

2018 NEBRASKA GAME AND PARKS COMMISSION BROODSTOCK COLLECTION

PALLID STURGEON RECOVERY EFFORTS

MISSOURI RIVER PROGRAM - NGPC

The Nebraska Game and Parks Commission (NGPC) - Fisheries Division organized the 11th annual intensive effort targeted towards sampling Pallid Sturgeon in reproductive condition in the upper channelized Missouri River. Volunteers were solicited from area universities, colleges, state and federal agencies, and the general public to assist NGPC Missouri River Program personnel from Monday, April 2nd through Friday, April 13th. Cold temperatures and winter precipitation hampered efforts and resulted in reduced effort and delayed start times for fish and crew safety.

In 2018, the main objective was to capture reproductive males as Gavins Point National Fish Hatchery was at capacity for reproductive females. Three sampling crews targeted the area near the confluence of the Platte and Missouri Rivers (River Mile [RM] 595.0) downstream to Upper Hamburg Bend south of Nebraska City, NE (RM 554.9). With the additional help from volunteers, crews sampled approximately 40 river miles which included 15 different river bends.

Sampling was conducted using 200-foot trotlines with 40 hooks per line baited with nightcrawlers. Throughout the eleven day sampling effort, 12,520 hooks were deployed resulting in 1,394 total fish captured including 90 Pallid Sturgeon (83 individual fish, 7 were captured twice), which resulted in 16 adult Pallid Sturgeon being assessed using an ultrasound for reproductive readiness. Three reproductive males were transferred to Gavins Point National Fish Hatchery (NFH).



Bob Incontro, Dan Flural, Frank Urzendowski, and Dave Lathrop with a Pallid Sturgeon collected during the 2018 NGPC Broodstock Collection.

SPECIES BACKGROUND

Pallid Sturgeon are native to the Missouri and Mississippi River systems, and due to population declines, the species was listed as federally endangered in 1990. The construction of the main-stem dams and channelization drastically modified the river from its natural state by changing the temperature, turbidity, and natural flow regime of the river. Additionally, river modifications caused widespread alteration and destruction of spawning areas, blocked fish migrations and reduced food availability resulting in sharp declines of many native fish populations throughout the Missouri River. Several recovery projects have been initiated to monitor the current population status of Pallid Sturgeon and other native river species, evaluate changes in habitat alterations/improvements, and identify and understand various life history characteristics of Pallid Sturgeon, particularly reproductive behaviors. In addition to these recovery projects, an artificial propagation and stocking program was developed to ensure the persistence of the species until Pallid Sturgeon are able to reproduce naturally and become self-



Alex Eifert, Lucas Eifert and Dante Koupal showing off Pallid Sturgeon that were collected on the last day of the 2018 broodstock effort near Plattsmouth, NE.

sustaining. Early stockings into this reach of the Missouri River relied on the availability of surplus fish from the Upper Basin (upstream of Garrison Dam) propagation program. In spring 2007, NGPC initiated a small scale effort to collect adult broodstock from the lower Missouri River. This effort was greatly expanded in 2008 when NGPC organized and conducted the first large scale effort targeted at collecting locally reproductively ready Pallid Sturgeon for the Propagation Program. Staff from the Missouri Department of Conservation have conducted similar collection efforts in reaches near St. Joseph, MO and Cooley Lake, MO. These local broodstock sampling efforts along with standardized efforts have resulted in hatchery facilities producing and stocking 89,866 hatchery-reared progeny. Recently, Pallid Sturgeon condition (length to weight ratio) has become a concern. The average condition increased for all size classes of Pallid Sturgeon in 2018 when compared to the 10 year average.

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PALLID STURGEON CAPTURES

A total of 90 Pallid Sturgeon were collected during the 2018 intensive broodstock collection effort, including 16 potential wild broodfish. Three fish were determined to be reproductively ready males were transported to Gavins Point NFH. Pallid Sturgeon lengths ranged from 349 mm (13.7") to 1,050 mm (41.3"; Figure 1) with an average length of 757 mm (29.8"), while weights ranged from 118 g (0.26 lbs) to 4,260 g (9.4 lbs.) with an overall mean weight of 1,862 g (4.1 lbs). The mean relative condition (Kn) was 0.93 for sub-adult (<800 mm) and 0.92 for adult Pallid Sturgeon. Both size classes were above the long term average. An additional 13 Pallid Sturgeon were collected during NGPC Population Assessment's standardized fall and spring sampling. Gavins Point NFH has dedicated two large tanks to hold broodfish from the lower Missouri River until they are reproductively ready. With these hold-over fish and NGPC's 2018 broodstock efforts, Gavins Point NFH has 43 potential broodfish at their facility.

