

THE PALLID STURGEON

**Draft Annotated Bibliography
Through 2003**

**Missouri River Fish and Wildlife Management Assistance Office
U.S. Fish and Wildlife Service
3425 Miriam Avenue
Bismarck, North Dakota**

DRAFT
ANNOTATED BIBLIOGRAPHY

Adams, R. S., G. Adams, and G. R. Parsons. 2003. Critical swimming speed and behavior of juvenile shovelnose sturgeon and pallid sturgeon. *Transactions of the American Fisheries Society* 132:392-397.

Published article concerning swimming performance of hatchery-reared, juvenile shovelnose sturgeon and pallid sturgeon. Results indicated that over the size range and temperatures tested, shovelnose sturgeon and pallid sturgeon probably do not segregate in rivers due to different swimming or station-holding abilities.

Adams, Reid S., Jan Jeffrey Hoover, and Jack K. Killgore. 1998. Swimming endurance of juvenile pallid sturgeon, *Scaphirhynchus albus*. CEWES-ER-A. UW Army Engineer Waterways Experiment Station, ER-A. Vicksburg. 13pp.

Pallid sturgeon were subjected to swimming stamina tests to measure endurance to compare with other sturgeon species.

Annear, Thomas C., Patrick Braaten, and Wyoming Game and Fish Department. 1994. Final environmental assessment for the reintroduction of shovelnose sturgeon into the Bighorn River drainage. Final Environmental Assessment. Wyoming Game and Fish Department. 22pp.

Final Environmental Assessment concerning the reintroduction of shovelnose sturgeon into the Bighorn River drainage. Objectives of the project are to re-establish shovelnose sturgeon in their native range, provide an additional sport fishery for anglers in Wyoming, and to enhance the biodiversity in the Bighorn River.

Army Corps of Engineers. 1990. Biological assessment for the endangered species pallid sturgeon. New Orleans District, Army Corps of Engineers, Louisiana. 31pp.

Biological Assessment (BA) for the pallid sturgeon in the New Orleans District, Louisiana. The BA submitted to the U.S. Fish and Wildlife Service to fulfill requirements of the U.S. Army Corps of Engineers (COE), in adhering to Section 7 of the Endangered Species Act.

Backes, K. M., W. M. Gardner, and P. A. Stewart. 1994. Lower Yellowstone River pallid sturgeon study IV and Missouri River pallid sturgeon creel survey. Montana Department Fish, Wildlife and Parks, Miles City.

Results of fourth year of study. Four pallid sturgeon were captured in Yellowstone River weighing from 3.8 kg to 18.2 kg and measuring from 981 mm to 1,384 mm FL. Fish were tagged and released back into river. Creel census also performed in relation to paddlefish snagging efforts at intake diversion dam on Yellowstone, with report of one pallid sturgeon being snagged and released.

Backes, Kenneth M., William M. Gardner, Dennis Scarnecchia, and Phillip A. Stewart. 1992. Lower Yellowstone River pallid sturgeon study II and Missouri River pallid sturgeon creel survey. Montana Department of Fish, Wildlife, and Parks, Miles City.

Report on second year of study (1992) on Yellowstone River and creel survey results near Fred Robinson Bridge above Fort Peck Reservoir, Missouri River. Authors examined a 138.1-cm pallid sturgeon taken by paddlefish snaggers below the intake diversion on June 26, 1992. Fish was tagged and released. Two pallids were caught by 89 bait fishermen near the Fred Robinson Bridge.

Backes, Kenneth M., William M. Gardner, Dennis Scarnecchia, and Phillip A. Stewart. 1994. Lower Yellowstone River pallid sturgeon study III and Missouri River creel survey. Montana Department of Fish, Wildlife and Parks, Miles City. 17pp.

The study objective below intake diversion dam was to record lengths and weights and attach a tag to all sturgeon caught by drift nets, anglers, or paddlefish snaggers from mid-May to early July. Above intake, the goal was recapturing any previously tagged sturgeon that move upstream of the diversion dam.

Bailey, R. M. and F. B. Cross. 1954. River Sturgeons of the American Genus *Scaphirhynchus*: characters, distribution, and synonymy. Michigan Academy of Science Arts and Letters 39:169-208.

Main reference used comparing the morphometrics and meristics between pallid and shovelnose sturgeon. Authors developed six mutually exclusive head ratios based on noted differences in relatively short length of inner barbel, and shorter distance between mouth and inner barbel of pallid sturgeon. Paper also notes differences in placement and arrangement of barbels and fin ray counts.

Bailey, Reeve M. and Marvin O. Allum. 1962. Fishes of South Dakota. Misc Pub 119. University of Michigan Museum of Zoology, Ann Arbor. 131pp.

General work on fishes of South Dakota. Authors note that the pallid sturgeon is confined to Missouri River and lower parts of major tributaries. Propose that specific name be changed from "album" to "albus" to fit gender ending used in generic name for species. Noted records in Missouri River near mouth of Grand River, mouth of James River, and near Fort Randall Dam.

Barnickol, P. G. and W. C. Starrett. 1951. Commercial and sport fishes of the Mississippi River between Caruthersville, Missouri, and Dubuque, Iowa. Illinois Natural History Survey, Champaign. Bulletin 25(5):267-350.

Data on fishery from cooperative studies from 1944 through 1946 on Mississippi River. No pallids were caught in gear biologists used, but they did procure one specimen weighing 0.12 lb in July 1944 from a fisherman fishing just above mouth of Missouri River. Fisherman near Alton claimed to catch pallids occasionally and called them white hackleback, white shovelnose, or white sturgeon.

Barton, B. A., Herb Bollig, Breana Hauskins, and Chris R. Jansen. 2000. Juvenile pallid (*Scaphirhynchus albus*) and hybrid pallid X shovelnose (*S. albus X platyrhynchus*) sturgeons exhibit low physiological responses to acute handling and severe confinement. *Comparative Biochemistry and Physiology*. Pages 125-134.

Although both pallid and hybrid sturgeons were responsive to stress, they exhibited very low physiological responses compared with those following equivalent stressors in most teleostan fishes or another chondrosteian, the paddlefish (*Polydon spathula*). Reasons for the apparent low responses to handling and confinement in scaphirhynchid sturgeon are not known, but may relate to their evolutionary history, neuroendocrine mechanisms involved in their corticosteroid responses, or anatomy of their internal tissue structure.

Beckman, L. G. and J. H. Elrod. 1971. Apparent abundance and distribution of young-of-year fishes in Lake Oahe, 1965-1969. Pages 333-347 in *Reservoir Fisheries and Limnology*. Spec Pub 8. American Fisheries Society, Bethesda.

Authors studied changes in fisheries of Missouri River after construction of mainstem dams, and noted that neither young pallid nor shovelnose sturgeon were found in the reservoir environment. Even though adult fish of both species were collected, no young-of-year fish of either species were found.

Benson, N. G. 1968. Review of fishery studies on Missouri River main stem reservoirs. Res Rep 71. U.S. Fish and Wildlife Service, Washington DC. 61pp.

Provides an often-used status table on Missouri River fish species in the reservoir system. The pallid sturgeon is classified as "rare" in Garrison Reservoir in North Dakota and in Lakes Oahe, Francis Case, and Lewis and Clark in South Dakota. Author also mentions that most of cyprinid minnows are also declining as a result of reservoirs. (Note: diet of pallid often listed as "cyprinids.")

Berard, E. 1973. Management surveys of the Missouri River and its main stem reservoirs in North Dakota. DJ Project F-2-R-20. Report. North Dakota Department of Game and Fish, Bismarck. 31pp.

Summary of 1972 fishery surveys on Missouri River in North Dakota. Reported capturing three pallids in Lake Sakakawea (Garrison Reservoir) in July, ranging from 535-840mm total length and 460-2040g in weight. Six adult pallids were also captured in the upper reaches of the Oahe Reservoir in North Dakota.

Berard, E. 1974. Management surveys of the Missouri River and its main stem reservoirs in North Dakota. DJ Project F-2-R-21. Report. North Dakota Department of Game and Fish, Bismarck. 33pp.

Summarizes fishery surveys on Missouri River in 1973. No pallids were reported for the Garrison Reservoir surveys, but 120 pallid sturgeon were captured from the river and headwaters of Oahe Reservoir in North Dakota. Pallid sturgeon were the most abundant species taken with 119 fish ranging from 510-675mm total length and from 370-750g weight, netted 525 hours during June and July.

Berard, E. 1975. Management surveys of the Missouri River and its main stem reservoirs in North Dakota. DJ Project F-2-R-22. Report. North Dakota Department of Game and Fish, Bismarck. 35pp.

Report summarizes fishery survey results on Missouri River in 1974. Four pallid sturgeon were captured in Garrison Reservoir ranging from 630-695mm total length and from 680-995g weight. One adult pallid was also captured in the headwater of the Oahe Reservoir in North Dakota.

