawl	4	0	100	0	0	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	0	0	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	1	0	100	0	0	0	0
	.	0	97	3	0	0	0

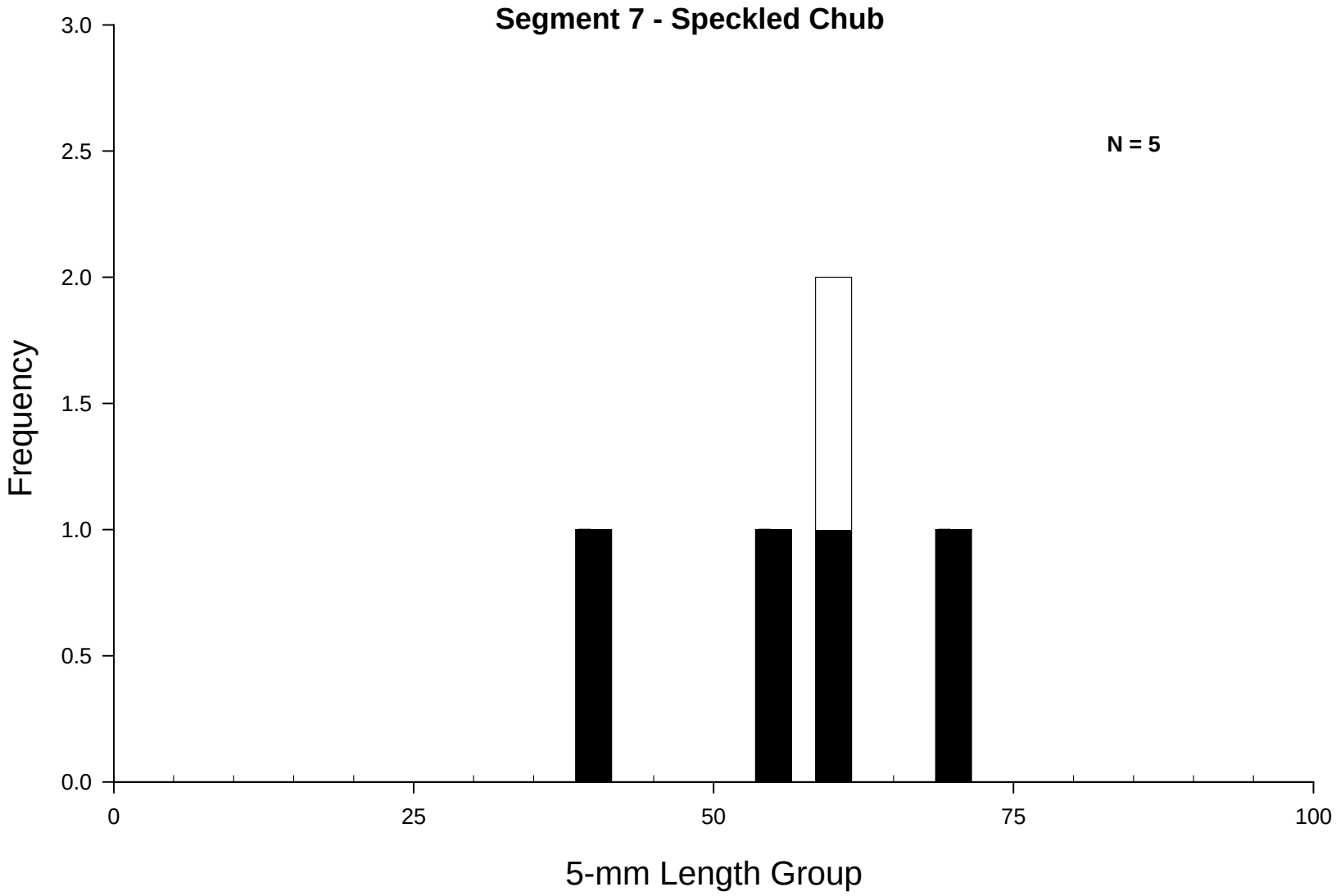

Figure 29. Length frequency of speckled chubs during fall through spring (sturgeon season, black bars) and summer (fish community season, white bars) in segment 7 of the Missouri River during 2006 - 2007.

Sand Shiner

Though they were still relatively common, shiner catches decreased in Segment 7 in 2007. A total of 391 were sampled during the fish community season and 14 during the sturgeon season. This compares to a catch of 894 during the 2006 fish community season and 1,251 during the same in 2005 (271 of those were captured in seine hauls). Mini fyke nets produced 382 fish (9.3 fish / net night) in 2007. The same gear had a catch rate of 8.5 fish / net night in 2006 and 9.6 per night in 2005. Otter trawls produced 17 sand shiners, and the push trawl produced 6 sand shiners in 2007.

Most of the fish were caught in inside bend macro habitats (22%). Braided macro habitats (21%) and small secondary channels (21%) produced the second and third most sand shiners. Catch rates (mini-fyke nets) were the highest in braided macro habitat (16.6 fish per net night). Habitat-based CPUE data can be found in Table 32. Sand shiners ranged in length from 19 mm to 61 mm (Figure 33).

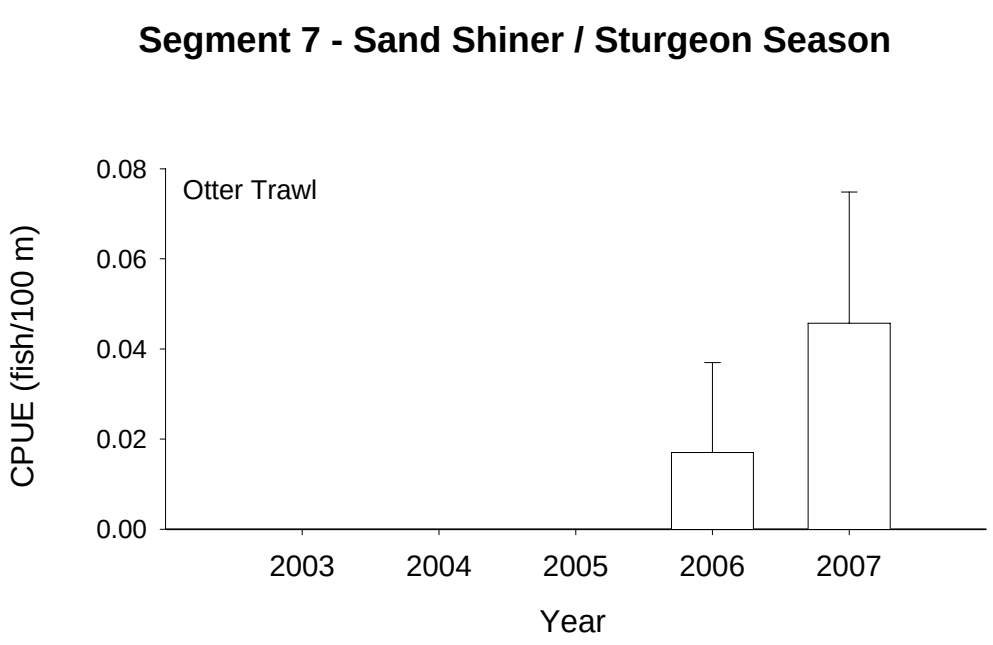

Figure 30. Mean annual catch-per-unit-effort (+/- 2SE) of sand shiner with otter trawls in segment 7 of the Missouri River during sturgeon season 2006 -2007.

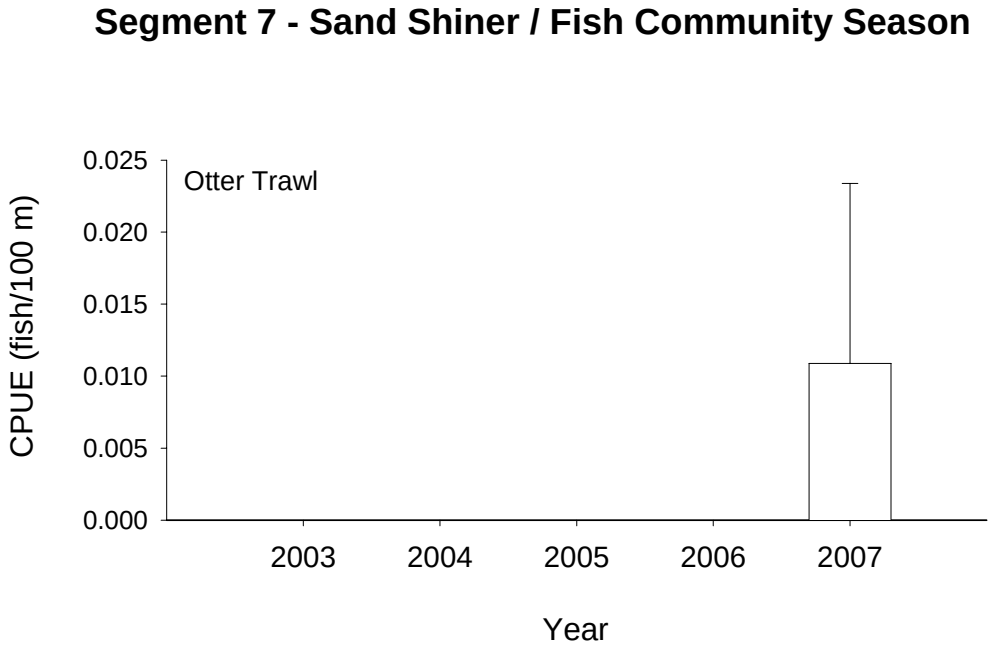

Figure 31. Mean annual catch-per-unit-effort (+/- 2SE) of sand shiner with otter trawls in segment 7 of the Missouri River during fish community season 2006 -2007.

Segment 7 - Sand Shiner / Fish Community Season

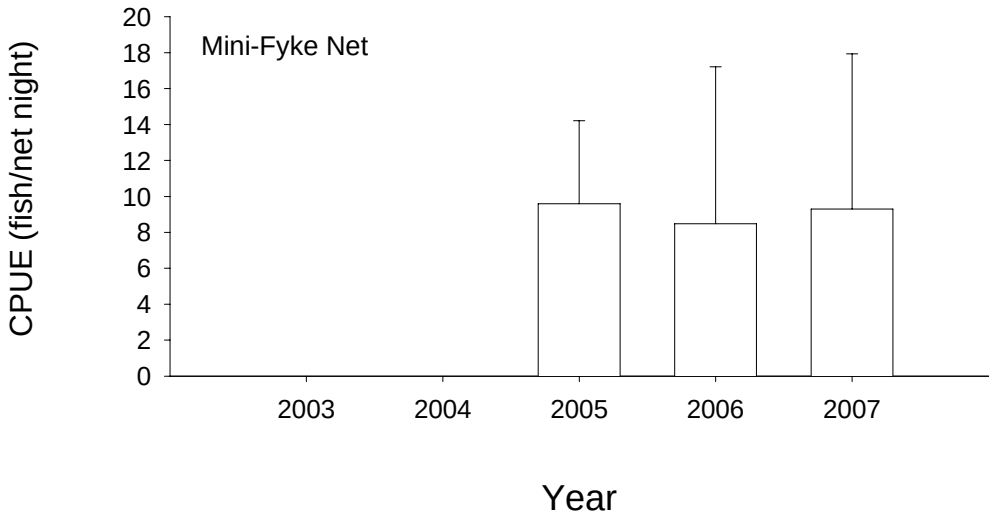

Figure 32. Mean annual catch-per-unit-effort (+/- 2SE) of sand shiner with mini-fyke nets in segment 7 of the Missouri River during fish community season 2006 - 2007.

Table 32. Total number of sand shiners captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	Macrohabitat													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	14	71	0	0	0	0	7	7	14	0	0	0	0	0	0
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	939	23	0	0	0	0	14	1	5	9	47	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	3	33	33	0	0	0	33	0	0	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 33. Total number of sand shiners captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	**Mesohabitat**					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	92	4	4	0	0
Gill Net	0	0	0	0	0	0	0
	.	0	75	0	4	21	0
Otter Trawl	14	0	93	0	7	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	939	53	1	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	3	0	100	0	0	0	0
	.	0	97	3	0	0	0

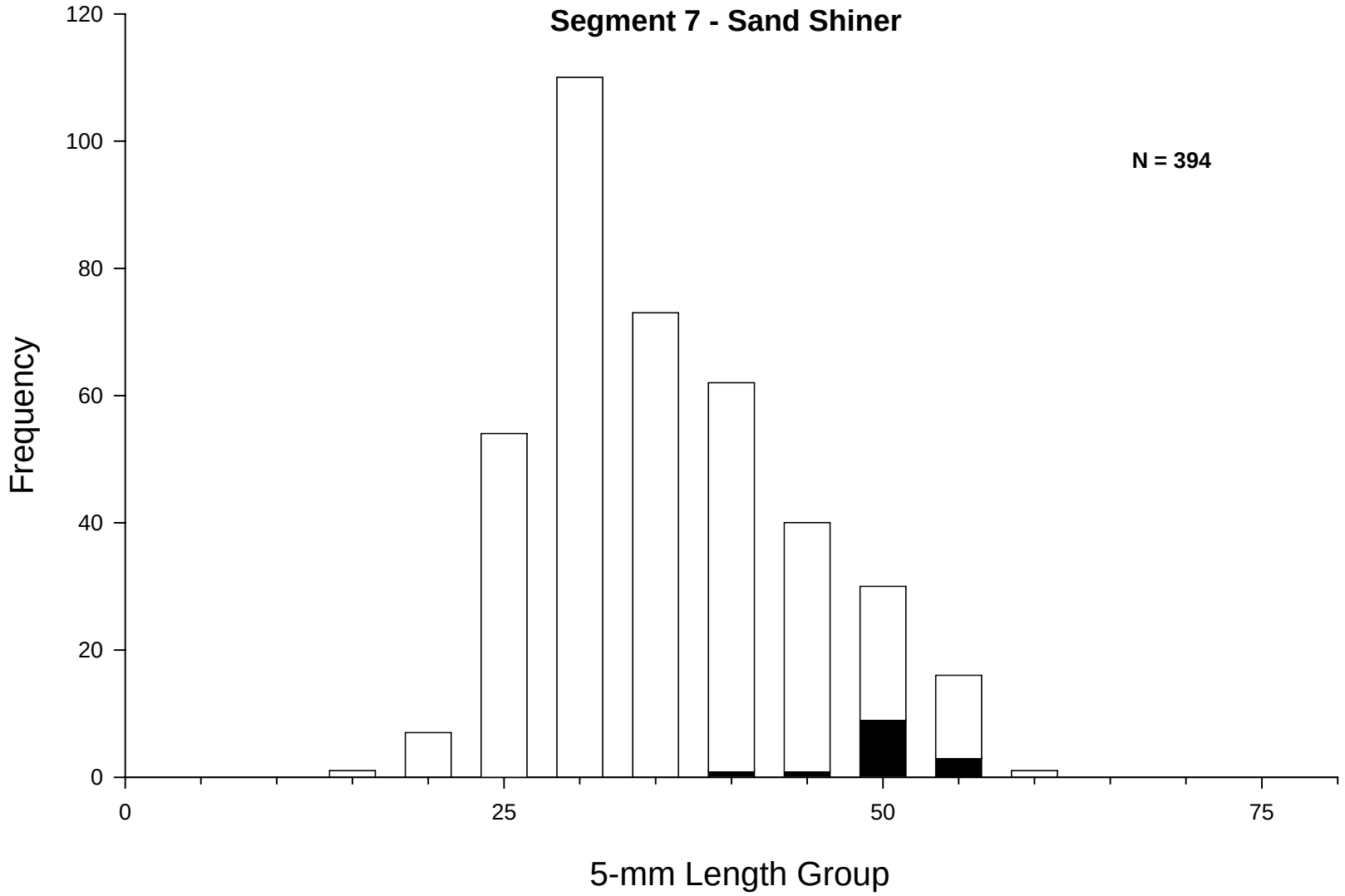

Figure 33. Length frequency of sand shiners during fall through spring (sturgeon season, black bars) and summer (fish community season, white bars) in segment 7 of the Missouri River during 2006 - 2007.

***Hybognathus* spp**.

One western silvery minnows was captured during 2007 sampling. Previous catches were 3 fish in 2005 and 10 in 2006.

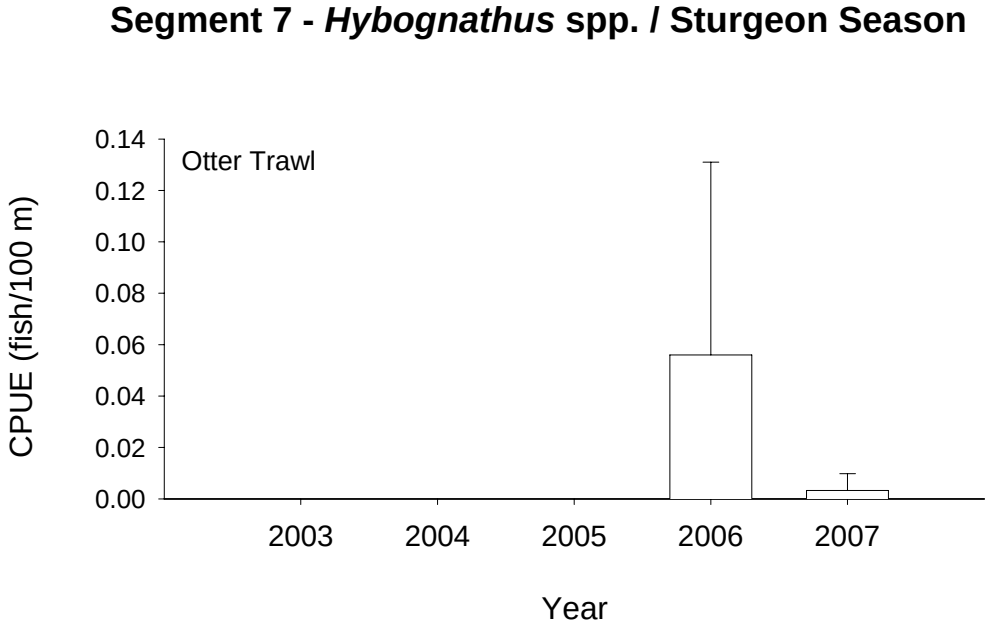

Figure 34. Mean annual catch-per-unit-effort (+/- 2SE) of *Hybognathus* spp. with otter trawls in segment 7 of the Missouri River during sturgeon season 2006 - 2007.