As of April 2018, Gavins Point is holding 11 reproductive females and 13 reproductive males. Spawning efforts will occur from late-April to early-May and their progeny will be stocked this fall (i.e., September or October) or next spring (i.e., April or May) after they are tagged. All adult fish will be released back into the river near their capture sites with a select number of fish being surgically implanted with telemetry tags to increase our understanding of habitat use and movement patterns.

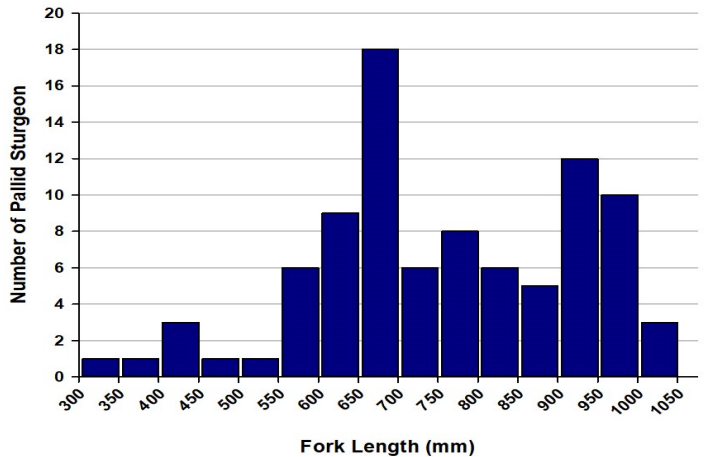


Figure 1. Length frequency of Pallid Sturgeon caught during the 2018 broodstock collection effort.



Top: An unmarked reproductive male Pallid Sturgeon collected by the NE City Crew that had no pectoral fins.

Bottom: Ally Beard, Camden Oathout, and Kylie Comba pose with a large Flathead Catfish caught by the Plattsmouth North Crew.



HATCHERY RECAPTURE DATA

During the intensive broodstock effort, 61 known hatchery-reared Pallid Sturgeon, 7 known wild-origin based on previous genetic results, and 15 unknown origin (potentially wild with genetic results pending) were collected. Only known wild or potentially wild Pallid Sturgeon (e.g. no marks or tags) that have not been used for propagation previously were transferred to the hatchery. Two wild reproductive Pallid Sturgeon were captured but not transported to the hatchery (1 male previously used in propagation and 1 female due to hatchery capacity limits). Two unmarked, sub-adult Pallid Sturgeon were collected and genetic results are pending to determine if they are hatchery reared or wild fish.

It was possible to determine hatchery, stocking site, and year produced (i.e. year class) for 34 of the 61 known hatchery-reared Pallid Sturgeon collected based on PIT tags. Rearing hatchery was determined for 38 of 61 Pallid Sturgeon. Fish reared at Gavins Point National Fish Hatchery represented 52% (N=20) of the total followed by Neosho National Fish Hatchery (N=12) and Garrison National Fish Hatchery (N=4). The most common stocking locations of recaptured hatchery-reared fish were Bellevue, NE (RM 601.0; N=6), Booneville, MO (RM 195.0; N=5), Mulberry, NE (RM 775.0; N=4), and Platte River, NE (RM 595.0; N=4). Five fish were captured that were stocked above Gavins Point Dam (RPMA #3) and passed through the dam. Age of recaptured hatchery reared Pallid Sturgeon ranged from 3 to 17 years. Using a combination of PIT tags and scute marks, 55 of the 61 hatchery-reared Pallid Sturgeon could be assigned to year class. The 2002 year class (N=15) was the most abundant followed by 2009 (N=12), 2007 (N=9), 2008 (N=5), and 2006 (N=4). Hatchery-reared Pallid Sturgeon were sampled from 12 of the 19 year classes that have been stocked in the lower Missouri River.

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SAMPLING EFFORT

Three crews fished daily from Monday, April 2 through Friday, April 13, 2018. A total of 132 volunteers, representing universities, colleges, government agencies, and the public contributed a total of 147 days of assistance. Nine NGPC Missouri River Program employees led this effort and worked a total of 108 days. A total of 255 days of effort were expended during the 12-day effort which resulted in a total of 313 trotlines being deployed or 12,520 hook nights. The majority, 1,168 (84%) of the fish collected were Pallid and Shovel-nose Sturgeon. Blue Sucker (N = 79) were the most frequently captured non-sturgeon species followed by Common Carp (N = 65) and Channel Catfish (N = 61). Overall, 12 different fish species were captured.