Berard, E. 1978. Ecological investigations of the Missouri main stem reservoirs in North Dakota. DJ Project F-2-R-25. Report. North Dakota Department of Game and Fish, Bismarck.

Summary of Missouri River fishery investigations in North Dakota in 1977. The report does not mention the location but does indicate the capture of a specimen in the Garrison Reservoir reach.

Berard, E. 1980. Ecological investigations of the Missouri main stem reservoirs in North Dakota. DJ Project F-2-R-26. Report. North Dakota Department of Game and Fish, Bismarck.

Summary of Missouri River fishery investigations in North Dakota in 1979. Four pallid sturgeon were reported, with three ranging from 570 to 635mm total length and from 390 to 950g in weight. Another individual was also reported as weighing 20,672g; however, no length measurement was given.

Berard, E. 1982. Ecological investigations of the Missouri main stem reservoirs in North Dakota. DJ Project F-2-R-28. Report. North Dakota Department of Game and Fish, Bismarck.

Summary of North Dakota fishery investigations along Missouri River in 1981. One pallid sturgeon was reported as being captured in 115 feet of water near the face of the dam, in a gill net set September 14-18, 1981. No weight or length was provided.

Berard, E. 1983. Ecological investigations of the Missouri main stem reservoirs in North Dakota. DJ Project F-2-R-29. Report. North Dakota Department of Game and Fish, Bismarck.

Missouri River fishery survey summary for 1982 reported one pallid sturgeon being captured in Lake Sakakawea (Garrison Reservoir) at Wolf Creek, McLean County, weighing 15,890g.

Berard, E. 1985. Ecological investigations of the Missouri main stem reservoirs in North Dakota. DJ Project F-2-R-31. Report. North Dakota Department of Game and Fish, Bismarck.

Fishery investigation summary report for Missouri River studies in 1984. Three pallid sturgeon were reported as being captured: a 825-mm, 2240-g fish taken at White Earth Bay, Mountrail County, on July 11; a 900-mm total length specimen weighing 3500-g collected at Charging Eagle Bay, Dunn County, July 17-20; and a 1525-mm total length specimen collected off the face of the dam on August 2.

Berg, R. K. 1981. Fish populations of the wild and scenic Missouri River, Montana. DJ Project FW-3-R. Report. Montana Department of Fish, Wildlife and Parks, Helena.

Author reports observing four pallid sturgeon during 5 years of study (1975-1979) in the Missouri River above Fort Peck Reservoir. One pallid sturgeon weighing 14.52 kg and measuring 135.1 cm was collected near Coal Banks Landing about 135 RM above the headwaters of Fort Peck Reservoir, one was observed near Cow Island about 43 RM above the reservoir, and two were seen near Fort Robinson Bridge about 22 RM upstream.

Berry, C. R. 1988. Rare fish in the Upper Missouri River basin. Proceedings of North Dakota Academy of Science 42:3.

Abstract only. Author lists three rare Missouri River fishes including the pallid sturgeon. Decline of species was attributed to inundation of habitat by reservoirs and change in structure and hydrology of remaining riverine habitats because of regulated flows.

Berry, Charles R. and Timothy Modde. 1985. Proposed field survey and status report preparation of three rare Missouri River fishes. U.S. Fish & Wildlife Service. 9pp.

The goal of this proposal is to determine the status of the pallid sturgeon, sturgeon chub, and sicklefin chub by determining ranges and relative densities of existing populations. Additionally, the study will characterize habitat where fish are observed.

Berry Jr., Charles R., Walter G. Duffy, and Kenneth F. Higgins. 1991. Annual report: October 1, 1990 to September 30, 1991. Cooperative Fish and Wildlife Research Unit, Department of Wildlife and Fisheries Sciences, South Dakota State University, Brookings. 27pp.

Annual report prepared by South Dakota State University detailing projects completed by students, awards, presentations, publications and their abstracts concerning fisheries, waterfowl wetlands and endangered species.

Berry Jr., Charles R., Walter G. Duffy, and Kenneth F. Higgins. 1992. Annual report: October 1, 1991 to September 30, 1992. Cooperative Fish and Wildlife Research Unit, Department of Wildlife and Fisheries Sciences, South Dakota State University, Brookings. 23pp.

Annual report prepared by South Dakota State University detailing projects completed by students, awards, presentations, publications and their abstracts concerning fisheries, waterfowl wetlands, and endangered species.

Birstein, Vadim J., ed. 1994. The sturgeon quarterly. 2-1.

Listings of published articles with abstracts from all over the world concerning sturgeon species.

Birstein, Vadim J. and Rob DeSalle. 1993. Pallid sturgeon conservation: molecular methods of species identification. A proposal. American Museum of Natural History, New York. 36pp.

A proposal detailing a plan to develop a high-resolution molecular diagnosis method for the pallid and shovelnose sturgeon; with the end result being a definite molecular method for the discrimination of parental *Scaphirhynchus* species and their hybrids.

Bollig, Herb. 1993. Pallid sturgeon propagation/genetics plan. Gavins Point National Fish Hatchery, U.S. Fish and Wildlife Service. 54pp.

The objective of the document is to identify and document culture methods that can be used while propagating pallid sturgeon in a hatchery environment. This includes information on broodstock development, spawning, genetics, fish production, capture location and handling, fishery management, research suggestions, and coordination activities with Service technology centers, field stations, tribes, and other state and federal agencies.

Bollig, Herbert. 1995. Fiscal year 1995 sturgeon activities and accomplishments. Gavins Point National Fish Hatchery, Yankton.

A detailed list of activities and accomplishments concerning propagation and culture of pallid and shovelnose sturgeon at Gavins Points National Fish Hatchery.

Braaten, Patrick J. 2001. Summary of pallid sturgeon-related studies in the Missouri River below Fort Peck Dam and proposed Fort Peck flow modification biological data collection plan (2/1/2001 draft). U.S. Geological Survey, Columbia. 28pp.

A short summary of pallid sturgeon studies being conducted on the Missouri River from Fort Peck Dam, Montana, to Lake Sakakawea in North Dakota. Studies detailed include: 1) determining the influence of dam operations of water temperature in the Missouri River downstream from Fort Peck Dam, 2) examining movements of pallid sturgeon inhabiting the upper Missouri and Yellowstone Rivers, 3) movements of paddlefish, blue sucker, and shovelnose sturgeon, 4) larval fish sampling and 5) food habits of piscivorous fish.

Bramblett, R. G. 1996. Habitats and movements of pallid and shovelnose sturgeon in the Yellowstone and Missouri Rivers, Montana and North Dakota. Biological Sciences. Montana State University.

Linear regression models suggested that discharge and photoperiod may be important environmental cues for movements of both species. Pallid sturgeon used moderately diverse, dynamic macrohabitats, while shovelnose sturgeon were less selective in macrohabitat use. Substantial differences in habitat use and movements between adult pallid and shovelnose sturgeon indicate that shovelnose sturgeon have limited utility as pallid sturgeon surrogates.

Bramblett R. G. and R. G. White. 2001. Habitat use and movements of pallid and shovelnose sturgeon in the Yellowstone and Missouri Rivers in Montana and North Dakota. Transactions of the American Fisheries Society 130:1006-1023.

Aggregations in late spring and early summer suggest that pallid sturgeon may spawn in the lower 14 rkm of the Yellowstone River. The infrequent use by both species of the Missouri River, from Fort Peck Dam downstream to the Yellowstone River confluence, may be due to altered ecological conditions associated with the dam, and emphasizes the importance of natural river processes for these species.

Bramblett, Robert Glenn and Robert G. White. 1992. Movement and habitat requirements of pallid sturgeon in the Missouri and Yellowstone Rivers, Montana and North Dakota. Montana Cooperative Fishery Research Unit, Bozeman.

Progress report for studies conducted between February 1 and December 1, 1992. Authors report radio and sonic tagging a 12.7 and a 22-kg pallid sturgeon, and obtaining 322 observations during the year. Authors also tagged seven shovelnose sturgeon. Pallid sturgeon chose areas with greater channel width and depth farther downriver, and with greater association with sand substrate.

Bramblett, Robert G. and Robert G. White. 1993. Progress report for the period, 1 January - 31 December 1993, on movement and habitat requirements of pallid sturgeon in the Missouri and Yellowstone Rivers, Montana and North Dakota. Montana Cooperative Fishery Research Unit, Montana State University, Bozeman. 12pp.

Summarize activities for second season of work on this project and focuses on telemetry results. Researchers followed 20 pallid sturgeon marked in 1992 (7) and 1993 (13) to study habitat use and movements, obtaining 372 relocations. Pallids preferred sandy substrate and avoided clay and gravel, which may be related to food availability. Distribution coincided with sand substrate.

Brown, C. J. D. 1955. Record-size pallid sturgeon, *Scaphirhynchus album*, from Montana. Copeia 1955:55.