Segment 7 - *Hybognathus* spp. / Fish Community Season

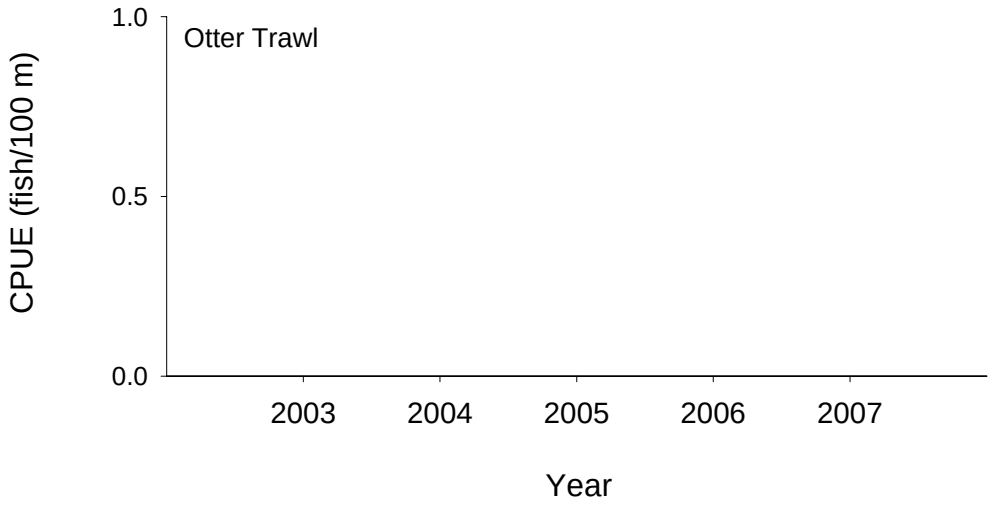

Figure 35. Mean annual catch-per-unit-effort (+/- 2SE) of *Hybognathus* spp. with otter trawls in segment 7 of the Missouri River during fish community season 2006 - 2007.

Segment 7 - *Hybognathus* spp. / Fish Community Season

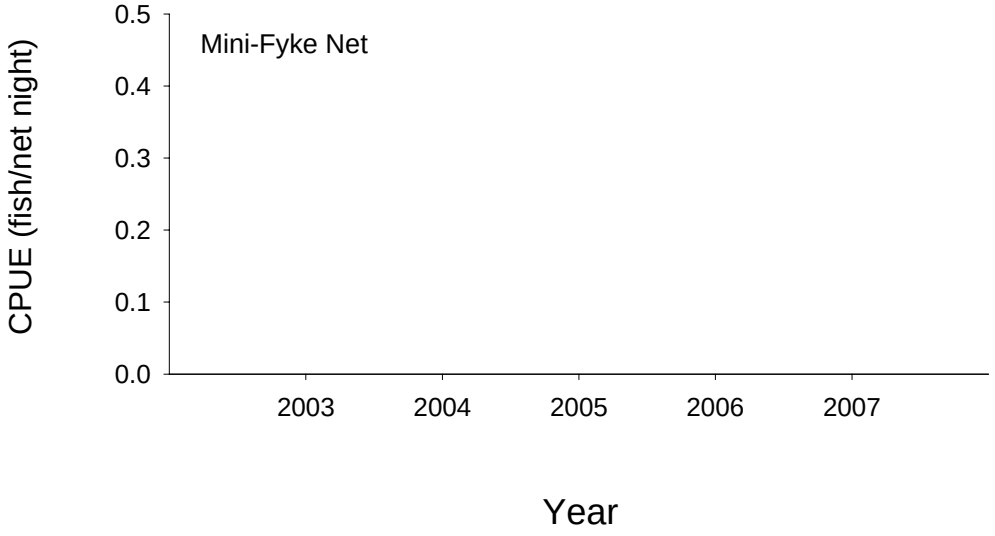

Figure 36. Mean annual catch-per-unit-effort (+/- 2SE) of *Hybognathus* spp. with mini-fyke nets in segment 7 of the Missouri River during fish community season 2006 - 2007.

Table 34. Total number of *Hybognathus* spp. captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	**Macrohabitat**													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	1	0	0	0	0	0	0	100	0	0	0	0	0	0	0
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 35. Total number of *Hybognathus* spp. captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	**Mesohabitat**					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	92	4	4	0	0
Gill Net	0	0	0	0	0	0	0
	.	0	75	0	4	21	0
Otter Trawl	1	0	100	0	0	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	0	0	0	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	0	0	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	97	3	0	0	0

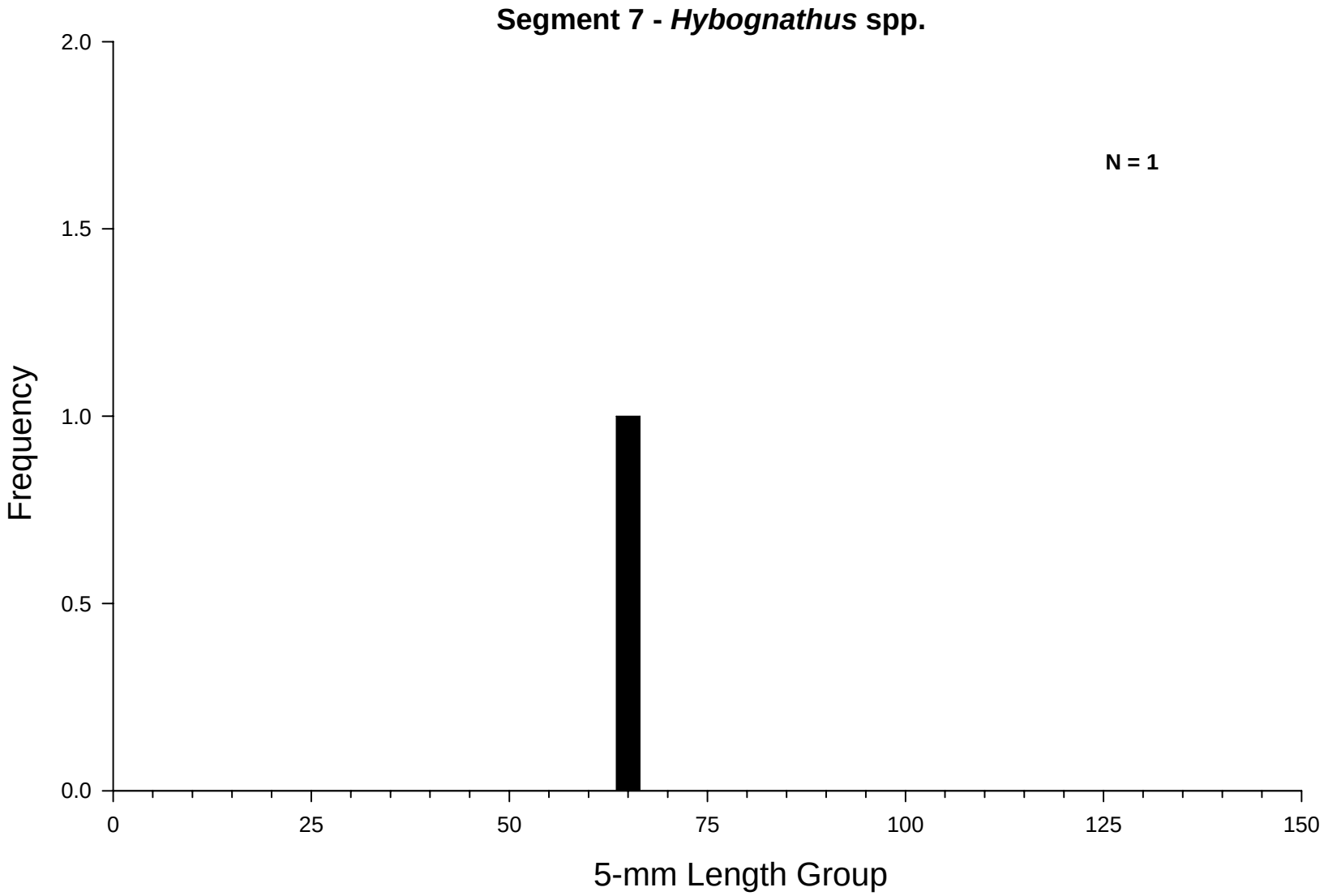

Figure 37. Length frequency of *Hybognathus* spp. caught during fall through spring (sturgeon season, black bars) and summer (fish community season, white bars) in segment 7 of the Missouri River during 2006 - 2007.

Blue Sucker

A total of 428 blue suckers were captured in 2007. That is a substantial decrease from the number caught in 2006 (n=917). However, the most productive gear from the 2006 season (2.5" trammel nets) was not used in 2007. This gear produced 334 fish in 2006. The majority (n=320) of the 2007 blue suckers were caught during the sturgeon season. Active gears caught 234 fish and passive gears 194 fish. The majority of blue suckers were captured in gill nets (n= 191) at a rate of 0.8 fish / net night. That is comparable to the 2006 catch rate of 1.4 fish per net night. Detailed catch per unit effort data can be found in Appendix H and tables 36 and 37. Trammel nets captured 161 fish resulting in a CPUE of 0.38 fish per / 100m. That is similar to the 2006 catch rate (0.43 fish / 100m). Otter trawls captured 72 fish resulting in a CPUE of 0.17 fish / 100m, which is down from a rate of 0.5 fish / 100m in 2006. One small blue sucker (134mm) was caught in a mini-fyke net. This gear failed to capture any blue suckers in 2005 or 2006.

Blue sucker lengths ranged from 85 to 820 mm (figure 44). Most of the fish (84%) were over 550 mm in length. That very closely resembles the 2006 size distribution, in which 85% were over 550mm. This population is dominated by large fish. It is extremely likely that 2 YOY fish were captured in Segment 7 during 2007. The first (85mm) was captured July 9 in an otter trawl at mile 775. The second (134mm) was captured July 19 in a mini-fyke net at mile 755. Both were found in inside bend macro habitats. Single YOY blue suckers were captured in 2005 and 2006.

Gears were set in a total of 11 macrohabitats. Blue suckers were captured in 8 of them. No blue suckers were found in non-connected secondary channels or small tributary mouths. Blue suckers were most common in braided macro habitats during both the sturgeon and fish community seasons (Table 36). Most blue suckers were captured in channel border mesohabitats, producing 63% of our blue sucker catch. Catch rates for 1" trammel nets were the highest in dam tailwater macrohabitats (1.3 fish / 100m).

Segment 7 - Blue Sucker / Sturgeon Season

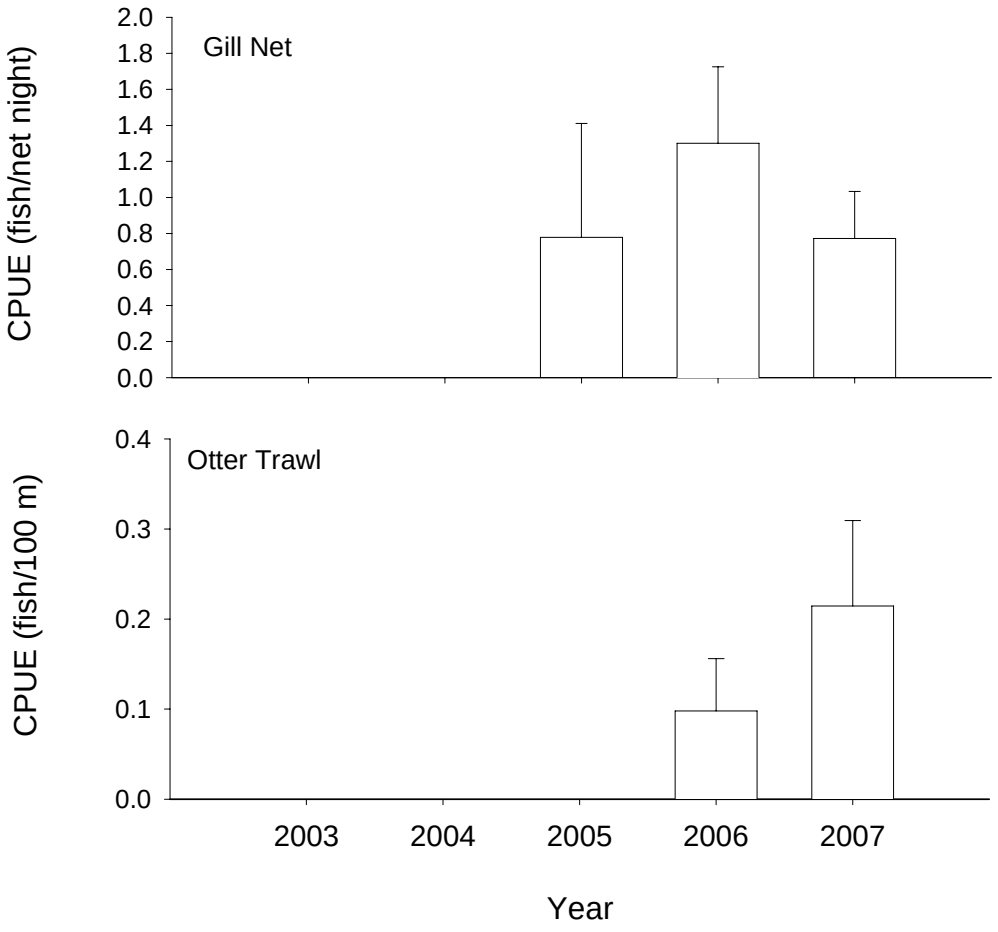

Figure 38. Mean annual catch-per-unit-effort (+/- 2SE) of blue sucker with gill nets and otter trawls in segment 7 of the Missouri River during sturgeon season 2006 - 2007.

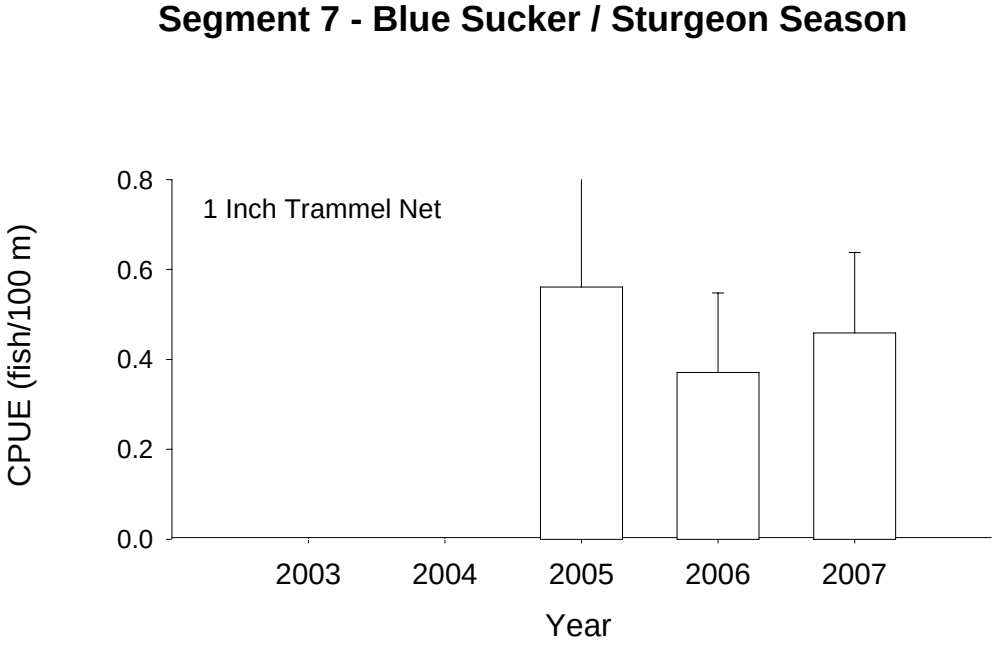

Figure 39. Mean annual catch-per-unit-effort (+/- 2SE) of blue sucker with 1 inch trammel nets in segment 7 of the Missouri River during sturgeon season 2006 - 2007.