During the broodstock effort, the number of Pallid Sturgeon captured ranged from 4 to 12 per day. During this effort, 7 Pallid Sturgeon were caught twice. Catch rates of Pallid Sturgeon and number evaluated for transport to Gavin's Point NFH were similar to the past two years, but drastically lower than previous years (Table 1). Overall, one Pallid Sturgeon was captured for every 139 hooks retrieved and one Pallid Sturgeon was transferred to the hatchery for every 4,173 hooks retrieved. Historic catch rates from the past ten years broodstock collection efforts are presented below.

Year	Historic Catch Numbers											Overall
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
Total Fish	4,254	3,982	4,774	4,957	2,811	2,598	3,095	4,869	4,048	3,577	1,394	40,359
CPUE (fish/line)	14.0	9.4	13.8	10.9	5.8	5.9	5.7	8.8	9.2	8.1	4.5	8.7
Total PDSG	168	160	167	212	84	194	221	212	110	105	90	1,723
PDSG Shipped	31	45	37	45	7	33	36	43	21	19	3*(16)	320
Progeny Produced	6,663	14,593	6,812	21,736	99	6,053	19,582	12,513	608	1,227	--	89,886
Water Temp (°C)	9.5	7.9	11.6	8.1	14.6	8.7	8.7	12.3	10.6	11.8	4.6	9.8
Ave Discharge (kcfs)	37.8	28.2	58.3	67.6	39.4	35.2	37.6	39.4	45.9	47.4	58.5	45.0

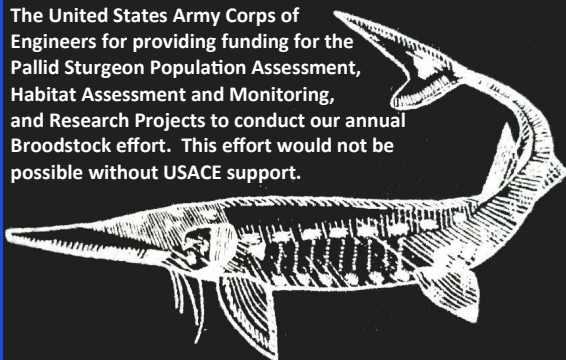
Table 1. Total number of fish, Pallid Sturgeon (PDSG) captured, and the subsequent number transferred to a hatchery for reproductive assessment during the intensive broodstock effort from the upper channelized Missouri River from 2008-2018. * In 2018, fish were evaluated before transport to Gavins Point National Fish Hatchery resulting in only 3 reproductive males being selected for transport.

Trot lines were deployed in a variety of habitat types and catch rates were similar between crews (Table 2). Overall, the Plattsmouth South and North crews tied for the most Pallid Sturgeon collected. The Nebraska City crew shipped the most fish to Gavins Point National Fish Hatchery and collected the most fish overall.

During this effort, water temperatures ranged from 3.7 to 7.6°C, which is the lowest average water temperatures sampled in the 11 years of broodstock sampling (Table 1). The average daily discharge during this two week period at Nebraska City was 58,500 cubic feet per second (cfs) and only varied by 2,500 cfs. This was highest discharge since 2011 when discharge averaged 67,600 cfs.

Acknowledgement

The United States Army Corps of Engineers for providing funding for the Pallid Sturgeon Population Assessment, Habitat Assessment and Monitoring, and Research Projects to conduct our annual Broodstock effort. This effort would not be possible without USACE support.



Capture Rates

Crew	Plattsmouth North	Plattsmouth South	NE City
Total Fish	398	486	510
Total PDSG	32	32	26
PDSG Shipped	1	0	2

Table 2. Total number of fish, Pallid Sturgeon (PDSG) captured and shipped by crew during the 2018 Intensive Broodstock Collection Effort.