Short note on three large specimens of this species from Montana. Corrects identification of a 47-lb specimen reported by Cope in 1879 from near Fort Benton on the Missouri River, a 58-inch specimen weighing 31.5 lb from Fort Peck Reservoir in 1949, and one caught July 24, 1950, weighing 38 lb and measuring 66 inches TL in the mouth of the Tongue River. This is the first report from the Yellowstone River.

Brown, C. J. D. 1962. Preliminary list of Montana fishes. Proceedings of Montana Academy of Science 22:21-26.

Abbreviated article providing list of fishes in Montana. Pallid sturgeon are listed as being found in Yellowstone and Missouri Rivers.

Brown, C. J. D. 1971. Fishes of Montana. Montana State University, Bozeman. 207pp.

General Montana reference. Author refers to five pallid sightings in Montana, including the three mentioned in his article in *Copeia* in 1955, and adding a specimen from Fort Peck weighing 40 lb, and another specimen from the Yellowstone River near Intake weighing 36 lb. Mention is made of unconfirmed reports of specimens weighing as much as 100 lb.

Brown, C. J. D. 1995. Fishes of Montana. Pages 29-31. Big Sky Books.

Three pages copied out of the *Fishes of Montana* book describing the characteristics of pallid and shovelnose sturgeon.

Buchanan, T. M. 1973. Key to the fishes of Arkansas. Arkansas Game and Fish Comm., Little Rock. 68pp.

General reference on the fishes of Arkansas. Although no voucher specimens had been obtained, author listed the species as on the Mississippi River, and showed on map where specimen had been reported from St. Francis River, a short distance from the Mississippi.

Burr, B. M. and M. L. Warren, Jr. 1986. Distributional atlas of Kentucky fishes. Kentucky Nature Press Science and Tech Ser 4.

General reference on distribution of fishes in Kentucky. Authors reference one record of a pallid sturgeon taken from the Mississippi River in Hickman County in November 1985, and report that commercial fishermen indicate that species not as rare as records suggest. Authors recommend that the species be classified as endangered within the state.

Campton, Donald E., Anna L. Bass, and Brian W. Bowen. 1999. Mitochondrial DNA sequence analysis of *Scaphirhynchus* species: phase II. 29pp.

Final report concluding that mtDNA results provided the first genetic evidence that three species of *Scaphirhynchus* are indeed distinct evolutionarily, and thus support current conservation efforts to protect pallid and Alabama sturgeon as endangered species under the Endangered Species Act.

Campton, Donald E., Anna L. Bass, Frank A. Chapman, and Brian W. Bowen. 2000. Genetic distinction of pallid, shovelnose, and Alabama sturgeon: emerging species and the US Endangered Species Act. *Conservation Genetics* 1. Pages 17-32.

The mitochondrial DNA results from this work indicate significant reproductive isolation between pallid and shovelnose sturgeon in areas of natural sympatry, and recent evolutionary divergence of Alabama sturgeon.

Campton, Donald E., Angelica I. Garcia, Brian W. Bowen, and Frank Chapman. 1995. Genetic evaluation of pallid, shovelnose, and Alabama sturgeon based on control region sequences of Mitochondrial DNA. Final Report. Florida Department of Fisheries and Aquatic Sciences (University of Florida). 35pp.

A final report based on the genetic evaluation of three types of sturgeon including the pallid, shovelnose, and Alabama sturgeon. Mitochondrial DNA data supported the genetic distinction of all three species on the basis of their apparent reproductive isolation and microevolutionary divergences.

Campton, Donald E., Angelica I. Garcia, Brian W. Bowen, and Frank Chapman. 1999. Genetic evaluation of pallid, shovelnose, and Alabama sturgeon based on control region sequences of Mitochondrial DNA-final report. Final.

A final report based on the genetic evaluation of three types of sturgeon including the pallid, shovelnose, and Alabama sturgeon. Mitochondrial DNA data supported the genetic distinction of all three species on the basis of their apparent reproductive isolation and microevolutionary divergences.

Carlander, K. D. 1969. Handbook of freshwater fishery biology. Iowa State University Press, Ames. 752pp.

Summarized weight, length, and age data on pallid sturgeon reported from Missouri River by Brown, Bailey and Cross, Fogle, Shields, and Sprage. Species reported as rare on Mississippi River, but fairly common on the Missouri River and the newly formed reservoirs on the Missouri. Largest specimen reported was a 30.8-kg fish from North Dakota.

Carlson, D. 1979. Sturgeon studies in Missouri. Endangered Species Project SE-1-6 Study 2. Performance Report.

A 2-year study of sturgeons in Missouri was initiated in 1977 to update the information on the endangered pallid and lake sturgeons' species, to determine whether further protective measures were needed. Not for publication.

Carlson, D. M., W. L. Pflieger, L. Trial, and P. S. Haverland. 1985. Distribution, biology and hybridization of *Scaphirhynchus albus* and *S. platyrhynchus* in the Missouri and Mississippi rivers. In S. Doroshov (ed) Sturgeon Symposium. Environmental Biology of Fishes 14:51-59.

Authors examined 4355 sturgeon from Missouri and Mississippi rivers captured in 1978 and 1979. Eleven pallid and 12 hybrid sturgeon were collected. Pallid sturgeon utilized more fish in diet (primarily cyprinids), were larger, and utilized faster currents than shovelnose sturgeon. First record of hybridization between species attributed to modification of habitats in channelized river.

Carlson, Douglas M. and William L. Pflieger. 1981. Abundance and life history of the lake, pallid and shovelnose sturgeons in Missouri. Final Report. Endangered Species Project SE-1-6. Missouri Department of Conservation, Jefferson City.

Summary of information gathered from 2-year sturgeon study conducted by Department personnel. Report information was published in Carlson *et al.* (1985).

Carufel, L. H. 1953. Sturgeon. North Dakota Outdoors 1953 (May):16-17.

Popular article on sturgeon fishing in the Missouri River. Author used common name "lake sturgeon" for the pallid sturgeon. Two photos accompany article showing large pallid sturgeon taken by Bruce Hoyer of Washburn, in which the fish is as long as the car hood. A second pallid taken by Otto Schmittke near Bismarck is as long as the man is tall. Fish were caught commercially or on set lines.

Carufel, L. H. 1958a. Creel census analysis of tailrace fishing area of the Garrison Reservoir. DJ Project F-3-R-5. Report. North Dakota Department of Game and Fish, Bismarck.

Author reports creel census data taken from Garrison Reservoir tailwaters in 1957. A total of 1777 anglers fished 4254 hours and caught one pallid sturgeon weighing 15 lb.

Carufel, L. H. 1958b. Creel census analysis of tailrace fishing area of Garrison Reservoir. DJ Project F-3-R-6. Report. North Dakota Department of Game and Fish, Bismarck.

Author reports that 3005 fishermen fished 6659 hours and caught eight pallid sturgeon ranging from 16 to 32 inches in length (ave 24), and weighing between .9 and 15.0 lb (ave 7.9) during the 1958 creel census study below Garrison Dam in North Dakota.

Clancey, P. 1989. Fort Peck pallid sturgeon study. Montana Department Fish, Wildlife and Parks, Helena.

Progress report for contract with U.S. Army Corps of Engineers. Author describes preliminary efforts to place telemetry equipment on pallid sturgeons, including unique method of obtaining specimens by divers downstream of Fort Peck Dam. Three fish referenced (29, 33, and 53 lb) as used. Two largest fish moved downstream 45 and 105 miles in one month respectively. Morphometric data provided.

Clancey, P. 1991. Dinosaurs of the deep. Montana Outdoors 22(2):19-22.

Popular article in Department magazine. Author portrays species as a remnant from the age of the dinosaurs. Species was once fairly common in Montana but has become depleted within last 50 years. Mentions results of recent studies and concerns about such things as toxins and lack of sufficient reproduction to maintain species. Interesting section on SCUBA diving for sturgeon during winter.

Clancey, P. 1992. Fort Peck pallid sturgeon study. Montana Department Fish, Wildlife and Parks, Helena. 34pp.

Author reports on third year of efforts to fix telemetry equipment to pallid sturgeon. Some fish were obtained by SCUBA diving below Fort Peck Dam during the winter. Angler reports of capturing pallids both at intake on Yellowstone River and above Fort Peck during paddlefish snagging season not uncommon. Author provides morphologic data on both pallids and shovelnose.

Clancey, Pat. 1991. Fort Peck pallid sturgeon study. Montana Department of Fish, Wildlife, and Parks, Fort Peck. 14pp.

Research project on the life cycle requirements of the pallid sturgeon in the Missouri River below Fort Peck Dam. This project revolved around data collected from pallid sturgeon caught and radio tagged in the Fort Peck Tailrace.

Clancey, Pat. 1991. Fort Peck pallid sturgeon study. Montana Department of Fish, Wildlife, and Parks. 13pp.