Segment 7 - Blue Sucker / Fish Community Season

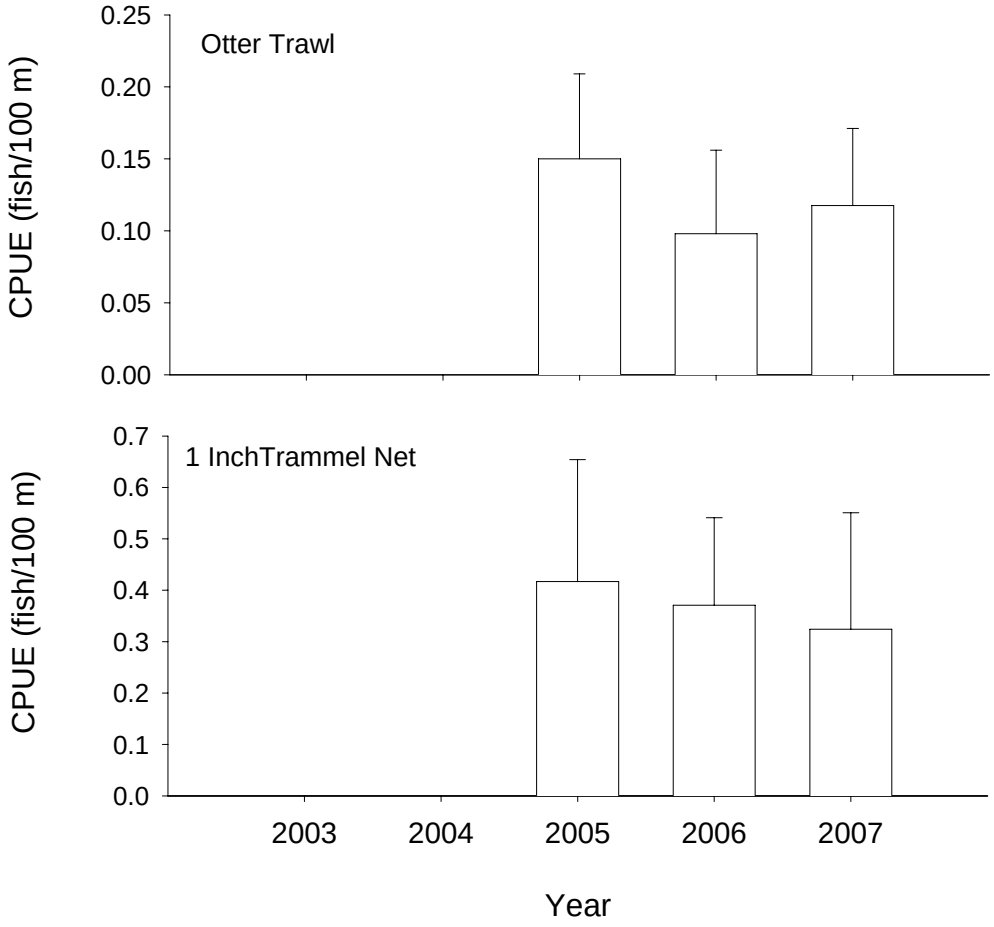

Figure 41. Mean annual catch-per-unit-effort (+/- 2SE) of blue sucker using otter trawls and 1 inch trammel nets in segment 7 of the Missouri River during fish community season 2006 - 2007.

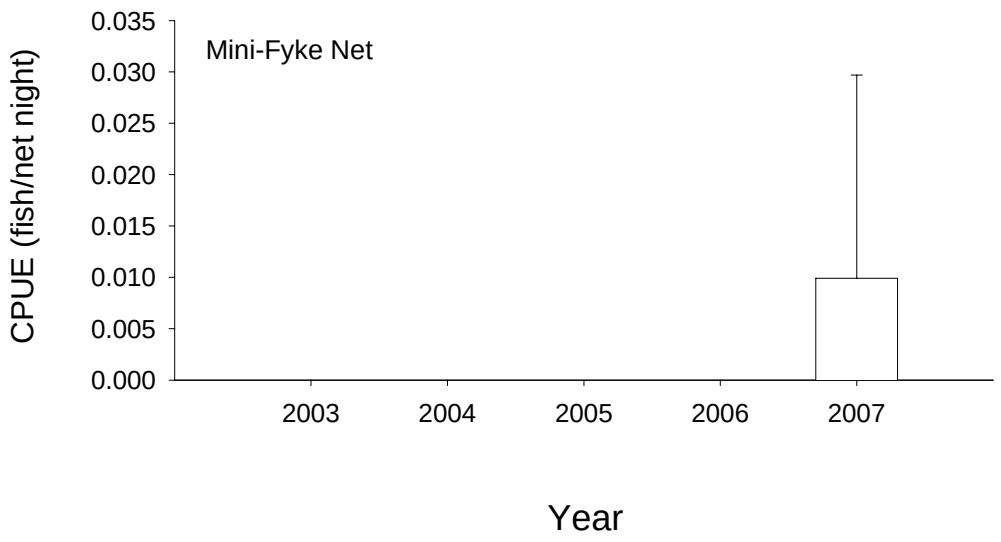

Figure 42. Mean annual catch-per-unit-effort (+/- 2SE) of blue suckers using mini-fyke nets in segment 7 of the Missouri River during fish community season 2006 - 2007.

Table 36. Total number of blue suckers captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	Macrohabitat													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	83	20	7	1	0	0	27	34	1	0	0	0	0	0	10
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	186	27	3	3	0	0	31	26	5	6	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	43	19	2	0	0	0	16	19	7	0	0	0	0	0	37
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	78	21	14	0	0	0	35	17	3	0	0	0	0	0	12
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	1	0	0	0	0	0	100	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	29	28	21	0	0	0	10	38	0	0	0	0	0	0	3
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 37. Total number of blue suckers captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	Mesohabitat					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	83	0	89	10	1	0	0
	.	0	92	4	4	0	0
Gill Net	186	0	39	0	6	54	0
	.	0	75	0	4	21	0
Otter Trawl	43	0	60	37	2	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	78	0	88	12	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	1	100	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	29	0	97	3	0	0	0
	.	0	97	3	0	0	0

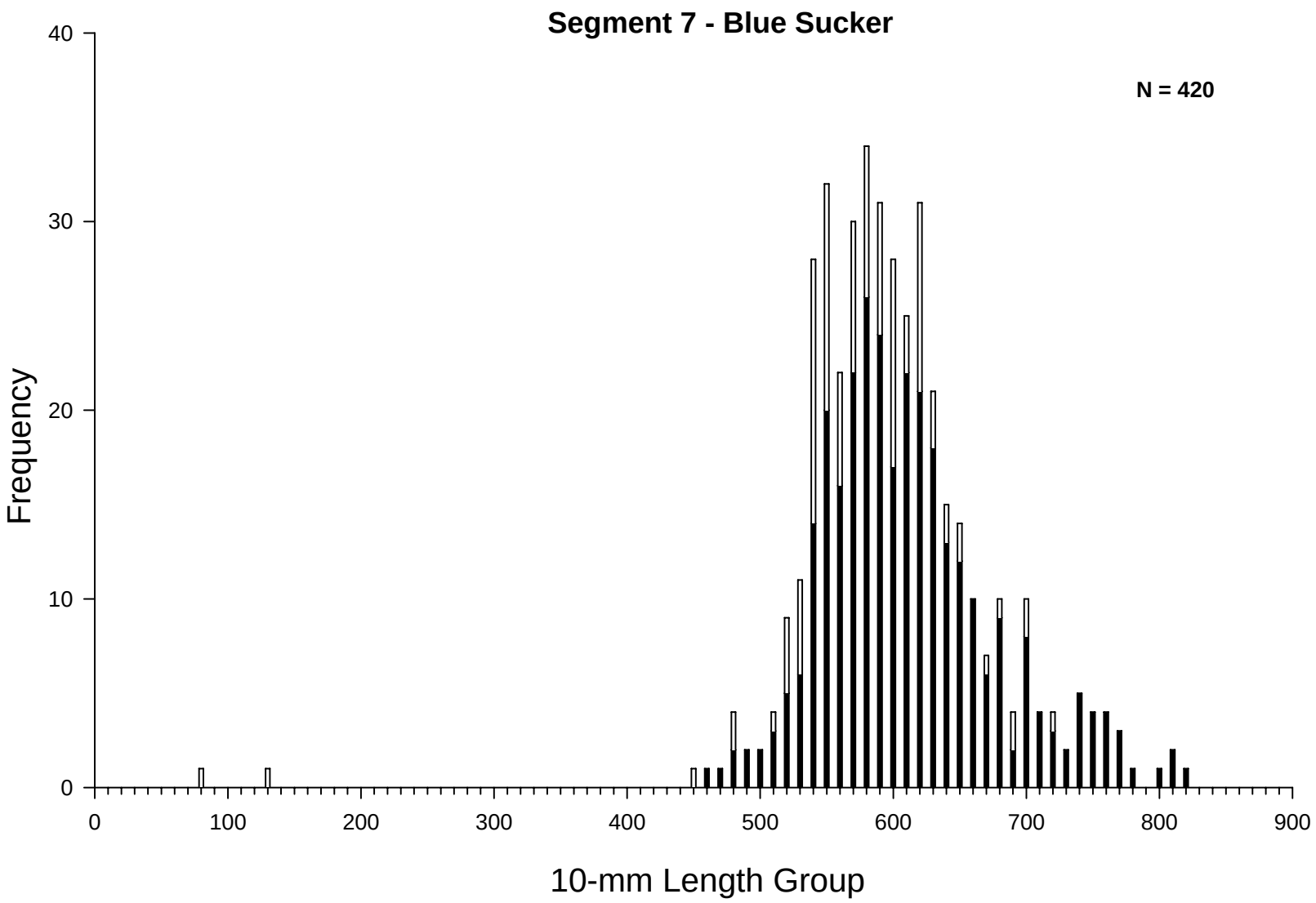

Figure 44. Length frequency of blue suckers during fall through spring (sturgeon season, black bars) and summer (fish community season, white bars) in segment 7 of the Missouri River during 2006 - 2007.

Sauger

A total of 13 saugers were captured in 2007. This is similar to the 2006 catch (n=17). The majority (n=8) of these were captured during the sturgeon season. Trammel nets produced 6 fish, gill nets 5 fish, and otter trawls 2 fish. The saugers ranged in length from 165-506 mm. Given the extensive hybridization and back-crossing among walleye *Sander vitreum*, sauger, and hybrids (saugeye) in this area, we could not confidently differentiate among young-of-year specimens. Hybridization is rampant among adults as well. A total of 94 fish were classified as saugeye in 2007. That number was 78 in 2006.

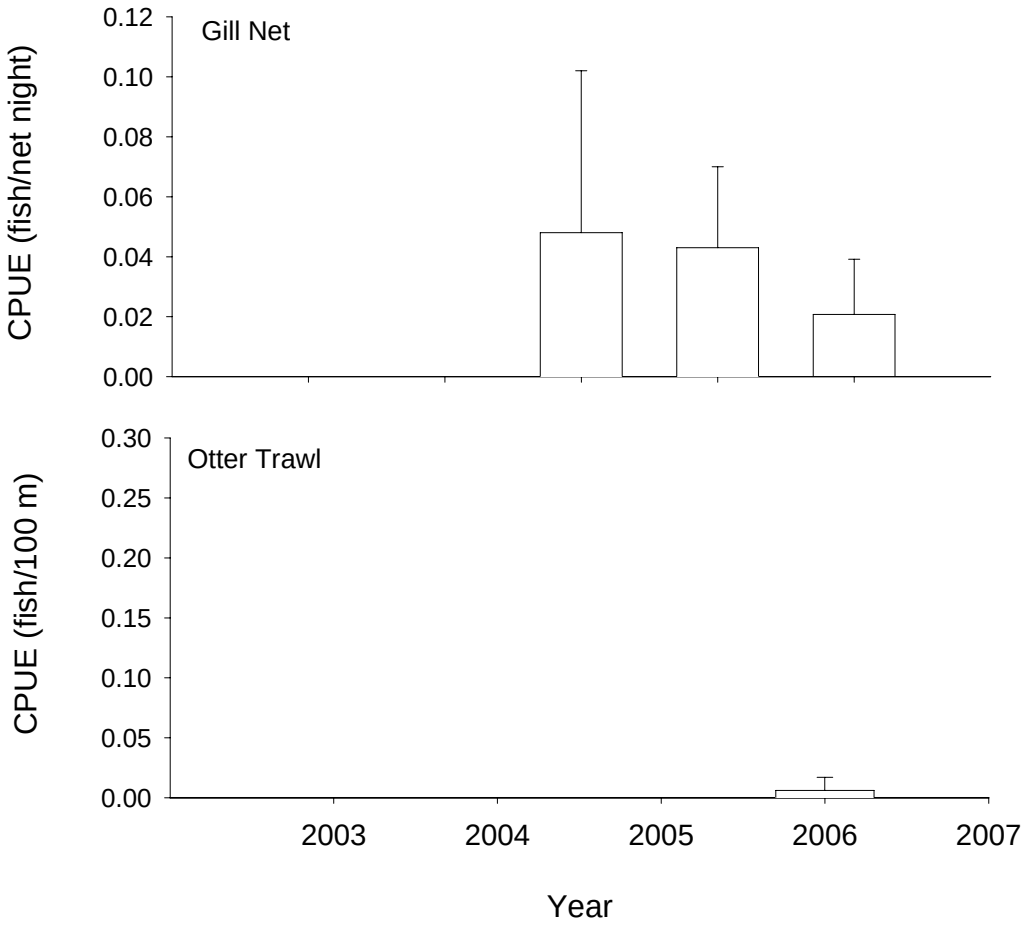

Figure 45. Mean annual catch-per-unit-effort (+/- 2SE) of sauger using gill nets and otter trawls in segment 7 of the Missouri River during sturgeon season 2006 - 2007.

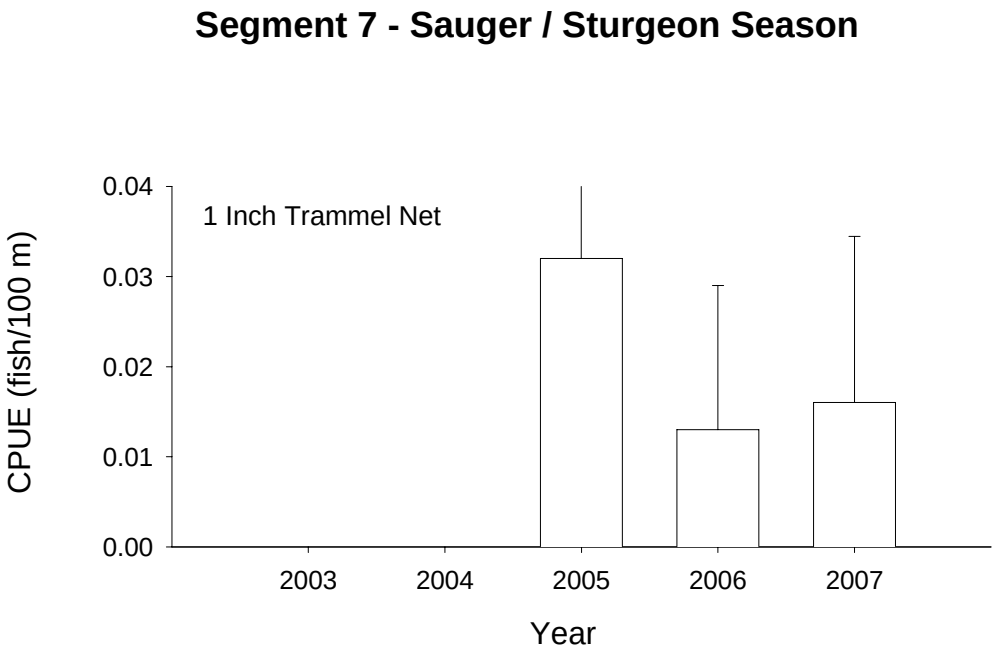

Figure 46. Mean annual catch-per-unit-effort (+/- 2SE) of sauger using 1 and 2.5 inch trammel nets in segment 7 of the Missouri River during sturgeon season 2006 - 2007.

Segment 7 - Sauger / Fish Community Season

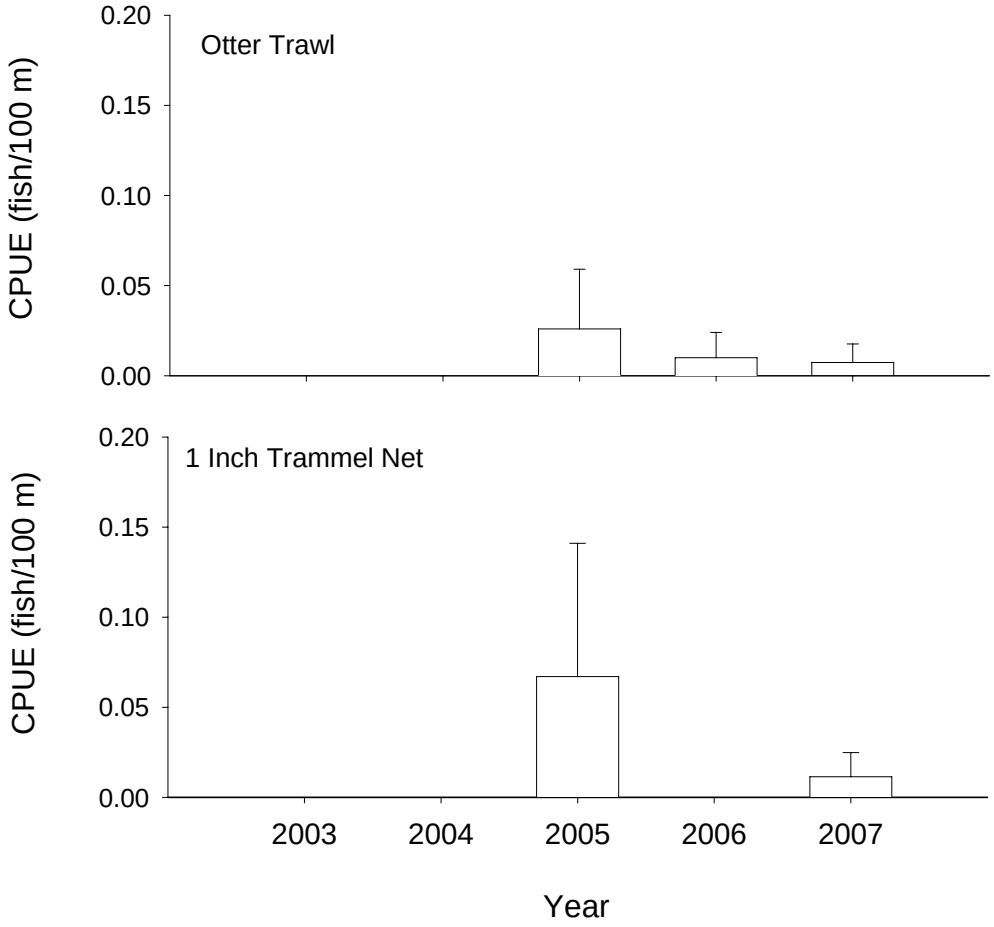

Figure 48. Mean annual catch-per-unit-effort (+/- 2SE) of sauger using otter trawls and 1 inch trammel nets in segment 7 of the Missouri River during fish community season 2006 - 2007.