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SAMPLING FACTS

- 1,394 - Total number of fish collected
 - 90 - Pallid Sturgeon
 - 1,078 - Shovelnose Sturgeon
 - 4 - Hybrid Pallid x Shovelnose Sturgeon
 - 1 - Lake Sturgeon
- 16 - Number of potentially wild Pallid Sturgeon evaluated for transport to Gavins Point National Fish Hatchery.
 - 3 - Reproductive males shipped to the hatchery
 - 1 - Reproductive female was returned to river
 - 1 - Reproductive male was returned to river that was previously used for propagation
- 61 - Pallid Sturgeon reproductively evaluated (ultrasound)
- 7 - Telemetry fish recaptured (2 re-implanted)
- 9.4 lbs. - Heaviest Pallid Sturgeon collected
- 41.3" - Longest Pallid Sturgeon collected
- 12.1 - Miles of trot lines deployed
- 12,520 - Approximate number of nightcrawlers used
- 1.16 - Miles of night crawlers used if laid end to end
- 4 - Worms eaten by volunteers/NGPC staff
- 43 mph - Highest recorded wind speed
- 2,550 - Estimated number of hours worked by NGPC personnel and volunteers
- 2 - Most days worked by a volunteer (12 individuals)
- 1,723 - Total number of Pallid Sturgeon sampled during the eleven years of broodstock efforts
- 164 - Number of reproductive Pallid Sturgeon collected and transferred in eleven years.
- 40,359 - Total number of fish sampled during the eleven years
- 738 - Unique volunteers over the 11 year broodstock effort
- 19,120 - Total number of volunteer hours since 2008 which is equivalent to 8 full time employees working for a year or approximately \$305,000 in wages.

of Unique Volunteers by years volunteered

- 462 = 1 year
- 142 = 2 years
- 52 = 3 years
- 34 = 4 years
- 16 = 5 years
- 11 = 6 years
- 9 = 7 years
- 2 = 8 years
- 3 = 9 years
- 2 = 10 years
- 5 = 11 years

PARTICIPANTS & VOLUNTEERS

Aaron Lafler	Dan Flural	Henry Hulsing	Krystal Bialas	Miranda Cynova	Scott Luedtke
Adam Sutton	Dane Pauley	Jacob Joy	Kyla Mohr	Mitch Albrecht	Scott O'Nele
Alex Eifert	Danny Menyweather	James Lyda	Kyle Liebig	Monica Macoubrie	Sean Wendling
Alex Wiles	Dante Koupal	Jeff Runge	Kyler Williams	Nathan McGrath	Shaeli Ekstein
Alexis Shorb	Dave Crane	Jenna Beckman	Kyler Williams	Pat Larsen	Shannon Jones
Ally Beard	Dave Lathrop	Jennie Sutton	Kylie Comba	Pat McGee	Sharri Gregg
Amanda Ciurej	Dave Oates	Jeremy Randall	Lee Lehn	Peter Lux	Shaun Dunn
Amanda Kelly	DeLue Miller	Jessie Hall	Logan Stromquist	Philip Hall	Steph Purcell
Andrea Hennings	Derek Kane	John Larsen	Lonny Zwickle	Randy Stutheit	Steve Kindschuh
Austin Herr	Diana Lindloff	John Shelman	Lucas Eifert	Rebecca Podkowka	Taylor Harmenning
Ben Hall	Doug Carroll	John Vrtiska	Lyn Gilbert	Richard Lehn	Tom Hurt
Bill Wendling	Doug Meigs	Jolene Hulsing	Marcus Miller	Rob Ruskamp	Tony Barada
Bob Incontro	Dylan Schulenberg	Jonas Randall	Mat Lehn	Rodger Kendall	Tucker Maxson
Brad Eifert	Eric Lippold	Josh Donahoo	Matt Miller	Ryan Wendling	Ty Stromquist
Brad Thompson	Ernest Renter	Josh Garner	Matthew Sierra	Sam Cowan	Vicky Cowan
Brandon Esch	Evan Carroll	Josh Gregg	Mavrick Burns	Sam Cubrich	William Taylor
Bryce Zimmerline	Frank Albrecht	Josh Wilhelm	Michael Randall	Sam Thompson	Willy Anderson
Camden Oathout	Frank Urzendowski	Journie Vaughan	Michele Fuhrer Hurt	Samuel Hulsing	Zach Horstman
Carson Groff	Gailynn Alberts	Katie Liebig	Michelle Schultz	Sandy Kendall	
Charlie DeShazer	Garrett Cook	Keith Koupal	Mick Sandine	Sarah Gaughan	
Chris Micaneck	Grace Gaard	Kelly Duckert	Mike Carrick	Sarah Miller	
Chris Thompson	Haley Kindschuh	Kevin Juszyk	Mike Gilbert	Sarah Pedrick	
Cole Burmeister	Hayden Schultz	Kirk Pawloski	Mike Throener	Scott Jarecki	

We want to thank all of our volunteers without whom this effort would not be possible.