The third year of the Fort Peck pallid sturgeon study where five pallid sturgeon were sampled and tracked through the use of telemetry. Shovelnose sturgeon information and habitat use and movements are also detailed.

Clancey, Pat. 1991. Paddlefish and pallid sturgeon spawning habitat study in the area of the Altamon Gas Transmission Company's proposed pipeline crossing of the wild and scenic Missouri River. 13pp.

The study was conducted to determine locations of paddlefish and pallid sturgeon staging and spawning sites, to evaluate the effects of the proposed pipeline crossing installation.

Coffey, Mike, Kenneth Phillips, John Harshbarger, and Timothy Gross. 2000. Middle Mississippi River sturgeon health assessment. Draft report.

This study investigated the potential role organochlorine chemical contamination has on limiting the recovery of the endangered sturgeon species along the Middle Mississippi River, by studying adult health of a surrogate species which was the shovelnose sturgeon.

Coker, R. E. 1930. Studies of common fishes of the Mississippi River at Keokuk. U.S. Bureau of Fisheries Bulletin 45:141-225.

Record of pallid sturgeon on Mississippi River before river modified by lock and dam system. Farthest reference upstream on Mississippi; sightings questioned by Bailey and Cross. Fish reported as 69-cm juvenile weighing 0.75kg. Collection made on April 21, 1916, at site later eliminated by construction of Keokuk Dam. Called "rare," but local fishermen reported catching them "not infrequently."

Constant, G. 1994. Movement, habitat preference, and current status of pallid sturgeon in the Mississippi, Atchafalaya, and Red Rivers. Progress Report. Louisiana Coop Fish and Wildlife Res Unit, Louisiana State University, Baton Rouge.

Author reports surgically implanting 18 pallid sturgeon with ultrasonic transmitters and attempting to follow movements and obtain information on habitat selection. Fish were collected in outflow channel of Old River Control Structure linking Atchafalaya to Mississippi River. Most fish were obtained using commercial fishermen.

Constant, Glenn C., William E. Kelso, Allen D. Rutherford, and Frederick C. Bryan. 1997. Habitat, movement, and reproductive status of the pallid sturgeon (*Scaphirhynchus albus*) in the Mississippi and Atchafalaya Rivers. MIPR Number W42-HEM-3-PD-27. Louisiana State University. Prepared for U. S. Army Corps of Engineers. 78pp.

Telemetry results from pallid sturgeon in the Mississippi and Atchafalaya Rivers. Seasonal movement patterns of pallid sturgeon in the Atchafalaya River were different than in the Yellowstone and upper Missouri Rivers.

Conte, F. S., S. I. Doroshov, P. B. Lutes, and E. M. Strange. 1988. Hatchery manual for the white sturgeon *Acipenser transmontanus* Richardson with application to the North American *Acipenseridae*. Coop Ext Pub 3322. University of California, Davis. 104pp.

Summary of reproductive information published on all North American sturgeon species, including age and size at sexual maturity, fecundity, and spawning dates of wild populations. Pallid listed as spawning in spring (June and July) with males reaching sexual maturity at 53.3 to 58.4 cm in length. General treatise on egg development, embryology, and larval development in sturgeon.

Conzelman, Paul, Terry Rabot, and Bobby C. Reed. 1997. Contaminant evaluation of shovelnose sturgeon from the Atchafalaya River, Louisiana. LFO-EC-97-04. Contaminant Evaluation of Shovelnose Sturgeon From the Atchafalaya River, Louisiana. U.S. Fish and Wildlife Service, Lafayette. 38pp.

Baseline contaminant levels were analyzed in shovelnose sturgeon, in this case, considered a surrogate species for the endangered pallid sturgeon. Contaminants identified were organochlorine pesticides, total polychlorinated biphenyls, polycyclic aromatic hydrocarbons, aliphatic hydrocarbons, and trace elements. Contaminant levels were compared with other fish species within the Atchafalaya Basin.

Cook, Fannye A. 1959. Freshwater fishes in Mississippi. Mississippi Game and Fish Commission. 51pp.

General reference to the freshwater fishes of Mississippi. Author indicates that no specimens of this species have been found in the state, but that it is known to inhabit the Mississippi River as far south as New Orleans. Reports of specimens weighing up to 25 lb had been received. Author surmised that the species could be present in the Yazoo River since it is a highly muddy river.

Corps of Engineers. 1989. Pallid sturgeon study outline and progress report.

A copy of the Corps of Engineers' pallid sturgeon study outline and progress report for 1988. This document was prepared in the context of providing a framework from which a coordinated basin-wide study could be developed.

Cross, F. B. and R. E. Moss. 1987. Historic changes in fish communities and aquatic habitats in plains streams of Kansas. Pages 155-165 in W.J. Matthews and D.C. Heins (eds) Community and Evolutionary Ecology of North American Stream Fishes. University Oklahoma Press, Norman.

Authors review changes in fish communities within state through literature and survey results. Pallid sturgeon no longer in Kansas River and greatly reduced in Missouri River which was its native habitat. Pallid associated with faunal group utilizing shallow streams with fluctuating channels and shifting sand beds. Decline of pallid associated with decline of native cyprinids and dams on river.

Cross, Frank B. 1967. Handbook of fishes of Kansas. University of Kansas Museum of Natural History, Lawrence. Misc Pub 45. 357pp.

General account of pallid sturgeon range within Kansas, including sightings on the lower Kansas River during the flood of 1952. The Kansas River specimens contained larval insects and small fishes as food items. The author notes that the limited range of this species, along with late sexual maturity, makes this species more vulnerable to habitat and overfishing threats.

Daigle, Michael C. 1996. Pallid sturgeon.

A six-page paper copied from Mike's Missouri Fish Page off of the Internet concerning different aspects of the pallid sturgeon life history, all the way to its future.

Deacon, J. E., G. Kobetich, J. D. Williams, and S. Contreras. 1979. Fishes of North America: endangered, threatened, or of special concern. Fisheries 4:29-44.

Special report by the American Fisheries Society on the status of fishes of North America. Pallid sturgeon was considered "threatened" throughout its range due to present or threatened destruction of its habitat. Species range considered to include states of AR, IA, IL, KS, KY, LA, MO, MS, MT, ND, NE, SD and TN.

DeLonay, Aaron J. and Edward E. Little. 2002. Development of methods to monitor pallid sturgeon (*Scaphirhynchus albus*) movement and habitat use in the lower Missouri River. 146pp.

Pallid sturgeon implanted with ultrasonic transmitters selected sandy areas with intermediate to high water velocities adjacent to the main channel, and avoided off-channel areas devoid of current.

Derksen, A. J. and J. S. Loch. Life histories of the shovelnose and pallid sturgeons. Manitoba Department of Natural Resources, Manitoba, Canada. Pp 80-37 and 92-163.

Life histories of the shovelnose and pallid sturgeon are acknowledged in this Manitoba Department of Natural Resources report, which identified several species of fish that may have the possibility of being introduced into the Hudson Bay Watershed via Garrison Diversion.

Dettlaff, T. A. 1981. Development of sturgeons. Moscow. 224pp.

Book written on the sturgeon development. All text is in Russian.

DiLauro, Martin N., Wayne S. Kaboord, Rosemary A. Walsh, and Herb Bollig. 2001. Cytology of the pallid sturgeon (*Scaphirhynchus albus*) sperm cell. 5pp.

Extended abstracts from poster papers for 4th International Symposium of Sturgeon.

DiLauro, Martin N., Rosemary A. Walsh, Michelle Peiffer, and Randy M. Bennett. 2001. Sperm-cell ultrastructure of North American sturgeons. IV. The Pallid Sturgeon (*Scaphirhynchus albus* Forbes and Richardson, 1905). Canadian Journal of Zoological 79:802-808.

Sperm-cell morphology and ultrastructure in the pallid sturgeon were examined using transmission and scanning electron microscopy. Metrics and structure were compared with similar metrics obtained from other published descriptions of sturgeon sperm cells.

Douglas, N. H. 1974. Freshwater fishes of Louisiana. Louisiana Wildlife and Fish Comm. Claitor's Pub, Baton Rouge.

General reference on freshwater fish of Louisiana. Author mentions only two specimens collected in Louisiana from the Mississippi River at Lake Providence from East Carroll Parish. Both specimens were young fish weighing only 0.7 and 1.4 kg. The pallid sturgeon was considered as apparently rare in the state.

Doyle, Wyatt, Louise Mauldin, Joanne Grady, and Jim Milligan. 2002. Lower Missouri River pallid sturgeon monitoring and population assessment project - annual report. U.S. Fish and Wildlife Service, Columbia. 18pp plus appendices.

A three-year project to monitor and evaluate pallid sturgeon populations on the lower Missouri River. No pallid or hybrid pallid sturgeons were captured during the study, although 198 shovelnose sturgeon and two-lake sturgeon were sampled.

Dryer, M. and S. Werdon. 1993. Pallid sturgeon recovery update. 6pp.