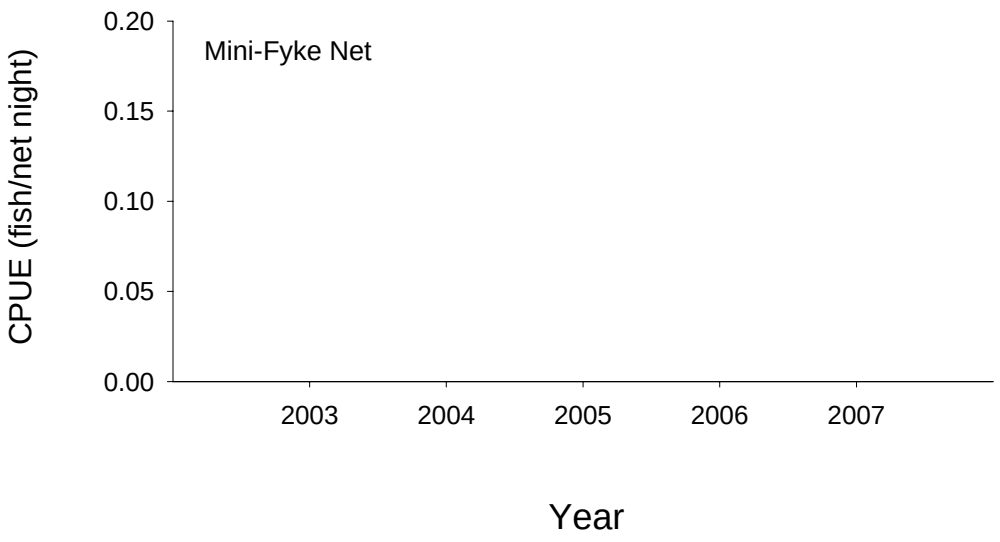

Figure 49. Mean annual catch-per-unit-effort (+/- 2SE) of sauger using mini-fyke nets in segment 7 of the Missouri River during fish community season 2006 - 2007.

Table 38. Total number of saugers captured for each gear during each season and the proportion caught within each macrohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	Macrohabitat													
		BRAD	CHXO	CONF	DEND	DRNG	ISB	OSB	SCCL	SCCS	SCCN	TRIB	TRML	TRMS	WILD
Sturgeon Season (Fall through Spring)															
1 Inch Trammel Net	3	33	33	0	0	0	33	0	0	0	0	0	0	0	0
	.	39	11	3	0	0	18	20	4	1	0	0	0	0	4
Gill Net	5	40	0	0	0	0	20	40	0	0	0	0	0	0	0
	.	37	12	4	0	0	21	19	3	2	0	0	2	0	0
Otter Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	36	13	3	0	0	21	17	8	0	0	0	0	0	3
Fish Community Season (Summer)															
1 Inch Trammel Net	3	33	0	0	0	0	33	33	0	0	0	0	0	0	0
	.	22	18	3	0	0	23	27	5	0	0	0	0	0	3
Mini-Fyke Net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	13	0	2	0	0	24	15	15	22	4	0	4	2	0
Otter Trawl	2	0	0	0	0	0	50	50	0	0	0	0	0	0	0
	.	38	13	1	0	0	20	18	7	0	0	0	0	0	3

Table 39. Total number of saugers captured for each gear during each season and the proportion caught within each mesohabitat type in segment 07 of the Missouri River during 2006 – 2007. The percent of total effort for each gear in each habitat is presented on the second line of each gear type. N-E indicates the habitat is non-existent in the segment.

Gear	N	Mesohabitat					
		BAR	CHNB	DTWT	ITIP	POOL	TLWG
Sturgeon Season (Fall through Spring)							
1 Inch Trammel Net	3	0	100	0	0	0	0
	.	0	92	4	4	0	0
Gill Net	5	0	40	0	0	60	0
	.	0	75	0	4	21	0
Otter Trawl	0	0	0	0	0	0	0
	.	0	94	3	3	0	0
Fish Community Season (Summer)							
1 Inch Trammel Net	3	0	100	0	0	0	0
	.	0	97	3	0	0	0
Mini-Fyke Net	0	0	0	0	0	0	0
	.	95	2	0	0	0	0
Otter Trawl	2	0	100	0	0	0	0
	.	0	97	3	0	0	0

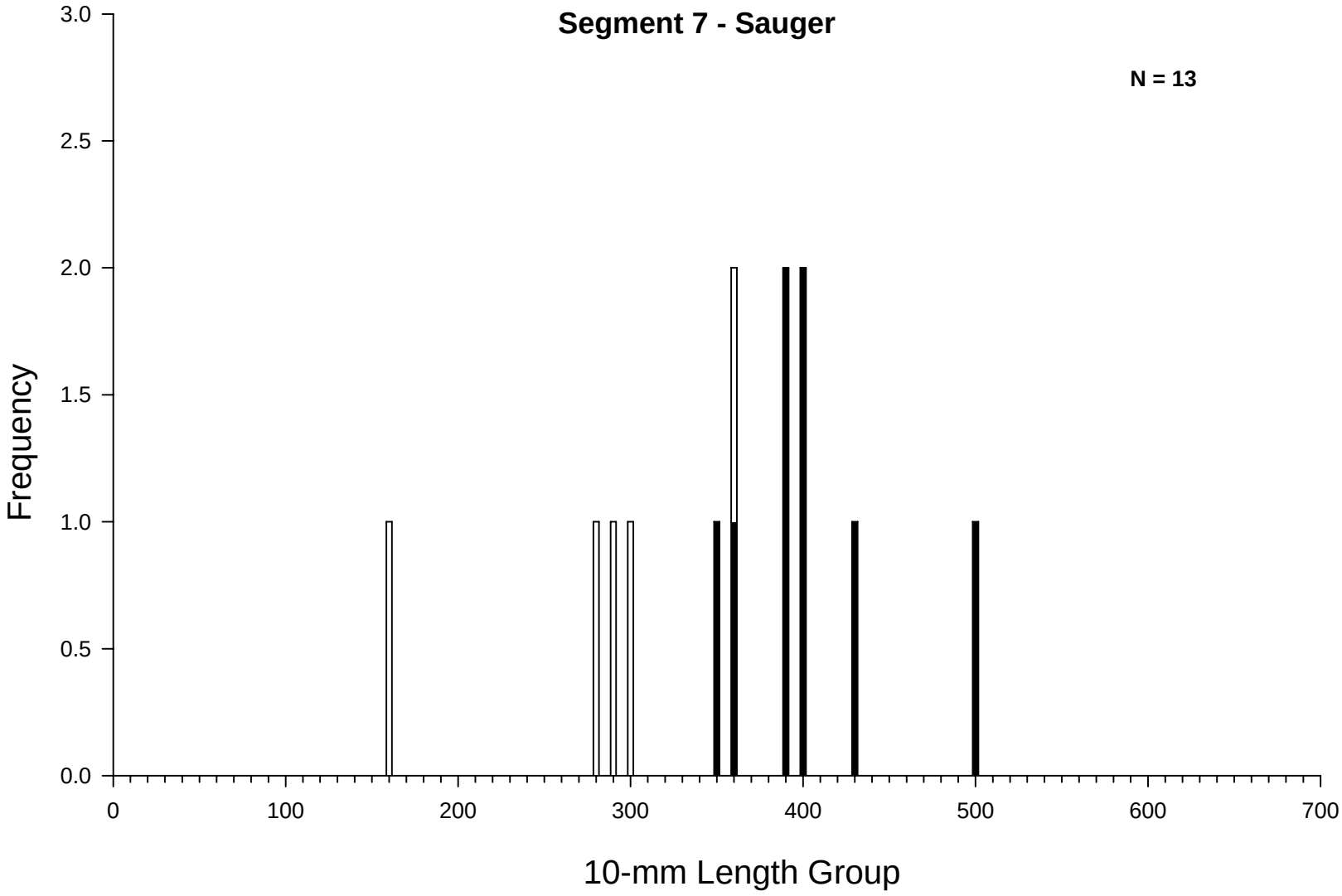

Figure 51. Length frequency of sauger during fall through spring (sturgeon season, black bars) and summer (fish community season, white bars) in segment 7 of the Missouri River during 2006 - 2007.

Missouri River Fish Community

A total of 50 species and 3 hybrids were captured in Segment 7 during the 2007 sampling season. This includes 16,331 individual fish. For 2006 those numbers were 52 species, 1 hybrid, and 11,021 individual fish. The most diversity (54 different species/hybrids) was seen during the fish community season. The sturgeon season yielded 37 different species/hybrids. The most common fish sampled during the fish community season were gizzard shad *Dorosoma cepedianum* (n=1,962), red shiners *Cyprinella lutrensis* (n=992), sand shiners (n= 948), and spotfin shiners *Cyprinella spiloptera* (n= 733). Nearly all of these were sampled in shallow water with mini-fyke nets. Shovelnose sturgeon (N=1,382), channel catfish *Ictalurus punctatus* (n=322), and blue suckers (n=782) were the most common species during the sturgeon season.

All 5 of the gears used during 2007 caught native target species. Large-mesh otter trawls captured 9 of the 10 target fishes with the exception of plains minnows. Mini-Fyke nets had the most diverse overall catch (40 species/hybrids). Trammel nets caught 29 species (including 4 target fishes). Shovelnose sturgeon were the most common (number) fish captured in 1" trammel nets during both the sturgeon season (CPUE = 1.49 fish / 100m) and the fish community season (CPUE = 0.92 fish / 100m).

Saugeye were the most common percid sampled throughout 2007 (n=94). Walleye *Sander vitreum* catches totaled 48 fish. A total of 13 sauger were sampled. It is very likely that there are multiple generations of back-crossing, making it challenging to differentiate between saugers and saugeye. In 2006 those numbers were 78 saugeye, 57 walleye, and 17 sauger.

Several exotic carp were sampled in 2007. We captured 5 bighead carp, 5 grass carp, and 624 common carp. The vast majority of the common carp were Young-of-year caught during the summer. That is a major increase compared to the past 2 years. Only 4 age-zero common carp were caught in 2006 and 132 in 2005. Silver carp were frequently observed jumping near the mouths of the James and Vermillion Rivers during the summer and early fall. Both bighead and silver carp seem very adept at avoiding our current gears. Bighead carp are often spotted in the tailrace area below Gavins Point Dam. Additionally, they are commonly taken by bow fishermen throughout Segment 7. No zebra mussels or were observed in Segment 7 during 2007. Asian clams were found throughout the 59-mile reach.

Through the end of the 2007 season we had the following turtle catches: 137 false map *Graptemys psudogeographica* , 17 smooth softshell *Apalone mutica*, and 1 painted turtle

Chrysemys picta bellii. Those numbers were 48, 14, and 1 in 2006 respectively. Mini-fyke nets accounted for all of the false map catches. No spiny softshell turtles *Apalone spinifera* were captured.

Discussion

Pallid sturgeon catches increased dramatically in 2007. There are several factors this can be attributed to. First, it is partially the result of increased stocking in Segment 7 (see appendix E). After not stocking in 2004 or 2005, over 2,400 fish were stocked in 2006 and 2007 (combined). Over 70% of the fish sampled this year were released in either 2006 or 2007.

Another factor that likely contributed to an increase in pallid captures this year was the flooding of the James River. Several substantial spring rains in the watershed led to prolonged flooding and high flows that lasted well into the summer. This water was noticeably warmer and substantially more turbid than the water in the mainstem Missouri at the confluence of the 2 rivers. Turbidity measurements as high as 653 NTU were observed at the confluence (May 10th). This is much higher than the mean of turbidity measurements (48 NTU) taken in Segment 7 in 2007 (n= 421). Turbidity readings exceeding 100 NTU were recorded in the confluence as late as June 29. The South Dakota crew did not observe similar, prolonged flow conditions in either 2005 or 2006. Of the 83 pallid sturgeon caught in 2007, 54% of them came from either the confluence (n=34) or the tributary mouth (n=11) of the James River.

The third factor contributing to the increased catch was the addition of angling as a sampling gear in 2007. This method accounted for 37 pallid sturgeon (45% of the total catch). Angling was only attempted on 9 days out of the entire 10-month season. Angling allowed the crew to target areas that would be difficult to sample with other gears. Small plunge pools in the turbid water of the James River mouth or confluence were targeted. Pallid sturgeon were the third most common fish caught via angling. Catches included 53 channel catfish, 43 shovelnose sturgeon, and 37 pallid sturgeon. Nightcrawlers were used as bait on each of the 9 days.

Aside from the confluence and tributary mouth of the James River, pallid sturgeon were captured in 5 of the 9 other different macro habitats sampled. Outside bends were the most productive, accounting for 18 fish. Braided areas (n=8), inside bends (n=7), large secondary channels (n=3), and channel crossovers (n=2) all produced pallid sturgeon.

Aside from the James River area, physical habitat data associated with the 9 captures was not very revealing. Measurements varied widely. Turbidity ranged from 11-169 NTU (mean = 76). The mean turbidity for the 9 fish captured in 2006 was 17 NTU. Bottom velocity ranged from 0.01-1.02 mps (mean = 0.51). The mean velocity for the 9 2006 captures was extremely similar (0.49). Capture depths (starting depth) ranged from 1.2 – 3.7m (mean =2.1). The mean

depth for the 9 2006 captures was similar (2.4). Though we may be getting closer, much more data is needed to confidently predict pallid sturgeon locations.

Spatially, 2007 pallid catches did not show the same evidence of unequal distribution in Segment 7 that appeared possibly in 2005 and 2006. After the first 2 sampling years, no pallid sturgeon had been captured between river miles 796 and 763 (roughly between the James and Vermillion River mouths). That 33-mile stretch of river represents 56% of Segment 7. Random sample site selection had resulted in reasonable sampling in the zone. Six bends were sampled within this stretch in 2005 and 5 bends in 2006. Eight pallid sturgeon were captured in this zone during 2007. Catches were definitely concentrated in the stretch of river near the James River mouth in 2007 (mile 800). The 7-mile stretch from mile 802 to 795 produced 65% of the total pallid catch. This area represents only 12% of the length of Segment 7.

Shovelnose sturgeon were captured in 9 different habitats during 2007. Small-mesh trammel net catch rates showed them to be almost equally abundant (based on catch rates) in inside bend (Trammel net CPUE 1.8 fish / 100m), outside bend (1.7 fish / 100m), and braided macro habitats (1.7 fish / 100m). Confluence macrohabits had the best catch rates (2.3 fish / 100m). As with the pallid sturgeon, it is quite possible the shovelnose sturgeon congregated in the warm, turbid waters at the James River confluence.

Catch rates in 2007 show a possible seasonal variation in shovelnose sturgeon abundance. In particular, there appears to be a pulse of fish in the area during the fall to early spring. Small-mesh trammel nets catch rates were the highest in September (2.3 fish / 100 m), March (2.0 fish / 100m), April (1.9 fish / 100m), and October (1.7 fish / 100m). Catch rates were lowest in July (0.7 fish /100m). Other researchers working in the same area noted similar trends in catches (Steve LaBay and Darin Simpkins, personal communication).

Shovelnose sturgeon catches indicated a lack of immature fish in Segment 7. Only 159 of 1,873 (8%) fish were less than 500 mm in length (Figure 17). That is very consistent with the percentage of fish < 500mm in 2006 (8%) and 2005 (9%). This could be the result of a general lack of reproduction/recruitment in Segment 7. It just as likely could indicate that larval sturgeon produced in this area drift downstream into the lower reaches of the river (Kynard et al. 2002). A third explanation is that current gears do not adequately sample young sturgeon. However, downstream crews have had success using these same gears (Doyle et al. 2005, NGPC 2004). Many gravid-looking sturgeon (robust and dark-colored midsection) were observed between March and July, indicating that spawning was possible. The effects of Gavins Point dam has led to a profusion of glacially-derived hard substrate (cobble and boulders) in the upper

10 miles of Segement 7 (USACE 1996). This type of habitat is a potential spawning site for sturgeon (Keenlyne 1989). Altered hydrographs, thermal regimes, and lack of sediment due to the effects of Gavins Point Dam could be affecting sturgeon spawning behavior in Segment 7 (Dryer and Sandvol 1993).

Blue sucker length data shows similarities to shovelnose sturgeon. Mature fish dominated the 2007 catch (Figure 44). Only 11 of 428 (2.5%) fish were less than 500 mm in length. That is similar to the percentage of the same size class from the 2006 (2%) and 2005 (5%) seasons. Relatively high catches of juvenile blue sucker were recorded in Segment 8 during 2006 (Kirk Stephensen, Nebraska Game and Parks Commission. Personal Communication). This indicates that current gears are effective at sampling this age class. Still, little is known about the early-life stages of this fish in the Missouri River.

Very few chubs were sampled in Segment 7 during 2007. Silver chubs were the most common (n=128). We captured only 2 sturgeon, 5 speckled, and 3 sicklefin chubs. All of the chubs (excluding 3 silvers) were sampled in the otter trawl. The low catch numbers may be partially attributable to the difficulty associated with trawling in such a challenging environment. Sand waves, cobble, and constant woody snags may decrease trawl efficiency. It is also possible that the effects of Gavins Point Dam have reduced chub numbers. Reduced turbidity may make these fish more vulnerable to sight-feeding predators (Everett 1999). Hydrograph or thermal modification could have also altered habitat and food availability (Hesse 1994). The same could be said for the *Hybognathus* spp. One was sampled in 2007 and only ten individuals were captured in 2006 (9 in otter trawls and one via hook and line).

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APPENDICES

Appendix A. Phylogenetic list of Missouri River fishes with corresponding letter codes used in the long-term pallid sturgeon and associated fish community sampling program. The phylogeny follows that used by the American Fisheries Society, Common and Scientific Names of Fishes from the United States and Canada, 5th edition. Asterisks and bold type denote targeted native Missouri River species.