Progress report on the third year of a pallid sturgeon study. Three pallids were captured via SCUBA surveys and were tagged, one with a radio transmitter and the other two with PIT and dangler tags. Data is also included from a shovelnose sturgeon study where they were used as surrogates for a telemetry study.

Dryer, Mark. 1989. Missouri River rare fish species with special emphasis on the pallid sturgeon. Presentation at Dakota's AFS Meeting

Presentation on pallid sturgeon to Dakota Chapter AFS meeting in 1989.

Dryer, Mark. 1996. Pallid sturgeon and shovelnose sturgeon activities conducted for propagation at Miles City SFH - spring, 1995.

A 1995 Missouri River FWMAO report regarding the outcome of the spring spawning activities from broodstock capture on the Yellowstone and Missouri River, to the actual spawning procedures that took place at Miles City State Fish Hatchery in Miles City, Montana.

Dryer, Mark. 1996. Pallid Sturgeon recovery update. Issue No.8:1-11.

Pallid sturgeon recovery update. Information collected range wide concerning pallid sturgeon recovery from a wide range of agencies.

Dryer, Mark, Wade King, and Steve Krentz. 1996. Pallid sturgeon and shovelnose sturgeon activities conducted for propagation at Garrison Dam NFH - 1996. 13pp.

A 1996 Missouri River FWMAO report describing the field stations activities. Issues included were spawning objectives, various study requests and needs, and results from broodstock capture efforts of pallid sturgeon. Brief discussion also takes place in regards to shovelnose sturgeon work conducted that year.

Dryer, Mark P. and Alan J. Sandvo. 1993. Recovery plan for the pallid sturgeon (*Scaphirhynchus albus*). U.S. Fish and Wildlife Service, Denver. 55pp.

Official recovery plan for this federally listed endangered species. Provides current information on distribution, abundance, habitat preferences, life history, and reasons for decline. The short-term objective is to avoid extinction through artificial propagation, and the long-term goal is to delist species by 2040 by establishing six naturally self-sustaining populations of the species.

Duffy, Walter G., Charles R. Berry, and Kent D. Keenlyne. 1995. The pallid sturgeon: biology and annotated bibliography. Technical Bulletin 5:1-32. South Dakota Cooperative Research Unit, South Dakota State University.

Annotated bibliography of pallid sturgeon literature through 1994. Included with the bibliographies is information on the biology, taxonomy, distribution and numbers, and the life history of pallid sturgeon.

Eddy, Samuel and James C. Underhill. Northern fishes. Third Edition, revised and expanded. Pages 78-131. University of Minnesota Press, Minneapolis.

Excerpts from the book named *Northern Fishes*, pages 78-79 and 126-131. The references describe some physical characteristics of sturgeon in general, and then discuss the family *Acipenseridae* including information on the pallid and shovelnose sturgeon.

Eddy, Samuel and James C. Underhill. 1980. Northern fishes. University of Minnesota Press.

Selected sections on the shovelnose and pallid sturgeon.

Elstad, Scott, Jeff C. Hendrickson, and Greg Power. 1992. Sturgeon and their associated habitat in the Missouri and Yellowstone Rivers of North Dakota. Fisheries Inventory Report 4. North Dakota Game and Fish Department, Bismarck.

Part of North Dakota fisheries investigations series. Authors report that pallid sturgeon are part of native fauna in Missouri and Yellowstone rivers within state, but they failed to capture a single pallid in 582 gill net drift sets for an equivalence of 99.2 miles of river fished in 1992, although 204 shovelnose sturgeon were captured, comprising 5% of the total fish catch.

Erickson, J.D. 1992. Habitat selection and movement of pallid sturgeon in Lake Sharpe, South Dakota. M.S. thesis. South Dakota State University, Brookings. 70pp.

Unpublished master's thesis. Author studied habitat use by pallid sturgeon through use of telemetry gear from 1989 to 1991. A total of 492 locations were obtained on seven fish. Pallids selected water at a 4-5 meter depth and avoided backwater and areas without current. Small pallids occupied different habitats than larger fish, and shovelnose sturgeon may be a competitor at the smaller sizes.

Erickson, Jonathan. 1991. Habitat preference and movements of pallid sturgeon in Lake Sharpe, South Dakota.

Study detailed movement and habitat selection of pallid sturgeon in the Lake Sharpe area below Oahe Dam. Radio telemetry was used to quantify velocity, substrate, turbidity, and movement information of pallid sturgeon in a reservoir habitat.

Fisher, H. J. 1962. Some fishes of the lower Missouri River. *American Midland Naturalist* 68:424-429.

Results of fishery surveys conducted in lower Missouri River in 1945. Four pallid sturgeon were collected out of 24,664 fish. One pallid was captured near Glasgow in May, one near Lexington in August, and two near St. Joseph in August. Author also obtained a 21.3-inch pallid from a commercial fisherman at Rocheport on October 30 and a 32-inch FL, 4.5-lb fish near Easley on October 25.

Fogle, N. E. 1964. Summation of four years of creel census, July 1959 through June 1963, on Oahe tailwater. DJ Project F-1-R-13. South Dakota Department of Game, Fish and Parks, Pierre.

Tailwater creel harvest below Oahe Dam on Missouri River for first 4 years after dam was closed. Pallid sturgeon were creeled for 2 of 3 years until water diverted through power plant facilities in fourth year. Largest pallid sturgeon creeled was 23 lb.

Fogle, Ned E. 1961. Report of the fisheries investigations during the third year of impoundments of Oahe Reservoir, South Dakota, 1960. DJ Project F-1-R-10. South Dakota Department of Game, Fish and Parks, Pierre.

Oahe Reservoir fishery investigations in 1960. Tailwater harvest of fish estimated at 547, including 20 pallid sturgeon. Reservoir studies netted 22 pallids representing 0.5% of all catches. Average condition factor for 17 males was 9.8 and for 5 females 10.8, which was down from 12.5 and 12.8 for previous year. Lengths were from 18 to 45 inches; males matured at 21 to 23 inches.

Fogle, Ned E. 1961. Report of the fisheries investigations during the second year of impoundment of Oahe Reservoir, South Dakota, 1959. Dingell-Johnson Project F-1-R-9. South Dakota Department of Game, Fish and Parks, Pierre.

Report of fishery investigations on Oahe Reservoir during second year of filling. Author reports capturing four pallid sturgeon in the riverine section as the reservoir filled. One fish was captured on July 7, one on July 27, and two on August 18, 1959. Three fish were 34 inches long, and one was 43. Condition factors were recorded as 12.4 and 12.8. Author thought small mesh prevented more captures.

Fogle, Ned E. 1963. Report of the fisheries investigations during the fourth year of impoundments of Oahe Reservoir, South Dakota, 1962. Dingell-Johnson Project F-1-R-12. Report. South Dakota Department of Game, Fish and Parks, Pierre.

Author summarizes fishery studies in Oahe Reservoir and the tailwater creel survey results for 1962. Title should have been "during fifth year of filling." Gill netting yielded 1613 fish, including 20 pallid sturgeon ranging from 26 to 42 inches and 1.8 to 9.25 lb. The tailwater fishery yielded seven pallid sturgeon weighing 27 lb. Author provides growth table from backdating on six fish.

Fogle, Ned E. 1963. Report of the fisheries investigations during the fourth year of impoundments of Oahe Reservoir, South Dakota, 1961. Dingell-Johnson Project F-1-R-11. Report. South Dakota Department of Game, Fish and Parks, Pierre.

Results of fishery surveys on Oahe Reservoir in 1961 and for the tailrace fishery. Author reported capturing a 30-inch male on June 27 with a condition factor of 10.3. The fish weighed 3.1 lb. The tailrace fishery was estimated to have taken 34 pallid sturgeon weighing 532 lb or 2.9 lb per surface acres of fishing area.

Forbes, S. A. and R. E. Richardson. 1905. On a shovelnose sturgeon from the Mississippi River. Bulletin of Illinois State Lab of Natural History 7:37-44.

Original description of this species from nine specimens collected by commercial fishermen on the Mississippi River near Grafton, Illinois. Authors report that about one in 500 sturgeon at Grafton (mouth of Illinois River upstream from Missouri River) were this "white" sturgeon, while one in five were this species near West Alton (mouth of Missouri River). Named *Parascaphirhynchus albus*.

Forbes, S. A. and R. E. Richardson. 1908. The fishes of Illinois: by authority of state legislature. Danville.

Excerpts from *The Fishes Of Illinois* book where species are described by Order, Family, Genus, Species, Scientific and Common names, as well as a descriptive key to identify the different species. Reference is made to pallid and shovelnose sturgeon, sucker, and flat-head chub.

Forbes, S. A. and R. E. Richardson. 1909. Fishes of Illinois. Illinois Natural History Survey 3:1-357.

Authors included species in *Parascaphirhynchus* and provided commonly known name of white sturgeon. Provided data on comparative morphometric features between this species and the shovelnose sturgeon. Reported species as rare on the Mississippi River but more common on the lower Missouri River. Spawning season was reported to be between June 1 and August 1, according to commercial fishermen.

Gabel, J. A. 1974. Species and age composition of trap net catches in Lake Oahe, South Dakota, 1963-67. Tech paper 75. U.S. Fish and Wildlife Service, Washington DC. 13pp.

Results of trap net catches in Oahe Reservoir from 1963 to 1967 as the reservoir completed filling. Three pallid sturgeon were reported in the catch in 1399 days of trap netting. All three fish were captured in 1964.

Gabel, James A. 1967. Species and age composition of trap net catches in Lake Oahe, South Dakota, 1963-1967. U.S. Fish and Wildlife, Washington DC. 75pp.

This paper describes the species, lengths, ages, and numbers of fish caught in trap nets from 1963 to 1967 in the Oahe Reservoir, to document the broad changes in the adult fish stocks during the filling period.

Gale, Larry R., Charles A. Purkett, Jr., Dan F. Dickneite, and James P. Fry. 1981. Abundance and life history of the lake, and pallid and shovelnose sturgeon in Missouri. SE-1-6. Missouri Department of Conservation. 63pp.

Primary emphasis was to better define the distribution and abundance of the lake and pallid sturgeon in Missouri; to identify existing and potential threats to their survival; and to develop recommendations for enhancing their survival. Comparative information was obtained on the shovelnose sturgeon due to the close relationship to the pallid sturgeon.

Gardner, Bill. 1994. Pallid sturgeon study. Monthly Activity Report. Montana Department of Fish, Wildlife, and Parks, Lewiston. 5pp.

A 1995 Missouri River FWMAO report regarding the outcome of the spring spawning activities from broodstock capture on the Yellowstone and Missouri River, to the actual spawning procedures that took place at Miles City State Fish Hatchery in Miles City, Montana.

Gardner, Bill. 1998. Movement patterns and habitat use of transmitted hatchery-reared juvenile pallid sturgeon stocked in the upper Missouri River. Annual Report to Western Area Power Authority. Montana Fish, Wildlife, and Parks, Lewiston. 13pp.

A summary of an inventory conducted on the Missouri River above Fort Peck Dam, Montana, from 1996 through 1997. A total of four adult pallid sturgeon were sampled with two being recaptures.

Gardner, W. M. 1990. Missouri River pallid sturgeon recovery. DJ Project F-46-R-3. Report. Montana Department of Fish, Wildlife and Parks, Helena.

Results of first year of study, including interviews of 50 people who fished or lived along the river upstream of Fort Peck Reservoir, regarding pallid sturgeon observations. A total of 35 observations were recorded. Recorded weights ranged from 17 to 62 lb. Of 22 captures, 8 were by setlines, 7 while snagging for paddlefish, 4 in gillnets, and 3 by electroshocking.

Gardner, W. M. 1991. Missouri River pallid sturgeon inventory. DJ Project Report. Montana Department of Fish, Wildlife and Parks, Helena.

Report of second year of study above Fort Peck Reservoir. Five pallids and 382 shovelnose sturgeon were captured on setlines and in trammel nets. The five pallids ranged from 30.0 to 50.0 lb and from 50.0 to 60.0 cm FL. Two pallid sturgeon were fitted externally with radio transmitters in attempts to gather information on movements and habitat selection.

Gardner, W. M. 1992. Missouri River pallid sturgeon inventory. DJ Project F-46-R-5. Report. Montana Department of Fish, Wildlife and Parks, Helena.

Results of third year of study above Fort Peck Reservoir. Author reports capture of two pallids weighing 30.0 and 38.0 lb and measuring 50.3 and 55.0 inches FL. One pallid captured the previous year was recaptured. Pallid sturgeon were captured in pools on downstream end of islands. One fish moved 69 and another 37 miles. Authors captured two pallids and 624 shovelnose in trammel nets.

Gardner, W. M. 1993. Missouri River pallid sturgeon inventory. DJ Project F-46-R-6. Report. Montana Department of Fish, Wildlife and Parks, Helena.

Summary of fourth year of study in Missouri River above Fort Peck Reservoir. Fifteen captured pallid sturgeon during 1992; 11 "new" fish and 4 recaptures. Six pallids were fitted with transmitters. Weights of the new fish ranged from 17.5 to 41.0 lb and lengths from 42.7 to 56.5 inches FL. A total of 147 radio relocations were obtained. Morphometric measurements provided.

Gardner, W. M. 1994. Missouri River pallid sturgeon inventory. DJ Project F-46-R-7. Report. Montana Department of Fish, Wildlife and Parks, Helena.

Author summarizes 5 years of study including results of 1993 field season where 6 "new" and 3 recaptured pallids were taken. A total of 24 pallids had been observed during the 5 years of study ranging from 13.2 to 50.0 lb and averaging 33.4 lb. All pallids were caught in the lower 60 miles of the study area above the headwaters of Fort Peck Reservoir in pool areas with sandy substrate.

Gardner, William M. 1994. The status of the pallid sturgeon population in the upper Missouri River.

Progress report of pallid sturgeon sampling activities conducted by Montana Fish, Wildlife and Parks in the Missouri River above Fort Peck Dam.

Gardner, William M. 1995. Missouri River pallid sturgeon inventory. F-78-R-1. Montana Department of Fish, Wildlife and Parks. 19pp.

A Montana Department of Fish, Wildlife, and Parks study evaluating the status of the pallid sturgeon in the middle Missouri River. Objectives of the study were to locate and define pallid sturgeon spawning, juvenile and adult habitat, as well as documenting population size and evidence of most recent reproduction.

Gardner, William M. 2000. Upper Missouri River pallid sturgeon recovery studies - 2000 progress report. Montana Department of Fish Wildlife and Parks. 12pp.

A pallid sturgeon recovery study progress report authored by Montana Department of Fish Wildlife and Parks in December of 2000. The study takes place above Fort Peck Dam in the upper Missouri River and describes pallid sturgeon sightings, as well as issues including sturgeon irido virus, pallid sturgeon spawning, and stocking success calculations.

Gardner, W. M. and P. A. Stewart. 1987. Fishery of the lower Missouri River, Montana. DJ Project FW-2-R. Report. Montana Department of Fish, Wildlife and Parks, Helena.

Report of studies on Missouri River with mention that pallid sturgeon were caught but with no records.

Gasaway, C. R. 1970. Changes in the fish population in Lake Francis case in South Dakota in the first 16 years of impoundment. Tech Paper 56. U.S. Fish and Wildlife Service, Washington DC.

Reports on commercial harvest of several species after Lake Francis case formed on Missouri River (Fort Randall Dam), including 328 sturgeon, between 1959 and 1968. Most of these sturgeon were presumed to be pallid sturgeon, since the average weight of sturgeon was about 15 lb and too large to be shovelnose sturgeon. Peak year was 1962 when 78 sturgeon, weighing 1,170 lb, were taken.

Gasaway, Charles R. 1970. Technical papers of the Bureau of Sport Fisheries and Wildlife.

A two-page excerpt from an issue of Technical Papers of the Bureau of Sport Fisheries and Wildlife. It describes population changes in Lake Francis case of various fish species, and also includes a paragraph about five pallid sturgeon caught on the lake in 1962.

Genetic Analysis, Inc. 1994. Genetic analysis results.

The contracted study was initially an analysis of morphologically identified pallid sturgeon, shovelnose sturgeon, and hybrid sturgeon using DNA. Objectives within the scope include: determining degree of genetic divergence between pallid and shovelnose sturgeon, identifying genetically meaningful management units (stocks) within the range of the pallid, determining if hybridization is occurring and whether it consists solely of F1 hybrids, and to analyze tissue samples from one Alabama sturgeon and developing a technique for extracting DNA material from tissue to compare with pallid and shovelnose sturgeon.

Genetic Analysis, Inc. 1994. Genetic Studies of *Scaphirynchus spp.* Smithville. 41pp.

The contracted study was initially an analysis of morphologically identified pallid sturgeon, shovelnose sturgeon, and hybrid sturgeon using DNA. Objectives within the scope include: determining degree of genetic divergence between pallid and shovelnose sturgeon, identifying genetically meaningful management units (stocks) within the range of the pallid, determining if hybridization is occurring and whether it consists solely of F1 hybrids, and to analyze tissue samples from one Alabama sturgeon, and developing a technique for extracting DNA material from tissue to compare with pallid and shovelnose sturgeon.

Genetic Analysis Inc. 1992. *Scaphirhynchus* project quarterly progress report. Genetic Analysis, Inc. *Scaphirhynchus* project. U.S. Army Corps of Engineers.

This project concluded that the use of these single copy gene PCR primers is completely compatible with determining genetic variation and DNA markers from a number of individuals. The technique in particular provides fast, accurate and, most importantly, unambiguous DNA level markers that are transportable and reproducible.