Scientific name	Common name	Letter Code
	CLASS CEPHALASPIDOMORPHI-LAMPREYS	
	ORDER PETROMYZONTIFORMES	
	Petromyzontidae – lampreys	
Ichthyomyzon castaneus	Chestnut lamprey	CNLP
Ichthyomyzon fossor	Northern brook lamprey	NBLP
Ichthyomyzon unicuspis	Silver lamprey	SVLP
Ichthyomyzon gagei	Southern brook lamprey	SBLR
Petromyzontidae	Unidentified lamprey	ULY
Petromyzontidae larvae	Unidentified larval lamprey	LVLP
	CLASS OSTEICHTHYES – BONY FISHES	
	ORDER ACIPENSERIFORMES	
	Ascipenseridae – sturgeons	
Acipenser fulvescens	Lake sturgeon	LKSG
Scaphirhynchus spp.	Unidentified Scaphirhynchus	USG
Scaphirhynchus albus	**Pallid sturgeon**	**PDSG***
Scaphirhynchus platorynchus	**Shovelnose sturgeon**	**SNSG***
S. albus X S. platorynchus	Pallid-shovelnose hybrid	SNPD
	Polyodontidae – paddlefishes	
Polyodon spathula	Paddlefish	PDFH
	ORDER LEPISOSTEIFORMES	
	Lepisosteidae – gars	
Lepisosteus oculatus	Spotted gar	STGR
Lepisosteus osseus	Longnose gar	LNGR
Lepisosteus platostomus	Shortnose gar	SNGR
	ORDER AMMIFORMES	
	Amiidae – bowfins	
Amia calva	Bowfin	BWFN
	ORDER OSTEOGLOSSIFORMES	
	Hiodontidae – mooneyes	
Hiodon alosoides	Goldeye	GDEY
Hiodon tergisus	Mooneye	MNEY
	ORDER ANGUILLIFORMES	
	Anguillidae – freshwater eels	
Anguilla rostrata	American eel	AMEL

Appendix A. (continued).

Scientific name	Common name	Lettter Code
	ORDER CLUPEIFORMES	
	Clupeidae – herrings	
Alosa alabame	Alabama shad	ALSD
Alosa chrysochloris	Skipjack herring	SJHR
Alosa pseudoharengus	Alewife	ALWF
Dorosoma cepedianum	Gizzard shad	GZSD
Dorosoma petenense	Threadfin shad	TFSD
D. cepedianum X D. petenense	Gizzard-threadfin shad hybrid	GSTS
	ORDER CYPRINIFORMES	
	Cyprinidae – carps and minnows	
Campostoma anomalum	Central stoneroller	CLSR
Campostoma oligolepis	Largescale stoneroller	LSSR
Carassus auratus	Goldfish	GDFH
Carassus auratus X Cyprinius carpio	Goldfish-Common carp hybrid	GFCC
Couesis plumbens	Lake chub	LKCB
Ctenopharyngodon idella	Grass carp	GSCP
Cyprinella lutrensis	Red shiner	RDSN
Cyprinella spiloptera	Spotfin shiner	SFSN
Cyprinus carpio	Common carp	CARP
Erimystax x-punctatus	Gravel chub	GVCB
Hybognathus argyritis	**Western slivery minnow**	**WSMN***
Hybognathus hankinsoni	Brassy minnow	BSMN
Hybognathus nuchalis	Mississippi silvery minnow	SVMW
Hybognathus placitus	**Plains minnow**	**PNMW***
***Hybognathus* spp.**	**Unidentified Hybognathus**	**HBNS***
Hypophthalmichthys molitrix	Silver carp	SVCP
Hypophthalmichthys nobilis	Bighead carp	BHCP
Luxilus chrysocephalus	Striped shiner	SPSN
Luxilus cornutus	Common shiner	CMSN
Luxilus zonatus	Bleeding shiner	BDSN
Lythrurus unbratilis	Western redfin shiner	WRFS
Macrhybopsis aestivalis	**Speckled chub**	**SKCB***
Macrhybopsis gelida	**Sturgeon chub**	**SGCB***
Macrhybopsis meeki	**Sicklefin chub**	**SFCB***
Macrhybopsis storeriana	Silver chub	SVCB
M. aestivalis X M. gelida	Speckled-Sturgeon chub hybrid	SPST
M. gelida X M. meeki	Sturgeon-Sicklefin chub hybrid	SCSC
Macrhybopsis spp.	Unidentified chub	UHY
Margariscus margarita	Pearl dace	PLDC
Mylocheilus caurinus	Peamouth	PEMT
Nocomis biguttatus	Hornyhead chub	HHCB
Notemigonus crysoleucas	Golden shiner	GDSN
Notropis atherinoides	Emerald shiner	ERSN
Notropis blennius	River shiner	RVSN
Notropis boops	Bigeye shiner	BESN
Notropis buchanani	Ghost shiner	GTSN
Notropis dorsalis	Bigmouth shiner	BMSN
Notropis greenei	Wedgespot shiner	WSSN

Appendix A. (continued).

Scientific name	Common name	Letter Code
	Cyprinidae – carps and minnows	
Notropis heterolepsis	Blacknose shiner	BNSN
Notropis hudsonius	Spottail shiner	STSN
Notropis nubilus	Ozark minnow	OZMW
Notropis rubellus	Rosyface shiner	RYSN
Notropis shumardi	Silverband shiner	SBSN
Notropis stilbius	Silverstripe shiner	SSPS
Notropis stramineus	**Sand shiner**	**SNSN***
Notropis topeka	Topeka shiner	TPSN
Notropis volucellus	Mimic shiner	MMSN
Notropis wickliffi	Channel shiner	CNSN
Notropis spp.	Unidentified shiner	UNO
Opsopoeodus emiliae	Pugnose minnow	PNMW
Phenacobius mirabilis	Suckermouth minnow	SMMW
Phoxinus eos	Northern redbelly dace	NRBD
Phoxinus erythrogaster	Southern redbelly dace	SRBD
Phoxinus neogaeus	Finescale dace	FSDC
Pimephales notatus	Bluntnose minnow	BNMW
Pimephales promelas	Fathead minnow	FHMW
Pimephales vigilas	Bullhead minnow	BHMW
Platygobio gracilis	Flathead chub	FHCB
P. gracilis X M. meeki	Flathead-sicklefin chub hybrid	FCSC
Rhinichthys atratulus	Blacknose dace	BNDC
Rhinichthys cataractae	Longnose dace	LNDC
Richardsonius balteatus	Redside shiner	RDSS
Scardinius erythrophtalmus	Rudd	RUDD
Semotilus atromaculatus	Creek chub	CKCB
	Unidentified Cyprinidae	UCY
	Unidentified Asian Carp	UAC
	Catostomidae - suckers	
Carpiodes carpio	River carpsucker	RVCS
Carpiodes cyprinus	Quillback	QLBK
Carpiodes velifer	Highfin carpsucker	HFCS
Carpiodes spp.	Unidentified Carpiodes	UCS
Catostomus catostomus	Longnose sucker	LNSK
Catostomus commersoni	White sucker	WTSK
Catostomus platyrhyncus	Mountain sucker	MTSK
Catastomus spp.	Unidentified *Catastomus* spp.	UCA
Cycleptus elongates	**Blue sucker**	**BUSK***
Hypentelium nigricans	Northern hog sucker	NHSK
Ictiobus bubalus	Smallmouth buffalo	SMBF
Ictiobus cyprinellus	Bigmouth buffalo	BMBF
Ictiobus niger	Black buffalo	BKBF
Ictiobus spp.	Unidentified buffalo	UBF
Minytrema melanops	Spotted sucker	SPSK
Moxostoma anisurum	Silver redhorse	SVRH
Moxostoma carinatum	River redhorse	RVRH
Moxostoma duquesnei	Black redhorse	BKRH
Moxostoma erythrurum	Golden redhorse	GDRH
Moxostoma macrolepidotum	Shorthead redhorse	SHRH
Moxostoma spp.	Unidentified redhorse	URH

Appendix A. (continued).

Scientific name	Common name	Letter Code
Catostomidae - suckers	Unidentified Catostomidae	UCT
	ORDER SILURIFORMES	
	Ictaluridae – bullhead catfishes	
Ameiurus melas	Black bullhead	BKBH
Ameiurus natalis	Yellow bullhead	YLBH
Ameiurusnebulosus	Brown bullhead	BRBH
Ameiurus spp.	Unidentified bullhead	UBH
Ictalurus furcatus	Blue catfish	BLCF
Ictalurus punctatus	Channel catfish	CNCF
I. furcatus X I. punctatus	Blue-channel catfish hybrid	BCCC
Ictalurus spp.	Unidentified *Ictalurus* spp.	UCF
Noturus exilis	Slender madtom	SDMT
Noturus flavus	Stonecat	STCT
Noturus gyrinus	Tadpole madtom	TPMT
Noturus nocturnes	Freckled madtom	FKMT
Pylodictis olivaris	Flathead catfish	FHCF
	ORDER SALMONIFORMES	
	Esocidae - pikes	
Esox americanus vermiculatus	Grass pickerel	GSPK
Esox lucius	Northern pike	NTPK
Esox masquinongy	Muskellunge	MSKG
E. lucius X E. masquinongy	Tiger Muskellunge	TGMG
	Umbridae - mudminnows	
Umbra limi	Central mudminnow	MDMN
	Osmeridae - smelts	
Osmerus mordax	Rainbow smelt	RBST
	Salmonidae - trouts	
Coregonus artedi	Lake herring or cisco	CSCO
Coregonus clupeaformis	Lake whitefish	LKWF
Oncorhynchus aguabonita	Golden trout	GDTT
Oncorhynchus clarki	Cutthroat trout	CTTT
Oncorhynchus kisutch	Coho salmon	CHSM
Oncorhynchus mykiss	Rainbow trout	RBTT
Oncorhynchus nerka	Sockeye salmon	SESM
Oncorhynchus tshawytscha	Chinook salmon	CNSM
Prosopium cylindraceum	Bonniville cisco	BVSC
Prosopium williamsoni	Mountain whitefish	MTWF
Salmo trutta	Brown trout	BNTT
Salvelinus fontinalis	Brook trout	BKTT
Salvelinus namaycush	Lake trout	LKTT
Thymallus arcticus	Arctic grayling	AMGL

Appendix A. (continued).

Scientific name	Common name	Letter Code
	ORDER PERCOPSIFORMES	
	Percopsidae – trout-perches	
Percopsis omiscomaycus	Trout-perch	TTPH
	ORDER GADIFORMES	
	Gadidae - cods	
Lota lota	Burbot	BRBT
	ORDER ATHERINIFORMES	
	Cyprinodontidae - killifishes	
Fundulus catenatus	Northern studfish	NTSF
Fundulus daphanus	Banded killifish	BDKF
Fundulus notatus	Blackstripe topminnow	BSTM
Fundulus olivaceus	Blackspotted topminnow	BPTM
Fundulus sciadicus	Plains topminnow	PTMW
Fundulus zebrinus	Plains killifish	PKLF
	Poeciliidae - livebearers	
Gambusia affinis	Western mosquitofish	MQTF
	Atherinidae - silversides	
Labidesthes sicculus	Brook silverside	BKSS
	ORDER GASTEROSTEIFORMES	
	Gasterosteidae - sticklebacks	
Culea inconstans	Brook stickleback	BKSB
	ORDER SCORPAENIFORMES	
	Cottidae - sculpins	
Cottus bairdi	Mottled sculpin	MDSP
Cottus carolinae	Banded sculpin	BDSP
	ORDER PERCIFORMES	
	Percichthyidae – temperate basses	
Morone Americana	White perch	WTPH
Morone chrysops	White bass	WTBS
Morone mississippiensis	Yellow bass	YWBS
Morone saxatilis	Striped bass	SDBS
M. saxatilis X M. chrysops	Striped-white bass hybrid	SBWB
	Centrarchidae - sunfishes	
Ambloplites rupestris	Rock bass	RKBS
Archoplites interruptus	Sacremento perch	SOPH
Lepomis cyanellus	Green sunfish	GNSF
Lepomis gibbosus	Pumpkinseed	PNSD
Lepomis gulosus	Warmouth	WRMH
Lepomis humilis	Orangespotted sunfish	OSSF
Lepomis macrochirus	Bluegill	BLGL
Lepomis magalotis	Longear sunfish	LESF
Lepomis microlophus	Redear sunfish	RESF
L. cyanellus X L. macrochirus	Green sunfish-bluegill hybrid	GSBG

Appendix A. (continued).

Scientific name	Common name	Letter Code
	Centrarchidae - sunfishes	
L. cyanellus X L. humilis	Green-orangespotted sunfish hybrid	GSOS
L. macrochirus X L. microlophus	Bluegill-redear sunfish hybrid	BGRE
Lepomis spp.	Unidentified *Lepomis*	ULP
Micropterus dolomieu	Smallmouth bass	SMBS
Micropterus punctatus	Spotted sunfish	STBS
Micropterus salmoides	Largemouth bass	LMBS
Micropterus spp.	Unidentified *Micropterus* spp.	UMC
Pomoxis annularis	White crappie	WTCP
Pomoxis nigromaculatus	Black crappie	BKCP
Pomoxis spp.	Unidentified crappie	UCP
P. annularis X P. nigromaculatus	White-black crappie hybrid	WCBC
Centrarchidae	Unidentified centrarchid	UCN
	Percidae - perches	
Ammocrypta asprella	Crystal darter	CLDR
Etheostoma blennioides	Greenside darter	GSDR
Etheostoma caeruleum	Rainbow darter	RBDR
Etheostoma exile	Iowa darter	IODR
Etheostoma flabellare	Fantail darter	FTDR
Etheostoma gracile	Slough darter	SLDR
Etheostoma microperca	Least darter	LTDR
Etheostoma nigrum	Johnny darter	JYDR
Etheostoma punctulatum	Stippled darter	STPD
Etheostoma spectabile	Orangethroated darter	OTDR
Etheostoma tetrazonum	Missouri saddled darter	MSDR
Etheostoma zonale	Banded darter	BDDR
Etheostoma spp.	Unidentified Etheostoma spp.	UET
Perca flavescens	Yellow perch	YWPH
Percina caproides	Logperch	LGPH
Percina cymatotaenia	Bluestripe darter	BTDR
Percina evides	Gilt darter	GLDR
Percina maculate	Blackside darter	BSDR
Percina phoxocephala	Slenderhead darter	SHDR
Percina shumardi	River darter	RRDR
Percina spp.	Unidentified Percina spp.	UPN
	Unidentified darter	UDR
Sander canadense	**Sauger**	**SGER***
Sander vitreus	Walleye	WLEY
S. canadense X S. vitreus	Sauger-walley hybrid/Saugeye	SGWE
Sander spp.	Unidentified *Sander* (formerly *Stizostedion*) spp.	UST
	Unidentified Percidae	UPC
	Sciaenidae - drums	
Aplodinotus grunniens	Freshwater drum	FWDM
	NON-TAXONOMIC CATEGORIES	
	Age-0/Young-of-year fish	YOYF
	Lab fish for identification	LAB
	No fish caught	NFSH
	Unidentified larval fish	LVFS
	Unidentified	UNID
	Net Malfunction (Did Not Fish)	NDNF

Appendix B. Definitions and codes used to classify standard Missouri River habitats in the long-term pallid sturgeon and associated fish community sampling program. Three habitat scales were used in the hierarchical habitat classification system: Macrohabitats, Mesohabitats, and Microhabitats.

Habitat	Scale	Definition	Code
Braided channel	Macro	An area of the river that contains multiple smaller channels and is lacking a readily identifiable main channel (typically associated with unchannelized sections)	BRAD
Main channel cross over	Macro	The inflection point of the thalweg where the thalweg crosses from one concave side of the river to the other concave side of the river, (i.e., transition zone from one-bend to the next bend). The upstream CHXO for a respective bend is the one sampled.	CHXO
Tributary confluence	Macro	Area immediately downstream, extending up to one bend in length, from a junction of a large tributary and the main river where this tributary has influence on the physical features of the main river	CONF
Dendric	Macro	An area of the river where the river transitions from meandering or braided channel to more of a treelike pattern with multiple channels (typically associated with unchannelized sections)	DEND
Deranged	Macro	An area of the river where the river transitions from a series of multiple channels into a meandering or braided channel (typically associated with unchannelized sections)	DRNG
Main channel inside bend	Macro	The convex side of a river bend	ISB
Main channel outside bend	Macro	The concave side of a river bend	OSB
Secondary channel-connected large	Macro	A side channel, open on upstream and downstream ends, with less flow than the main channel, large indicates this habitat can be sampled with trammel nets and trawls based on width and/or depths > 1.2 m	SCCL
Secondary channel-connected small	Macro	A side channel, open on upstream and downstream ends, with less flow than the main channel, small indicates this habitat cannot be sampled with trammel nets and trawls based on width and/or on depths < 1.2 m	SCCS
Secondary channel-non-connected	Macro	A side channel that is blocked at one end	SCCN
Tributary	Macro	Any river or stream flowing in the Missouri River	TRIB
Tributary large mouth	Macro	Mouth of entering tributary whose mean annual discharge is > 20 m^3/s, and the sample area extends 300 m into the tributary	TRML
Tributary small mouth	Macro	Mouth of entering tributary whose mean annual discharge is < 20 m^3/s, mouth width is > 6 m wide and the sample area extends 300 m into the tributary	TRMS
Wild	Macro	All habitats not covered in the previous habitat descriptions	WILD
Bars	Meso	Sandbar or shallow bank-line areas with depth < 1.2 m	BARS
Pools	Meso	Areas immediately downstream from sandbars, dikes, snags, or other obstructions with a formed scour hole > 1.2 m	POOL
Channel border	Meso	Area in the channelized river between the toe and the thalweg, area in the unchannelized river between the toe and the maximum depth	CHNB
Dam Tailwaters	Meso	Area below dam	DTWT
Thalweg	Meso	Main channel between the channel borders conveying the majority of the flow	TLWG
Island tip	Meso	Area immediately downstream of a bar or island where two channels converge with water depths > 1.2 m	ITIP

Appendix C. List of standard and wild gears (type), their corresponding codes in the database, seasons deployed (Fall-Spring, Summer, or all), years used, and catch-per-unit-effort units for collection of Missouri River fishes in segment 7 for the long-term pallid sturgeon and associated fish community sampling program. Long-term monitoring began in 2005 for segment 7.