Genetic Analysis Inc. 1994. Genetic studies of *Scaphirhynchus* species. U.S. Army Corps of Engineers. 41pp.

The contracted study was initially an analysis of morphologically identified pallid sturgeon, shovelnose sturgeon, and hybrid sturgeon using DNA. Objectives within the scope include: determining degree of genetic divergence between pallid and shovelnose sturgeon, identifying genetically meaningful management units (stocks) within the range of the pallid, determining if hybridization is occurring and whether it consists solely of F1 hybrids, and to analyze tissue samples from one Alabama sturgeon and developing a technique for extracting DNA material from tissue to compare with pallid and shovelnose sturgeon.

Gilbraith, David M. and Charles R. Berry. 1986. Preliminary report on the status of the pallid sturgeon, a candidate endangered species. 63pp.

Preliminary draft report on the status of the pallid sturgeon, including species information, assessment and recommendations, information sources, as well as new information or revisions to the status report.

Gilbraith, David M., Monica J. Schwalbach, and Charles R. Berry. 1988. Preliminary report on the status of the pallid sturgeon, *Scaphirhynchus albus*, a candidate endangered species. South Dakota State University, Brookings. 76pp.

Status of the species throughout its known range. Authors identify habitat alteration, possible hybridization with the more common shovelnose sturgeon, river operations, and possible overuse as threats to the species' continued existence. The species was protected by all states on the Missouri River but by no state along the Mississippi River. Compiles known data.

Gould, G. and J. Schmulbach. 1975. Relative abundance and distribution of fishes in the Missouri River, Gavins Point Dam to Rulo, Nebraska. Missouri River Envir Inventory. University of South Dakota, Vermillion. 59pp.

Summary of studies in Missouri River from 1968 to 1973. Only one pallid sturgeon was captured to 6392 shovelnose sturgeon. The pallid was captured in the unchannelized river section (now Wild and Scenic River section) below Gavins Point Dam.

Gowanloch, J. N. 1933. Fishes and fishing in Louisiana. Bull 23. Louisiana Department of Conservation, New Orleans.

Author considers the “white shovelnose” as one of the least known of all sturgeons. No site data or captures are referenced, but a key is provided to enlist help of fishermen in obtaining data on this species. Generic name listed as “*Paraschaphirhynchus*” as originally described by Forbes and Richardson, and one of distinguishing characteristics is 20 to 21 ribs (10 to 11 ribs for shovelnose).

Grady, Joanne M., Louise Mauldin, Bill Davison, and Jim Milligan. 2001. Missouri River pallid sturgeon survey route 19 bridge replacement project-Hermann, Missouri. Final Report. U.S. Fish & Wildlife Service, Columbia.

This is a report detailing the impacts on pallid sturgeon of a bridge replacement project near Hermann, Missouri. The report concluded that all construction activities that would alter streamflow, modify depths, or impact sediment loading within the wing dike fields should be avoided from November through May.

Grady, Joanne M., Jim Milligan, Craig Gemming, David Herzog, Gerald Mestl, Lannie Miller, Don Hernig, Keith Hurley, Paul Willis, and Robert Sheehan. 2001. Pallid and shovelnose sturgeon in the lower Missouri and middle Mississippi Rivers. Final Report. 45pp.

A report detailing the findings of a fish sampling effort conducted from March 1996 through April 2000 on the lower Missouri and middle Mississippi Rivers. A total of 6544 fish of 41 species were sampled, including seven wild pallid sturgeons and two hatchery reared pallid sturgeon.

Graham, K., et al. 1993. MICRA paddlefish/sturgeon committee strategic plan. Mississippi Interstate Cooperative Resource Agreement, Columbia.

Strategic plan for sturgeon and paddlefish as developed by the paddlefish/sturgeon committee working under the auspices of the Mississippi Interstate Cooperative Resource Agreement. Organization is a cooperative and coordinating group involved with interjurisdictional fishery resources within the Mississippi drainage basin. Brief species accounts are provided as well as goals for the committee.

Graham, K., J. Hamilton, T. Grace, N. Stucky, and B. Hrabik. 1995. An action plan for pallid sturgeon in Missouri. Missouri Department of Conservation. 11pp.

A plan outlining the Missouri Department of Conservation’s long-range (1995-2004) strategic direction for pallid sturgeon recovery in Missouri.

Grisak, Grant G. 1997. Research chronology of pallid sturgeon, shovelnose sturgeon, blue sucker, sicklefin chub and sturgeon chub in the Missouri and Yellowstone Rivers in Montana and North Dakota. Montana State University, Bozeman. 83pp.

A paper that provides succinct listing of research that has been conducted on pallid sturgeon, shovelnose sturgeon, blue sucker, sicklefin chub, and sturgeon chub in five study areas: Missouri River from Great Falls, Montana, to Fort Peck Reservoir; Fort Peck Dam to the headwaters of Lake Sakakawea; the Yellowstone River from its confluence with the Missouri River to Miles City, Montana; the Missouri and Yellowstone Rivers above Lake Sakakawea; and the Missouri River from Garrison Dam to Bismarck, North Dakota.

Guy, Christopher S., Richard W. Dykstra, and William M. Gardner. 2002. Preliminary results for habitat use and movements of juvenile stocked pallid sturgeon and indigenous shovelnose sturgeon. 13pp.

A report on the ongoing study of habitat use and movement of hatchery reared pallid sturgeon and indigenous shovelnose sturgeon above Fort Peck Reservoir.

Haddix, Michael H. and Christopher C. Estes. 1976. Lower Yellowstone River fishery study final report. Montana Department Fish, Wildlife, and Parks, Helena.

Final report for a fishery survey of the Yellowstone River conducted for the Bureau of Reclamation. Authors report capturing a 52.0-inch pallid sturgeon weighing 24.5 lb while electroshocking below the intake diversion structure on the Yellowstone River in 1975.

Harlan, J. R., E. B. Speaker, and J. Mayhew. 1987. Iowa fish and fishing. Iowa Department Natural Resources, Des Moines. 323pp.

General reference on fish and fishing in Iowa. Authors indicate historic range along both eastern and western borders of Iowa in Mississippi and Missouri Rivers. Species presently rare and classified as "endangered" in Iowa and protected. Pallid sturgeon presently confined to Missouri River only and considered to be rare.

Harlan, James R. and Everett B. Speaker. 1956. Iowa fish and fishing. Iowa Conservation Commission, Des Moines.

General reference on fishes in Iowa. Pallid sturgeon reference short, giving the common names of white sturgeon or hackleback. Mentions specimen by Coker and probable credence of sighting since fish was collected prior to Keokuk locks. Authors believed species likely in Missouri River, although no specimens were verified from Missouri River in Iowa waters.

Heckman, W. H. 1952. By "Steamboat Bill." Missouri Conservationist 13(12):11.

Author is a steamboat captain responding to an article on sturgeon in the October issue of the Conservationist. Mentions catching a 24-lb pallid near Herman, also seeing a 35-lb pallid near Herman, and a 65-lb pallid taken in 1910. Claimed pallid sturgeon (i.e. "white" sturgeon) are about a fourth of sturgeon in river. Bite only during cool weather in fall and spring. Setlines used.

Hendrickson, Jeff C. 1998. North Dakota fisheries investigations. A-1251. Aquatic Investigations of the Missouri Mainstem in North Dakota. North Dakota Game and Fish Department, Fisheries Division, Bismarck.

A document providing data and interpretation of the biological, physical, and chemical characteristics of the Missouri River system in North Dakota. Data obtained from survey and research investigations provides the needed information to formulate fishing regulations, stocking rates, and water level recommendations

Henry, Catherine J. and Richard Ruelle. 1992. Study of pallid sturgeon and shovelnose sturgeon reproduction. U.S. Fish and Wildlife Service, Pierre. 19pp.

Reproductive data on 12 pallid sturgeon (3 Illinois, 9 Louisiana) from Mississippi River compared with data from 11 shovelnose from Nebraska. Hybrid female had GSI of 23.9 while three immature pallid females had GSIs of 7.2, 9.0, and 10.5. The GSI of male pallids ranged from 1.3 to 7.6. Female pallids over 700mm FL showed developing eggs and at 900mm appeared mature.

Hesse, Larry W. and John R. Carreiro. 1997. The status of paddlefish, pallid sturgeon, lake sturgeon, and shovelnose sturgeon. Mississippi Interstate Cooperative Resource Association, Bettendorf. 52pp.

A summary of information regarding status, distribution, and current management strategies of paddlefish, pallid sturgeon, lake sturgeon, and shovelnose sturgeon within their present range. Pallid sturgeon have been eliminated from approximately 47.6% of the rivers they live in, paddlefish 12.7%, shovelnose sturgeon 25.4%, and lake sturgeon have been eliminated from 29.3% of the lakes and streams they live in.