Gear	Code	Type	Season	Years	CPUE units
Gillnet – 4 meshes, small mesh set upstream	GN14	Standard	Sturgeon	2003 - Present	fish/net night
Gillnet – 4 meshes, large mesh set upstream	GN41	Standard	Sturgeon	2003 - Present	fish/net night
Gillnet – 8 meshes, small mesh set upstream	GN18	Standard	Sturgeon	2003 - Present	fish/net night
Gillnet – 8 meshes, large mesh set upstream	GN81	Standard	Sturgeon	2003 - Present	fish/net night
Mini-fyke net	MF	Standard	Fish Comm.	2003 - Present	fish/net night
Push Trawl – 8 ft 4mm x 4mm	POT02	Evaluation	Fish Comm.	2006 - Present	fish/ m trawled
Trammel net – 1 inch inner mesh	TN	Standard	All	2003 - Present	fish/100 m drift
Trot Line – Circle hooks**	TLC_	Wild	Sturgeon	2007 - Present	fish/hook night
Trot Line – Octopus hooks**	TLO_	Wild	Sturgeon	2007 - Present	fish/hook night
Trot Line – O'Shaughnessy hooks**	TLS_	Wild	Sturgeon	2007 - Present	fish/hook night
Otter trawl – 16 ft head rope	OT16	Standard	All	2003 - Present	fish/100 m trawled
Otter trawl – 16 ft SKT 4mm x 4mm HB2 MOR	OT01	Wild	Fish Comm.	2006 - Present	fish/100 m trawled

* Standard only in upper Missouri River segments

** Code ends with line length in feet (1 = 105 ft, 2 = 205 ft, 3 = 305 ft, 4 = 405 ft). Hooks are placed between 5 and 10 feet apart.

Appendix D. Stocking locations and codes for pallid sturgeon by Recovery Priority Management Area (RPMA) in the Missouri River Basin.

State(s)	RPMA	Site Name	Code	River	RM
MT	2	Forsyth	FOR	Yellowstone	253.2
MT	2	Cartersville	CAR	Yellowstone	235.3
MT	2	Miles City	MIC	Yellowstone	181.8
MT	2	Fallon	FAL	Yellowstone	124.0
MT	2	Intake	INT	Yellowstone	70.0
MT	2	Sidney	SID	Yellowstone	31.0
MT	2	Big Sky Bend	BSB	Yellowstone	17.0
ND	2	Fairview	FRV	Yellowstone	9.0
MT	2	Milk River	MLK	Milk	11.5
MT	2	Mouth of Milk	MOM	Missouri	1761.5
MT	2	Grand Champs	GRC	Missouri	1741.0
MT	2	Wolf Point	WFP	Missouri	1701.5
MT	2	Poplar	POP	Missouri	1649.5
MT	2	Brockton	BRK	Missouri	1678.0
MT	2	Culbertson	CBS	Missouri	1621.0
MT	2	Nohly Bridge	NOB	Missouri	1590.0
ND	2	Confluence	CON	Missouri	1581.5
SD/NE	3	Sunshine Bottom	SUN	Missouri	866.2
SD/NE	3	Verdel Boat Ramp	VER	Missouri	855.0
SD/NE	3	Standing Bear Bridge	STB	Missouri	845.0
SD/NE	3	Running Water	RNW	Missouri	840.1
SD/NE	4	St. Helena	STH	Missouri	799.0
SD/NE	4	Mullberry Bend	MUL	Missouri	775.0
NE/IA	4	Ponca State Park	PSP	Missouri	753.0
NE/IA	4	Sioux City	SIO	Missouri	732.6
NE/IA	4	Sloan	SLN	Missouri	709.0
NE/IA	4	Decatur	DCT	Missouri	691.0
NE/IA	4	Boyer Chute	BYC	Missouri	637.4
NE/IA	4	Bellevue	BEL	Missouri	601.4
NE/IA	4	Rulo	RLO	Missouri	497.9
NE/MO/KS	4	Kansas River	KSR	Missouri	367.5
NE	4	Platte River	PLR	Platte	5.0
KA/MO	4	Leavenworth	LVW	Missouri	397.0
MO	4	Parkville	PKV	Missouri	377.5
MO	4	Kansas City	KAC	Missouri	342.0
MO	4	Miami	MIA	Missouri	262.8
MO	4	Grand River	GDR	Missouri	250.0
MO	4	Boonville	BOO	Missouri	195.1
MO	4	Overton	OVT	Missouri	185.1
MO	4	Hartsburg	HAR	Missouri	160.0

MO	4	Jefferson City	JEF	Missouri	143.9
MO	4	Mokane	MOK	Missouri	124.7
MO	4	Hermann	HER	Missouri	97.6
MO	4	Washington	WAS	Missouri	68.5
MO	4	St. Charles	STC	Missouri	28.5

Appendix E. Juvenile and adult pallid sturgeon stocking summary for segment 7 of the Missouri River (RPMA 4)

Year	Stocking Site	Number Stocked	Year Class	Stock Date	Age at Stocking[a]	Primary Mark	Secondary Mark
2002	St. Helena	280	2001	4/3/02	Yearling	PIT Tag	
2002	Mulberry Bend	321	2001	4/3/02	Yearling	PIT Tag	
2002	Mulberry Bend	1855	2001	6/26/01	Yearling	PIT Tag	
2002	Ponca St Pk	28	1997	4/23/02	5	PIT Tag	Elastomere
2002	Ponca St Pk	28	2001	6/26/01	Yearling	PIT Tag	
2002	Ponca St Pk	180	1999	4/23/02	3	PIT Tag	
2003	Mulberry Bend	1166	2002	6/22/02	Yearling	PIT Tag	Elastomere
2003	Mulberry Bend	2069	2002	6/22/06	Yearling	PIT Tag	
2003	Mulberry Bend	1763	2003	6/25/03	Fingerling	Coded Wire Tag	Elastomere
2003	Ponca St Pk	7	1997	4/23/03	5	PIT Tag	Elastomere
2006	Ponca St Pk	15	2004	5/9/06	2	PIT Tag	
2006	St. Helena	610	2005	9/1/2006	Yearling	PIT Tag	Elastomere
2007	St. Helena	950	2006	5/9/2007	Yearling	Scute	Elastomere
2007	Mulberry Bend	907	2006	5/10/2007	Yearling	Scute	Elastomere

[a]Age of fish when stocked: Fry, Fingerling, Yearling, 1yo, 2yo, 3yo, etc…

Appendix F

Total catch, overall mean catch per unit effort [± 2 SE], and mean CPUE (fish/100 m) by Mesohabitat within a Macrohabitat for all species caught with each gear type during sturgeon season and fish community season for segment 7 of the Missouri River during 2006-2007. Species captured are listed alphabetically and their codes are presented in Appendix A. Asterisks with bold type indicate targeted native Missouri River species and habitat abbreviations are presented in Appendix B. Standard Error was not calculated when N < 2.

Appendix F1. Gill Net: overall season and segment summary. Lists CPUE (fish/net night) and 2 standard errors on second line.

Species	Total Catch	Overall CPUE	BRAD			CHXO	CONF	ISB		OSB		SCCL	SCCS	TRML
			CHNB	ITIP	POOL	CHNB	CHNB	CHNB	POOL	CHNB	POOL	CHNB	ITIP	CHNB
BHCP	2	0.008	0	0	0	0	0	0	0	0	0	0	0.5	0
		0.017	0	0	0	0	0	0	0	0	0	0	1	0
BKBH	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
BKCP	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
BLGL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
BMBF	1	0.004	0	0	0	0	0.1	0	0	0	0	0	0	0
		0.008	0	0	0	0	0.2	0	0	0	0	0	0	0
BMSN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
BSMW*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
BUSK*	**186**	**0.772**	**0.429**	**0.167**	**0.963**	**0.167**	**0.5**	**0.526**	**2.846**	**0.286**	**3.8**	**1.125**	**2.75**	**0**
		0.261	**0.288**	**0.333**	**0.802**	**0.168**	**0.447**	**0.425**	**2.916**	**0.194**	**2.491**	**1.278**	**3.202**	**0**
CARP	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
CNCF	34	0.141	0.089	0.167	0.148	0.1	0	0	0	0	0.2	0.875	0	3
		0.113	0.092	0.333	0.176	0.2	0	0	0	0	0.267	0.959	0	6
ERSN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
FHCF	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
FHMW	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
FSMT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
FWDM	2	0.008	0	0	0	0	0	0	0	0	0.1	0.125	0	0
		0.012	0	0	0	0	0	0	0	0	0.2	0.25	0	0
GDEY	142	0.589	0.107	0.5	1.148	0.033	0.1	0.079	1.462	0	1.2	5.375	0.25	5.5
		0.293	0.132	0.683	0.706	0.067	0.2	0.116	1.658	0	1.222	5.277	0.5	9.11
GNSF	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
GSBG	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
GSCP	4	0.017	0.036	0	0	0	0	0.026	0	0	0	0.125	0	0
		0.02	0.071	0	0	0	0	0.053	0	0	0	0.25	0	0
GSOS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0

Species	Total Catch	Overall CPUE	BRAD			CHXO	CONF	ISB		OSB		SCCL	SCCS	TRML
			CHNB	ITIP	POOL	CHNB	CHNB	CHNB	POOL	CHNB	POOL	CHNB	ITIP	CHNB
GTSN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
GZSD	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
HFCS	8	0.033	0	0	0.259	0	0	0	0.077	0	0	0	0	0
		0.059	0	0	0.519	0	0	0	0.154	0	0	0	0	0
JYDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
LMBS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
LNDC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
LNGR	22	0.091	0	0	0	0	0.1	0.026	0.077	0	0	2.375	0	0
		0.109	0	0	0	0	0.2	0.053	0.154	0	0	2.999	0	0
LVFS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
MMSN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
NTPK	2	0.008	0	0	0	0	0	0	0.154	0	0	0	0	0
		0.012	0	0	0	0	0	0	0.208	0	0	0	0	0
OSSF	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
PATT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
PDFH	11	0.046	0	0	0	0	0	0	0.077	0.029	0.1	0.875	0	0.25
		0.041	0	0	0	0	0	0	0.154	0.057	0.2	1.031	0	0.5
PDSG*	**2**	**0.008**	**0**	**0**	**0.037**	**0**	**0**	**0**	**0**	**0**	**0.1**	**0**	**0**	**0**
		0.012	**0**	**0**	**0.074**	**0**	**0**	**0**	**0**	**0**	**0.2**	**0**	**0**	**0**
QLBK	11	0.046	0	0.167	0.259	0	0	0.026	0.077	0	0	0.125	0	0
		0.06	0	0.333	0.519	0	0	0.053	0.154	0	0	0.25	0	0
RDSN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
RVCS	26	0.108	0.018	0.167	0.259	0	0	0.026	0.231	0	0	1.625	0	0
		0.1	0.036	0.333	0.448	0	0	0.053	0.243	0	0	2.448	0	0
SFCB*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
SFSN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
SGCB*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Species	Total Catch	Overall CPUE	BRAD			CHXO	CONF	ISB		OSB		SCCL	SCCS	TRML
			CHNB	ITIP	POOL	CHNB	CHNB	CHNB	POOL	CHNB	POOL	CHNB	ITIP	CHNB
SGER*	**5**	**0.021**	**0.018**	**0**	**0.037**	**0**	**0**	**0**	**0.077**	**0.029**	**0.1**	**0**	**0**	**0**
		0.018	**0.036**	**0**	**0.074**	**0**	**0**	**0**	**0.154**	**0.057**	**0.2**	**0**	**0**	**0**
SGWE	22	0.091	0.054	0.167	0.259	0	0.3	0	0.077	0.029	0.3	0.25	0	0.25
		0.047	0.061	0.333	0.229	0	0.6	0	0.154	0.057	0.427	0.327	0	0.5
SHRH	19	0.079	0.036	0.167	0.148	0.033	0	0.053	0.077	0.057	0.1	0.5	0	0.25
		0.04	0.05	0.333	0.232	0.067	0	0.073	0.154	0.08	0.2	0.378	0	0.5
SKCB*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	0	0	0	0	0	0	0	0	0	0	0	0
SMBF	8	0.033	0	0.333	0	0	0	0	0.077	0	0	0.625	0	0
		0.031	0	0.667	0	0	0	0	0.154	0	0	0.648	0	0
SMBS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
SMST	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
SNGR	20	0.083	0	0	0	0	0	0.026	0.538	0	0	1.5	0	0
		0.087	0	0	0	0	0	0.053	0.804	0	0	2.104	0	0
SNPD	2	0.008	0	0	0	0.033	0	0	0	0	0	0.125	0	0
		0.012	0	0	0	0.067	0	0	0	0	0	0.25	0	0
SNSG*	**743**	**3.083**	**1.857**	**2.167**	**7.778**	**0.533**	**6**	**1.737**	**6.769**	**0.714**	**8.7**	**0.875**	**13.25**	**3.5**
		0.885	**1.354**	**2.333**	**4.289**	**0.404**	**4.442**	**1.022**	**5.765**	**0.334**	**5.121**	**0.959**	**23.2**	**4.726**
SNSN*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
STSN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
SVCB	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
UCA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
UCN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
UCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
UCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
ULP	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
UNO	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
UPM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0

Species	Total Catch	Overall CPUE	BRAD			CHXO	CONF	ISB		OSB		SCCL	SCCS	TRML
			CHNB	ITIP	POOL	CHNB	CHNB	CHNB	POOL	CHNB	POOL	CHNB	ITIP	CHNB
UPN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
WLYE	8	0.033	0	0	0	0	0	0	0.231	0	0.1	0.25	0	0.5
		0.028	0	0	0	0	0	0	0.332	0	0.2	0.327	0	1
WTBS	1	0.004	0	0	0	0	0	0	0.077	0	0	0	0	0
		0.008	0	0	0	0	0	0	0.154	0	0	0	0	0
WTCP	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0
YWPH	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix F2. 1 Inch Trammel Net: overall season and segment summary. Lists CPUE (fish/100 m) and 2 standard errors on second line.

Species	Total Catch	Overall CPUE	BRAD		CHXO	CONF	ISB	OSB	SCCL	SCCS	WILD
			CHNB	ITIP	CHNB	CHNB	CHNB	CHNB	CHNB	ITIP	DTWT
BHCP	2	0.004	0.007	0	0	0	0	0.009	0	0	0
		0.006	0.014	0	0	0	0	0.018	0	0	0
BKBH	1	0.002	0.008	0	0	0	0	0	0	0	0
		0.005	0.016	0	0	0	0	0	0	0	0
BKCP	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
BLGL	4	0.01	0	0	0.011	0	0	0.023	0	0	0.083
		0.01	0	0	0.022	0	0	0.032	0	0	0.167
BMBF	2	0.005	0.009	0	0.017	0	0	0	0	0	0
		0.007	0.017	0	0.034	0	0	0	0	0	0
BMSN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
BSMW*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
BUSK*	**161**	**0.383**	**0.255**	**0.145**	**0.246**	**0.068**	**0.58**	**0.414**	**0.153**	**0**	**1.309**
		0.149	**0.162**	**0.29**	**0.137**	**0.136**	**0.587**	**0.261**	**0.167**	**0**	**0.874**
CARP	8	0.021	0.051	0	0	0.075	0	0.015	0	0	0
		0.018	0.055	0	0	0.15	0	0.031	0	0	0
CNCF	240	0.601	0.581	0	0.505	1.211	0.692	0.519	0.489	0	0.951
		0.155	0.342	0	0.302	1.075	0.398	0.249	0.334	0	0.825
ERSN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
FHCF	1	0.002	0	0	0	0	0	0.011	0	0	0
		0.005	0	0	0	0	0	0.022	0	0	0
FHMW	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
FSMT	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
FWDM	10	0.023	0.007	0	0	0.233	0.036	0.023	0	0	0
		0.017	0.013	0	0	0.252	0.055	0.032	0	0	0
GDEY	78	0.183	0.243	1.246	0.034	0.373	0.138	0.156	0.288	0	0
		0.061	0.14	1.582	0.048	0.445	0.082	0.12	0.244	0	0
GNSF	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0

Species	Total Catch	Overall CPUE	BRAD		CHXO	CONF	ISB	OSB	SCCL	SCCS	WILD
			CHNB	ITIP	CHNB	CHNB	CHNB	CHNB	CHNB	ITIP	DTWT
GSBG	2	0.007	0	0	0	0	0	0	0	0	0.167
		0.013	0	0	0	0	0	0	0	0	0.333
GSCP	1	0.003	0	0.208	0	0	0	0	0	0	0
		0.006	0	0.417	0	0	0	0	0	0	0
GSOS	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
GTSN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
GZSD	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
HFCS	18	0.045	0.016	0	0.043	0.169	0.032	0.069	0.14	0	0
		0.024	0.023	0	0.049	0.23	0.037	0.064	0.281	0	0
JYDR	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
LMBS	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
LNDC	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
LNGR	3	0.008	0.011	0	0	0.071	0	0.011	0	0	0
		0.01	0.023	0	0	0.143	0	0.023	0	0	0
LVFS	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
MMSN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
NTPK	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
OSSF	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
PATT	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
PDFH	2	0.006	0	0.222	0	0	0	0.01	0	0	0
		0.008	0	0.444	0	0	0	0.021	0	0	0
PDSG*	**37**	**0.079**	**0.036**	**0**	**0.03**	**0.478**	**0.053**	**0.168**	**0**	**0**	**0**
		0.035	**0.035**	**0**	**0.042**	**0.567**	**0.047**	**0.105**	**0**	**0**	**0**

Species	Total Catch	Overall CPUE	BRAD		CHXO	CONF	ISB	OSB	SCCL	SCCS	WILD
			CHNB	ITIP	CHNB	CHNB	CHNB	CHNB	CHNB	ITIP	DTWT
QLBK	50	0.116	0.146	0	0.178	0	0.137	0.074	0.07	0	0
		0.054	0.103	0	0.245	0	0.115	0.061	0.14	0	0
RDSN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
RVCS	67	0.168	0.206	0.499	0.123	0.209	0.075	0.199	0.246	1.176	0
		0.055	0.113	0.653	0.158	0.223	0.06	0.125	0.341	2.353	0
SFCB*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
SFSN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
SGCB*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
SGER*	**6**	**0.013**	**0.017**	**0**	**0.017**	**0**	**0.02**	**0.009**	**0**	**0**	**0**
		0.011	**0.024**	**0**	**0.034**	**0**	**0.028**	**0.018**	**0**	**0**	**0**
SGWE	37	0.089	0.06	0	0.032	0.374	0.118	0.119	0.07	0	0
		0.04	0.045	0	0.044	0.387	0.11	0.118	0.14	0	0
SHRH	106	0.243	0.051	0.353	0.305	0	0.426	0.249	0.105	0	0.792
		0.088	0.042	0.458	0.243	0	0.313	0.147	0.145	0	0.724
SKCB*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	0	0	0	0	0	0	0	0	0
SMBF	7	0.016	0.03	0	0	0.062	0.013	0.011	0	0	0
		0.016	0.046	0	0	0.124	0.026	0.023	0	0	0
SMBS	8	0.019	0	0	0.028	0	0.014	0.02	0.105	0	0.062
		0.013	0	0	0.039	0	0.028	0.028	0.145	0	0.125
SMST	1	0.003	0	0	0	0	0.016	0	0	0	0
		0.007	0	0	0	0	0.032	0	0	0	0
SNGR	11	0.026	0.028	0	0.014	0.147	0.024	0.015	0.05	0	0
		0.021	0.057	0	0.028	0.199	0.033	0.031	0.1	0	0
SNPD	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
SNSG*	**668**	**1.593**	**1.737**	**0.641**	**1.404**	**2.312**	**1.754**	**1.673**	**1.303**	**1.176**	**0.074**
		0.317	**0.743**	**0.897**	**0.544**	**2.096**	**0.585**	**0.728**	**1.011**	**2.353**	**0.147**
SNSN*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
STSN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0

Species	Total Catch	Overall CPUE	BRAD		CHXO	CONF	ISB	OSB	SCCL	SCCS	WILD
			CHNB	ITIP	CHNB	CHNB	CHNB	CHNB	CHNB	ITIP	DTWT
SVCB	1	0.002	0	0	0	0.062	0	0	0	0	0
		0.004	0	0	0	0.124	0	0	0	0	0
UCA	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
UCN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
UCS	7	0.018	0	0	0.014	0	0.06	0	0.07	0	0
		0.019	0	0	0.029	0	0.085	0	0.14	0	0
UCY	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
ULP	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
UNO	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
UPM	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
UPN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
WLYE	14	0.036	0.02	0	0.047	0	0.071	0	0.175	0	0
		0.019	0.028	0	0.054	0	0.058	0	0.193	0	0
WTBS	2	0.005	0	0	0	0	0.012	0.011	0	0	0
		0.007	0	0	0	0	0.024	0.023	0	0	0
WTCP	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
YWPH	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0

Appendix F4. Otter Trawl: overall season and segment summary. Lists CPUE (fish/100 m) and 2 standard errors on second line.

Species	Total Catch	Overall CPUE	BRAD		CHXO	CONF	ISB	OSB	SCCL		WILD
			CHNB	ITIP	CHNB	CHNB	CHNB	CHNB	CHNB	ITIP	DTWT
BHCP	1	0.003	0	0	0	0	0	0	0.036	0	0
		0.005	0	0	0	0	0	0	0.073	0	0
BKBH	1	0.002	0.006	0	0	0	0	0	0	0	0
		0.004	0.011	0	0	0	0	0	0	0	0
BKCP	5	0.009	0	0	0	0	0	0	0.123	0	0
		0.013	0	0	0	0	0	0	0.177	0	0
BLGL	3	0.008	0	0	0.039	0	0	0	0	0	0.062
		0.009	0	0	0.055	0	0	0	0	0	0.125
BMBF	5	0.01	0.024	0	0	0	0	0	0.026	0	0
		0.01	0.028	0	0	0	0	0	0.052	0	0
BMSN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
BSMW*	**1**	**0.002**	**0**	**0**	**0**	**0**	**0**	**0.009**	**0**	**0**	**0**
		0.003	**0**	**0**	**0**	**0**	**0**	**0.018**	**0**	**0**	**0**
BUSK*	**72**	**0.165**	**0.073**	**0.625**	**0.126**	**0**	**0.111**	**0.253**	**0.094**	**0**	**1.026**
		0.054	**0.044**	**1.25**	**0.099**	**0**	**0.082**	**0.152**	**0.115**	**0**	**0.716**
CARP	17	0.031	0.044	0	0.015	0.125	0.006	0.031	0.075	0	0
		0.019	0.043	0	0.03	0.25	0.013	0.046	0.083	0	0
CNCF	203	0.428	0.35	1.25	0.268	0.603	0.176	0.384	1.288	1.06	1.088
		0.141	0.22	2.5	0.253	0.381	0.103	0.246	1.188	0.933	1.289
ERSN	43	0.077	0.105	0	0.047	0	0.158	0.018	0	0	0
		0.043	0.094	0	0.065	0	0.134	0.025	0	0	0
FHCF	4	0.011	0	0	0	0	0.052	0	0	0	0
		0.013	0	0	0	0	0.064	0	0	0	0
FHMW	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
FSMT	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
FWDM	72	0.129	0.08	0	0.053	0	0.035	0.03	1.176	0	0
		0.096	0.081	0	0.079	0	0.045	0.034	1.234	0	0
GDEY	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
GNSF	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0

Species	Total Catch	Overall CPUE	BRAD		CHXO	CONF	ISB	OSB	SCCL		WILD
			CHNB	ITIP	CHNB	CHNB	CHNB	CHNB	CHNB	ITIP	DTWT
GSBG	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
GSCP	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
GSOS	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
GTSN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
GZSD	7	0.012	0.01	0	0.015	0	0	0	0.101	0	0
		0.011	0.014	0	0.03	0	0	0	0.121	0	0
HFCS	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
JYDR	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
LMBS	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
LNDC	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
LNGR	1	0.002	0	0	0	0	0.008	0	0	0	0
		0.003	0	0	0	0	0.016	0	0	0	0
LVFS	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
MMSN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
NTPK	1	0.002	0	0	0	0	0	0	0.023	0	0
		0.003	0	0	0	0	0	0	0.046	0	0
OSSF	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
PATT	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
PDFH	2	0.004	0	0	0	0	0	0	0.053	0	0
		0.008	0	0	0	0	0	0	0.107	0	0
PDSG*	**6**	**0.01**	**0.01**	**0**	**0**	**0**	**0.009**	**0**	**0.047**	**0.143**	**0**
		0.008	**0.014**	**0**	**0**	**0**	**0.018**	**0**	**0.066**	**0.286**	**0**
QLBK	7	0.014	0.01	0	0.05	0	0	0	0.056	0	0
		0.011	0.014	0	0.058	0	0	0	0.082	0	0

Species	Total Catch	Overall CPUE	BRAD		CHXO	CONF	ISB	OSB	SCCL		WILD
			CHNB	ITIP	CHNB	CHNB	CHNB	CHNB	CHNB	ITIP	DTWT
RDSN	4	0.007	0.005	0	0	0	0.018	0	0.025	0	0
		0.009	0.009	0	0	0	0.037	0	0.05	0	0
RVCS	14	0.03	0.023	0	0.014	0	0.039	0.028	0.023	0	0.14
		0.017	0.023	0	0.028	0	0.047	0.04	0.046	0	0.195
SFCB*	**3**	**0.005**	**0.006**	**0**	**0.025**	**0**	**0**	**0**	**0**	**0**	**0**
		0.007	**0.011**	**0**	**0.051**	**0**	**0**	**0**	**0**	**0**	**0**
SFSN	2	0.004	0	0	0	0	0.018	0	0	0	0
		0.005	0	0	0	0	0.026	0	0	0	0
SGCB*	**2**	**0.004**	**0**	**0**	**0**	**0**	**0.009**	**0**	**0.025**	**0**	**0**
		0.005	**0**	**0**	**0**	**0**	**0.018**	**0**	**0.05**	**0**	**0**
SGER*	**2**	**0.004**	**0**	**0**	**0**	**0**	**0.009**	**0.01**	**0**	**0**	**0**
		0.005	**0**	**0**	**0**	**0**	**0.018**	**0.02**	**0**	**0**	**0**
SGWE	31	0.06	0.031	0	0.04	0.156	0.117	0.065	0.076	0	0
		0.029	0.025	0	0.045	0.205	0.109	0.073	0.084	0	0
SHRH	71	0.155	0.035	0.625	0.239	0.167	0.27	0.089	0.107	0	0.58
		0.054	0.032	1.25	0.183	0.333	0.161	0.077	0.213	0	0.488
SKCB*	**5**	**0.009**	**0.021**	**0**	**0**	**0**	**0.011**	**0**	**0**	**0**	**0**
		0.01	0.026	0	0	0	0.022	0	0	0	0
SMBF	1	0.001	0.004	0	0	0	0	0	0	0	0
		0.003	0.009	0	0	0	0	0	0	0	0
SMBS	1	0.002	0	0	0.016	0	0	0	0	0	0
		0.004	0	0	0.032	0	0	0	0	0	0
SMST	9	0.02	0	0	0.029	0	0.039	0.027	0	0	0.062
		0.014	0	0	0.042	0	0.047	0.039	0	0	0.125
SNGR	23	0.048	0.005	0	0	0	0.009	0	0.392	0	0.375
		0.047	0.01	0	0	0	0.019	0	0.553	0	0.544
SNPD	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
SNSG*	**242**	**0.444**	**0.695**	**0.556**	**0.436**	**0.396**	**0.271**	**0.25**	**0.314**	**1.801**	**0.062**
		0.153	**0.403**	**1.111**	**0.427**	**0.308**	**0.131**	**0.129**	**0.279**	**2.007**	**0.125**
SNSN*	**17**	**0.028**	**0.051**	**0**	**0.014**	**0**	**0.016**	**0.012**	**0.023**	**0.208**	**0**
		0.016	**0.038**	**0**	**0.028**	**0**	**0.023**	**0.025**	**0.046**	**0.417**	**0**
STSN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
SVCB	125	0.247	0.22	0	0.195	0	0.401	0.253	0.097	1.051	0.057
		0.084	0.137	0	0.141	0	0.266	0.212	0.112	0.643	0.114

Species	Total Catch	Overall CPUE	BRAD		CHXO	CONF	ISB	OSB	SCCL		WILD
			CHNB	ITIP	CHNB	CHNB	CHNB	CHNB	CHNB	ITIP	DTWT
UCA	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
UCN	3	0.005	0	0	0	0	0	0	0.069	0	0
		0.01	0	0	0	0	0	0	0.137	0	0
UCS	14	0.023	0	0	0	0	0	0	0.327	0	0
		0.039	0	0	0	0	0	0	0.549	0	0
UCY	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
ULP	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
UNO	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
UPM	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
UPN	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
WLYE	23	0.045	0.021	0	0.085	0	0.037	0.011	0.141	0.143	0.124
		0.027	0.022	0	0.125	0	0.073	0.022	0.168	0.286	0.169
WTBS	5	0.012	0	0	0	0	0.014	0.01	0.026	0	0.125
		0.011	0	0	0	0	0.027	0.021	0.052	0	0.171
WTCP	1	0.002	0.006	0	0	0	0	0	0	0	0
		0.004	0.011	0	0	0	0	0	0	0	0
YWPH	1	0.002	0	0	0	0	0	0	0.023	0	0
		0.003	0	0	0	0	0	0	0.046	0	0

Appendix F6. Mini-fyke Net: overall season and segment summary. Lists CPUE (fish/net night) and 2 standard errors on second line.

			BRAD	CONF	ISB	OSB		SCCL	SCCS	SCN		TRML	TRMS
Species	Total Catch	Overall CPUE	BAR	BAR	BAR	BAR	CHNB	BAR	BAR	BAR	(blank)	BAR	BAR
BHCP	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0
BKBH	12	0.119	0	0	0	0	0	0	0	0	0	0.25	5.5
		0.219	0	0	0	0	0	0	0		0	0.5	11
BKCP	223	2.208	1.077	1	1.167	5.692	0.5	1.733	0.227	27	4.333	2	12.5
		1.237	1.024	0	0.906	7.478	1	2.004	0.183		3.528	2.16	17
BLGL	15	0.149	0.154	0	0.083	0.077	0	0.333	0.045	0	0.667	0.25	0.5
		0.091	0.208	0	0.115	0.154	0	0.422	0.091		1.333	0.5	1
BMBF	448	4.436	1.615	0	2.5	0	2	4.733	4.591	25	52.333	0	4.5
		2.761	1.688	0	2.325	0	4	5.125	4.544		66.916	0	5
BMSN	35	0.347	1.385	0	0	0	0	0.133	0.636	0	0.333	0	0
		0.403	2.607	0	0	0	0	0.182	1.024		0.667	0	0
BSMW*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	0	0	0	0	0	0	0		0	0	0
BUSK*	**1**	**0.01**	**0**	**0**	**0.042**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0.02	**0**	**0**	**0.083**	**0**	**0**	**0**	**0**		**0**	**0**	**0**
CARP	591	5.851	9.692	0	2.25	0.308	5.5	5.733	5.091	59	9.667	25	5
		2.755	8.444	0	2.019	0.474	9	8.089	4.726		5.333	38.236	2
CNCF	73	0.723	0.231	1	0.583	0	0	0.533	1.727	0	1.667	0.75	0
		0.399	0.243	2	0.731	0	0	0.473	1.49		3.333	0.5	0
ERSN	441	4.366	8.538	1	5.167	5.308	0	0.4	4.909	0	0.667	4	1.5
		3.114	15.605	2	6.437	6.091	0	0.327	7.773		1.333	8	3
FHCF	1	0.01	0	0	0.042	0	0	0	0	0	0	0	0
		0.02	0	0	0.083	0	0	0	0		0	0	0
FHMW	133	1.317	1.615	0	2.167	0	0	0.6	0.773	3	4.333	2.5	4
		0.694	1.494	0	2.401	0	0	0.579	0.63		6.766	4.359	8
FSMT	137	1.356	0.615	3	0.625	1.923	0	0.933	0.455	0	0.333	14.25	0.5
		0.71	0.622	0	0.562	1.887	0	0.568	0.569		0.667	9.878	1
FWDM	419	4.149	1.615	3	4.458	1	7	2.533	8.045	4	6.333	3.25	3.5
		1.738	1.21	2	2.167	0.641	8	1.83	7.088		12.667	2.754	1
GDEY	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0
GNSF	1	0.01	0	0	0	0.077	0	0	0	0	0	0	0
		0.02	0	0	0	0.154	0	0	0		0	0	0

Species	Total Catch	Overall CPUE	BRAD	CONF	ISB	OSB		SCCL	SCCS	SCN		TRML	TRMS
			BAR	BAR	BAR	BAR	CHNB	BAR	BAR	BAR	(blank)	BAR	BAR
GSBG	1	0.01	0	0	0	0	0	0	0	0	0.333	0	0
		0.02	0	0	0	0	0	0	0		0.667	0	0
GSCP	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0
GSOS	1	0.01	0	0	0	0	0	0.067	0	0	0	0	0
		0.02	0	0	0	0	0	0.133	0		0	0	0
GTSN	1	0.01	0	0	0	0	0	0	0.045	0	0	0	0
		0.02	0	0	0	0	0	0	0.091		0	0	0
GZSD	1679	16.624	9.308	0	36.208	0.308	5.5	26.067	9.455	12	10.333	0.5	15
		11.69	14.835	0	38.364	0.266	11	45.537	7.195		20.667	1	4
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0
JYDR	11	0.109	0	0	0.042	0	0	0	0.091	1	2.333	0	0
		0.109	0	0	0.083	0	0	0	0.182		2.404	0	0
LMBS	11	0.109	0	0	0.083	0.385	0	0.267	0	0	0	0	0
		0.093	0	0	0.167	0.426	0	0.413	0		0	0	0
LNDC	2	0.02	0	0	0	0	0	0.067	0.045	0	0	0	0
		0.028	0	0	0	0	0	0.133	0.091		0	0	0
LNGR	15	0.149	0.154	0	0	0	0.5	0.067	0.227	3	0.333	0.25	0.5
		0.091	0.208	0	0	0	1	0.133	0.225		0.667	0.5	1
LVFS	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0
MMSN	18	0.178	0.538	0	0.125	0	0	0.267	0.136	0	0.333	0	0
		0.15	0.923	0	0.25	0	0	0.363	0.199		0.667	0	0
NTPK	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0
OSSF	25	0.248	0	0	0	0	0	0	0.318	8	1.333	0.75	1.5
		0.222	0	0	0	0	0	0	0.549		2.667	0.957	3
PATT	1	0.01	0.077	0	0	0	0	0	0	0	0	0	0
		0.02	0.154	0	0	0	0	0	0		0	0	0
PDFH	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0
PDSG*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**	**0**	**0**

Species	Total Catch	Overall CPUE	BRAD	CONF	ISB	OSB		SCCL	SCCS	SCN		TRML	TRMS
			BAR	BAR	BAR	BAR	CHNB	BAR	BAR	BAR	(blank)	BAR	BAR
QLBK	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0
RDSN	992	9.822	33.385	4	2.5	5.154	3	1.4	13.636	0	29	2	0.5
		8.617	53.503	4	1.419	7.531	2	1.247	22.739		32.741	1.414	1
RVCS	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0
SFCB*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**	**0**	**0**
SFSN	723	7.158	10.692	1	6.667	1.692	19.5	7.2	8.182	0	23	0.75	0.5
		2.095	6.462	0	2.704	1.047	39	4.958	5.876		15.144	0.957	1
SGCB*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**	**0**	**0**
SGER*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
											0	**0**	**0**
SGWE	4	0.04	0	0	0.125	0.077	0	0	0	0	0	0	0
		0.048	0	0	0.183	0.154	0	0	0		0	0	0
SHRH	15	0.149	0.692	0	0.042	0	0	0.133	0.045	0	0	0.25	0.5
		0.165	1.228	0	0.083	0	0	0.182	0.091		0	0.5	1
SKCB*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	0	0	0	0	0	0	0		0	0	0
SMBF	3	0.03	0	0	0.042	0	0	0.067	0.045	0	0	0	0
		0.034	0	0	0.083	0	0	0.133	0.091		0	0	0
SMBS	55	0.545	0.769	0	0.5	1.077	0	0.4	0.409	0	1	0	0.5
		0.202	0.462	0	0.417	0.619	0	0.428	0.553		1.155	0	1
SMST	5	0.05	0.077	0	0	0.077	0	0.133	0	0	0	0.25	0
		0.043	0.154	0	0	0.154	0	0.182	0		0	0.5	0
SNGR	129	1.277	0	3	0.667	1.615	0	2.867	0.591	10	1	3	2.5
		0.578	0	4	0.749	1.231	0	2.759	0.612		2	4.69	3
SNPD	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0
SNSG*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**	**0**	**0**
SNSN*	**939**	**9.297**	**16.615**	**0**	**5.458**	**0.308**	**3.5**	**3.4**	**4.045**	**4**	**145.333**	**0**	**0.5**
		8.637	**25.545**	**0**	**5.757**	**0.474**	**7**	**3.182**	**2.896**		**254.677**	**0**	**1**
STSN	1	0.01	0.077	0	0	0	0	0	0	0	0	0	0
		0.02	0.154	0	0	0	0	0	0		0	0	0

Species	Total Catch	Overall CPUE	BRAD	CONF	ISB	OSB		SCCL	SCCS	SCN		TRML	TRMS
			BAR	BAR	BAR	BAR	CHNB	BAR	BAR	BAR	(blank)	BAR	BAR
SVCB	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0
UCA	2225	22.03	17.923	0	17.708	0	12	17.667	24.227	90	19.333	143.75	11
		9.676	14.437	0	13.49	0	4	18.111	15.789		24.828	166.75	16
UCN	3	0.03	0	0	0	0	0	0	0.091	0	0.333	0	0
		0.044	0	0	0	0	0	0	0.182		0.667	0	0
UCS	24	0.238	0	0.5	0.208	0.154	0	0.333	0.5	0	0	0	0
		0.195	0	1	0.24	0.208	0	0.319	0.819		0	0	0
UCY	942	9.327	0.846	0	5.667	0	6.5	3.2	3	0	218.333	3.25	0
		9.355	1.692	0	7.162	0	13	6.12	6		219.181	4.272	0
ULP	165	1.634	1.077	0	2.083	0	0	0.267	1	0	1	16.25	3.5
		1.295	1.832	0	2.482	0	0	0.413	1.036		1.155	26.837	3
UNO	573	5.673	2.692	1	2.292	0	0	3.6	18.545	0	0	0.75	8
		5.829	2.358	0	2.182	0	0	4.679	26.117		0	1.5	16
UPM	1	0.01	0	0	0	0	0	0	0.045	0	0	0	0
		0.02	0	0	0	0	0	0	0.091		0	0	0
UPN	1	0.01	0	0	0	0	0	0.067	0	0	0	0	0
		0.02	0	0	0	0	0	0.133	0		0	0	0
WLYE	1	0.01	0	0	0	0.077	0	0	0	0	0	0	0
		0.02	0	0	0	0.154	0	0	0		0	0	0
WTBS	267	2.644	1	2.5	4.583	0.923	1	2.4	1.773	4	3	7.5	3.5
		0.892	0.784	5	2.59	0.799	2	2.036	1.234		4.163	9.883	7
WTCP	3	0.03	0.154	0	0	0	0	0.067	0	0	0	0	0
		0.044	0.308	0	0	0	0	0.133	0		0	0	0
YWPH	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0

Appendix F7. Push Trawl: overall season and segment summary. Lists CPUE (fish/net night) and 2 standard errors on second line.

Species	Total Catch	Overall CPUE	BRAD		CHXO		ISB	SCCL	SCCS	SCN
			BAR	CHNB	BAR	CHNB	BAR	BAR	BAR	(blank)
BHCP	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
BKBH	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
BKCP	2	0.04	0	0	0	0	0	0	0	1
		0.08	0		0	0	0	0	0	2
BLGL	2	0.04	0	0	0	0	0	0	0	1
		0.08	0		0	0	0	0	0	2
BMBF	4	0.069	0.067	0	0.4	0	0	0	0	1
		0.089	0.133		0.8	0	0	0	0	2
BMSN	1	0.027	0	0	0	0	0	0	0.148	0
		0.053	0		0	0	0	0	0.296	0
BSMW*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**		**0**	**0**	**0**	**0**	**0**	**0**
BUSK*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**		**0**	**0**	**0**	**0**	**0**	**0**
CARP	8	0.186	0.147	0	0.4	0	0.055	0.074	0.626	0
		0.172	0.197		0.8	0	0.11	0.148	0.872	0
CNCF	6	0.123	0.147	0	0	0	0.051	0	0.444	0
		0.166	0.197		0	0	0.103	0	0.889	0
ERSN	214	2.971	1	0	0	0	3.574	9.185	1.047	0
		3.329	0.872		0	0	3.852	17.713	1.531	0
FHCF	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
FHMW	1	0.02	0	0	0	0	0	0.111	0	0
		0.04	0		0	0	0	0.222	0	0
FSMT	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
FWDM	5	0.105	0	0	0	0	0.171	0.111	0.222	0
		0.108	0		0	0	0.243	0.222	0.444	0
GDEY	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
GNSF	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0

Species	Total Catch	Overall CPUE	BRAD		CHXO		ISB	SCCL	SCCS	SCN
			BAR	CHNB	BAR	CHNB	BAR	BAR	BAR	(blank)
GSBG	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
GSCP	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
GSOS	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
GTSN	1	0.013	0	0	0	0	0.051	0	0	0
		0.027	0		0	0	0.103	0	0	0
GZSD	276	5.213	3.2	0	0.8	1.75	2.008	2.963	10.366	37
		3.234	2.76		1.6	3.5	1.607	4.793	11.277	40
HFCS	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
JYDR	1	0.04	0	0	0	0	0	0	0.222	0
		0.08	0		0	0	0	0	0.444	0
LMBS	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
LNDC	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
LNGR	3	0.067	0	0	0	0	0.051	0.074	0.222	0
		0.087	0		0	0	0.103	0.148	0.444	0
LVFS	24	0.627	0.067	0	1.157	0	0.209	0	2.848	0
		0.949	0.133		0.886	0	0.318	0	5.216	0
MMSN	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
NTPK	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
OSSF	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
PATT	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
PDFH	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
PDSG*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**		**0**	**0**	**0**	**0**	**0**	**0**
QLBK	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0

Species	Total Catch	Overall CPUE	BRAD		CHXO		ISB	SCCL	SCCS	SCN
			BAR	CHNB	BAR	CHNB	BAR	BAR	BAR	(blank)
RDSN	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
RVCS	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
SFCB*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**		**0**	**0**	**0**	**0**	**0**	**0**
SFSN	9	0.12	0.6	0	0	0	0	0	0	0
		0.177	0.854		0	0	0	0	0	0
SGCB*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**		**0**	**0**	**0**	**0**	**0**	**0**
SGER*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**		**0**	**0**	**0**	**0**	**0**	**0**
SGWE	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
SHRH	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
SKCB*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**		**0**	**0**	**0**	**0**	**0**	**0**
SMBF	1	0.013	0	0	0	0	0.051	0	0	0
		0.027	0		0	0	0.103	0	0	0
SMBS	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
SMST	2	0.027	0	0	0	0	0	0	0.148	0
		0.053	0		0	0	0	0	0.296	0
SNGR	1	0.013	0	0	0	0	0	0.074	0	0
		0.027	0		0	0	0	0.148	0	0
SNPD	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
SNSG*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	**0**		**0**	**0**	**0**	**0**	**0**	**0**
SNSN*	**6**	**0.087**	**0.2**	**0**	**0**	**0.217**	**0.064**	**0**	**0.074**	**0**
		0.078	**0.285**		**0**	**0.435**	**0.128**	**0**	**0.148**	**0**
STSN	15	0.361	0	0	1.2	0	0.128	0	1.556	0
		0.495	0		2.4	0	0.256	0	2.648	0
SVCB	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0

Species	Total Catch	Overall CPUE	BRAD		CHXO		ISB	SCCL	SCCS	SCN
			BAR	CHNB	BAR	CHNB	BAR	BAR	BAR	(blank)
UCA	80	2.906	0.28	0	0.4	0	0.161	0.074	15.327	0.5
		5.196	0.304		0.8	0	0.17	0.148	28.712	1
UCN	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
UCS	2	0.03	0.067	0	0	0	0.064	0	0	0
		0.042	0.133		0	0	0.128	0	0	0
UCY	8	0.107	0.533	0	0	0	0	0	0	0
		0.213	1.067		0	0	0	0	0	0
ULP	7	0.253	0	0	0	0	0	0.074	1.333	0
		0.48	0		0	0	0	0.148	2.667	0
UNO	6	0.163	0	0	0.4	0	0	0	0.815	0
		0.246	0		0.8	0	0	0	1.329	0
UPM	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
UPN	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
WLYE	2	0.08	0	0	0	0	0	0	0.444	0
		0.16	0		0	0	0	0	0.889	0
WTBS	6	0.112	0.2	0	0.4	0	0	0	0.202	0.5
		0.103	0.285		0.8	0	0	0	0.404	1
WTCP	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0
YWPH	0	0	0	0	0	0	0	0	0	0
		0	0		0	0	0	0	0	0

Appendix G. Hatchery names, locations, and abbreviations.

Hatchery	State	Abbreviation
Blind Pony State Fish Hatchery	MO	BYP
Neosho National Fish Hatchery	MO	NEO
Gavins Point National Fish Hatchery	SD	GAV
Garrison Dam National Fish Hatchery	ND	GAR
Miles City State Fish Hatchery	MT	MCH
Blue Water State Fish Hatchery	MT	BLU
Bozeman Fish Technology Center	MT	BFT
Fort Peck State Fish Hatchery	MT	FPH

Appendix H. Alphabetic list of Missouri River fishes with total catch-per-unit-effort by gear type for sturgeon season (fall through spring) and fish community season (summer) during 2006 – 2007 for segment 07 of the Missouri River. Species codes are located in Appendix A. Asterisks and bold type denote targeted native Missouri River species.

Species Code	Sturgeon Season (Fall through Spring)			Fish Community Season (Summer)			
	1 Inch Trammel Net	Gill Net	Otter Trawl	1 Inch Trammel Net	Mini-Fyke Net	Otter Trawl	Push Trawl
BHCP	0.005	0.008	0.000	0.003	0.000	0.005	0.000
BKBH	0.005	0.000	0.004	0.000	0.119	0.000	0.000
BKCP	0.000	0.000	0.000	0.000	2.208	0.017	0.040
BLGL	0.000	0.000	0.005	0.018	0.149	0.011	0.040
BMBF	0.000	0.004	0.000	0.009	4.436	0.019	0.069
BMSN	0.000	0.000	0.000	0.000	0.347	0.000	0.027
BSMW*	**0.000**	**0.000**	**0.003**	**0.000**	**0.000**	**0.000**	**0.000**
BUSK*	**0.459**	**0.772**	**0.215**	**0.324**	**0.010**	**0.118**	**0.000**
CARP	0.005	0.000	0.000	0.033	5.851	0.062	0.186
CNCF	0.612	0.141	0.552	0.591	0.723	0.308	0.123
ERSN	0.000	0.000	0.048	0.000	4.366	0.104	2.971
FHCF	0.000	0.000	0.005	0.004	0.010	0.016	0.000
FHMW	0.000	0.000	0.000	0.000	1.317	0.000	0.020
FSMT	0.000	0.000	0.000	0.000	1.356	0.000	0.000
FWDM	0.024	0.008	0.024	0.021	4.149	0.230	0.105
GDEY	0.257	0.589	0.000	0.125	0.000	0.000	0.000
GNSF	0.000	0.000	0.000	0.000	0.010	0.000	0.000
GSBG	0.000	0.000	0.000	0.012	0.010	0.000	0.000
GSCP	0.007	0.017	0.000	0.000	0.000	0.000	0.000

Appendix H. (continued).

Species Code	Sturgeon Season (Fall through Spring)			Fish Community Season (Summer)			
	1 Inch Trammel Net	Gill Net	Otter Trawl	1 Inch Trammel Net	Mini-Fyke Net	Otter Trawl	Push Trawl
GSOS	0.000	0.000	0.000	0.000	0.010	0.000	0.000
GTSN	0.000	0.000	0.000	0.000	0.010	0.000	0.013
GZSD	0.000	0.000	0.000	0.000	16.624	0.024	5.213
HFCS	0.028	0.033	0.000	0.058	0.000	0.000	0.000
JYDR	0.000	0.000	0.000	0.000	0.109	0.000	0.040
LMBS	0.000	0.000	0.000	0.000	0.109	0.000	0.000
LNDC	0.000	0.000	0.000	0.000	0.020	0.000	0.000
LNGR	0.008	0.091	0.000	0.009	0.149	0.003	0.067
LVFS	0.000	0.000	0.000	0.000	0.000	0.000	0.627
MMSN	0.000	0.000	0.000	0.000	0.178	0.000	0.000
NFSH	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NTPK	0.000	0.008	0.000	0.000	0.000	0.003	0.000
OSSF	0.000	0.000	0.000	0.000	0.248	0.000	0.000
PATT	0.000	0.000	0.000	0.000	0.010	0.000	0.000
PDFH	0.008	0.046	0.000	0.004	0.000	0.007	0.000
PDSG*	**0.032**	**0.008**	**0.013**	**0.115**	**0.000**	**0.007**	**0.000**
QLBK	0.196	0.046	0.016	0.053	0.000	0.012	0.000
RDSN	0.000	0.000	0.014	0.000	9.822	0.000	0.000
RVCS	0.151	0.108	0.038	0.181	0.000	0.023	0.000
SFCB*	**0.000**	**0.000**	**0.010**	**0.000**	**0.000**	**0.000**	**0.000**

Appendix H. (continued).

Species Code	Sturgeon Season (Fall through Spring)			Fish Community Season (Summer)			
	1 Inch Trammel Net	Gill Net	Otter Trawl	1 Inch Trammel Net	Mini-Fyke Net	Otter Trawl	Push Trawl
SFSN	0.000	0.000	0.004	0.000	7.158	0.004	0.120
SGCB*	**0.000**	**0.000**	**0.007**	**0.000**	**0.000**	**0.000**	**0.000**
SGER*	**0.016**	**0.021**	**0.000**	**0.011**	**0.000**	**0.007**	**0.000**
SGWE	0.057	0.091	0.035	0.113	0.040	0.084	0.000
SHRH	0.277	0.079	0.181	0.216	0.149	0.129	0.000
SKCB*	**0.000**	**0.000**	**0.015**	**0.000**	**0.000**	**0.003**	**0.000**
SMBF	0.026	0.033	0.000	0.008	0.030	0.003	0.013
SMBS	0.006	0.000	0.000	0.029	0.545	0.004	0.000
SMST	0.000	0.000	0.020	0.006	0.050	0.019	0.027
SNGR	0.019	0.083	0.023	0.032	1.277	0.073	0.013
SNPD	0.000	0.008	0.000	0.000	0.000	0.000	0.000
SNSG*	**1.566**	**3.083**	**0.557**	**1.614**	**0.000**	**0.334**	**0.000**
SNSN*	**0.000**	**0.000**	**0.046**	**0.000**	**9.297**	**0.011**	**0.087**
STSN	0.000	0.000	0.000	0.000	0.010	0.000	0.361
SVCB	0.000	0.000	0.355	0.004	0.000	0.143	0.000
UCA	0.000	0.000	0.000	0.000	22.030	0.000	2.906
UCN	0.000	0.000	0.000	0.000	0.030	0.010	0.000
UCS	0.000	0.000	0.000	0.032	0.238	0.045	0.030
UCY	0.000	0.000	0.000	0.000	9.327	0.000	0.107

Appendix H. (continued).

Species Code	Sturgeon Season (Fall through Spring)			Fish Community Season (Summer)			
	1 Inch Trammel Net	Gill Net	Otter Trawl	1 Inch Trammel Net	Mini-Fyke Net	Otter Trawl	Push Trawl
ULP	0.000	0.000	0.000	0.000	1.634	0.000	0.253
UNO	0.000	0.000	0.000	0.000	5.673	0.000	0.163
UPM	0.000	0.000	0.000	0.000	0.010	0.000	0.000
UPN	0.000	0.000	0.000	0.000	0.010	0.000	0.000
WLYE	0.042	0.033	0.017	0.031	0.010	0.071	0.080
WTBS	0.000	0.004	0.000	0.009	2.644	0.024	0.112
WTCP	0.000	0.000	0.000	0.000	0.030	0.004	0.000
YWPH	0.000	0.000	0.000	0.000	0.000	0.003	0.000