Hill, W. J. 1966. Progress and job completion report, test netting survey of Garrison Reservoir, Missouri River, and Oahe Reservoir investigations, Snake Creek Reservoir, commercial fishing in Garrison Reservoir. DJ Project F-2-R-13. Report. North Dakota Department of Game and Fish, Bismarck.

Summary of Garrison Reservoir fishery surveys for 1965. Author reports capturing one pallid sturgeon at the Deepwater Creek station weighing 14 lb, 4 oz and measuring 48 inches long. Fish was caught in a gill net in 91 hours of fishing.

Hill, W. J. 1968. Management surveys of the Missouri River and its main stem reservoirs in North Dakota. DJ Project F-2-R-15. Report. North Dakota Department of Game and Fish, Bismarck.

Missouri River fishery survey results for 1967. Author reported gill netting pallid sturgeon in the Van Hook Arm station of Lake Sakakawea (Garrison Reservoir) in August (25.8 inches long and 2 lb, 6 oz), one at Fort Yates (2 lb, 8 oz, 28.0 inches long in 133 hours), and two in Porcupine Bay (6 lb, 6 oz, 39.3 inches; 7 lb, 0 oz, 41.1 inches, 87 hours) in the Oahe Reservoir headwaters.

Hrabik, Robert A., David P. Herzog, and David E. Ostendorf. 2001. Larval pallid sturgeon and pallid-shovelnose hybrids collected in the Mississippi River. Missouri Department of Conservation, Jackson.

Larval sturgeon species were collected in the middle Mississippi River using a benthic trawl. These samples were sent off to Dr. Snyder at Colorado State University. Of the 39 samples, three were confirmed pallid sturgeon and seventeen were believed to be pallid x shovelnose hybrids.

Hurley, K. L. 1999. Habitat use, selection, and movements of middle Mississippi River pallid sturgeon and validity of pallid sturgeon age estimates from pectoral fin rays. South Dakota State University.

Pallid sturgeon in the middle Mississippi River were implanted with sonic transmitters and the fish's movements were recorded for two years. Pallid sturgeon were most often found in the main channel (43%) and main channel borders (33%). Using pectoral fin rays to estimate the age of pallid sturgeon should be viewed with caution.

Jacobson, Robert B. and Mark S. Lastrup. 2001. Habitat assessment for pallid sturgeon overwintering surveys, lower Missouri River. 47pp.

This report documents methods and results of aquatic habitat analysis of pallid sturgeon overwintering habitat on the lower Missouri River. Physical aquatic habitat (depth, velocity, and substrate) were assessed at five wing-dike sites along the lower Missouri River where pallid sturgeon have been captured historically.

Jones, Lloyd A., Greg Power, and Randy Kreil. 1992. Preliminary status investigation of the pallid sturgeon in North Dakota. Project SE - 1. Endangered Species Program, North Dakota Game and Fish Department, Bismarck.

A summary of the North Dakota Game and Fish Department Endangered Species Program as it relates to the pallid sturgeon.

June, F. C. 1976. Changes in young-of-year fish stocks during and after filling of Lake Oahe, an upper Missouri River storage reservoir, 1966-74. Tech paper 87. U.S. Fish and Wildlife Service, Washington DC. 25pp.

Success of spawning in Oahe Reservoir from seventh to sixteenth year after initiation of filling. Even though adults persisted, no reproduction of several large river fish, including the pallid and shovelnose sturgeons, paddlefish, blue catfish, and channel catfish, were found. Twelve of 45 species previously in this section of the Missouri River were no longer found.

Kallemeyn, L. W. 1983. Status of the Pallid Sturgeon. American Fisheries Society 8:3-9.

Reported 250 sightings of pallid sturgeon; 76% of them from Missouri River in Montana and North and South Dakota. Of 13 states representing species range, nine classify it as rare, endangered, or of special concern. Discusses distribution, abundance, habitat, food, harvest, and reproduction. Length-weight formula of $\log W = -7.311 + 3.664 \log L$ developed for Missouri River population.

Kallemeyn, L. W., and J. F. Novotny. 1977. Fish and fish food organisms in various habitats of the Missouri River in South Dakota, Nebraska, and Iowa. FWS/OBS-77/25. U.S. Fish and Wildlife Service, Columbia.

Authors report capturing one pallid sturgeon in a gill net in the riverine section of the Missouri River downstream of the Fort Randall Dam in 1976.

Kallemeyn, Larry W. 1985. Pallid sturgeon. Unpublished work.

A section written about pallid sturgeon for the Red Data Books that were published in 1985. It discusses the range, population, habitat, reproduction, and threats to survival of the pallid sturgeon.

Kapuscinski, Kevin. 2002. Forecasted population abundance of wild and hatchery-reared pallid sturgeon in recovery-priority management area #2 of the Missouri and Yellowstone Rivers during 2016-2028. 15pp.

Forecasted abundance of stocked pallid sturgeon in the Missouri and Yellowstone Rivers in Montana and North Dakota for 2016-2028.

Kapuscinski, Kevin. 2002. Population abundance estimation of wild pallid sturgeon in recovery-priority management area #2 of the Missouri and Yellowstone Rivers during 1991-2001. 14pp.

Reevaluation of population estimates for Recovery Priority Area #2 in Montana and North Dakota. Based on more recent recapture data, population estimates for this section of the habitat are calculated at 96 to 351 adults remaining (Draft).

Kapuscinski, Kevin. 2002. Forecasted population abundance of wild and hatchery-reared pallid sturgeon in recovery-priority management area #2 of the Missouri and Yellowstone Rivers during 2011-2036. 15pp.

Forecasted abundance of stocked pallid sturgeon in the Missouri and Yellowstone Rivers in Montana and North Dakota for 2011-2036.

Keenlyne, K. and Pat Clancey. 1992. Morphometric comparison of upper Missouri River sturgeon. Draft.

A draft of a study that compares morphometric measurements between pallid sturgeon and shovelnose sturgeon. Pallid sturgeon had proportionately longer heads and interrostral lengths and narrower mouths, shorter inner barbells and greater relative distance between mouth and barbells. Three morphometric ratios can be used to differentiate between the two species.

Keenlyne, K. and L. G. Jenkins. 1993. Age at sexual maturity of the pallid sturgeon. American Fisheries Society.

Age and reproductive development data were obtained for five male and nine female pallid sturgeons collected from 1983 to 1991. Males reached sexual maturity at ages 5-7. Females began egg development at ages 9-12 and first spawned at age 15.

Keenlyne, K. D. and P. D. Evenson. Standard and relative weight for the pallid sturgeon, *Scaphirhynchus albus*. 16pp.

Standard and relative weight parameters were calculated from weight-length data on 214 pallid sturgeon observed throughout the species range. Length-specific standard weight was calculated as $W_s = 4.18^7$.

Keenlyne, K. D. and P. D. Evenson. 1993. Standard and relative weight for pallid sturgeon, *Scaphirhynchus albus*. Proceedings South Dakota Academy of Science 72:41-49.

Authors developed standard and relative weight formulae from weight-length data obtained from 214 pallid sturgeon collected from throughout the species range. The weight to length formula of $\log W = -6.378 + 3.357 \log L$ provided an r-square value of 0.974. A length-specific standard weight formula was also calculated as $W_s = 4.18$ to the 7th power times L to the 3.357th power.

Keenlyne, K. D., L. K. Graham, and B. C. Reed. 1994. Hybridization between the pallid and shovelnose sturgeons. 14pp.

Hybridization of shovelnose and pallid sturgeon has been reported from the Missouri River, the middle Mississippi River, and the headwaters of the Atchafalaya River. Few hybrids showed intermediacy in all characteristics as would be expected in a first generation cross. Both male and female hybrids have been found to exist.

Keenlyne, K. D., L. K. Graham, and B. C. Reed. 1994. Hybridization between the pallid and shovelnose sturgeon. *Proceedings of the South Dakota Academy of Science* 73:59-66.

Hybridization of shovelnose and pallid sturgeon has been reported from the Missouri River, the middle Mississippi River, and the headwaters of the Atchafalaya River. Few hybrids showed intermediacy in all characteristics as would be expected in a first generation cross. Both male and female hybrids have been found to exist.

Keenlyne, K. D., E. M. Grossman, and L. G. Jenkins. 1992. Fecundity of pallid sturgeon. *Transactions of American Fisheries Society* 121:139-140.

Authors report on fecundity of a 41-year old fish collected from Missouri River in North Dakota. The ripe female weighed 17.1 kg and was 140.4 cm FL. Egg mass represented 11.4% of total weight. Sampling provided an average of 87 eggs/g for a total fecundity estimate of 170,000 eggs. This is the oldest pallid reported in the literature but not the largest, meaning fish may get much older.

Keenlyne, K. D. and C. J. Henry. 1994. Morphometric comparisons of upper Missouri River sturgeons. *American Fisheries Society* 123:779-785.

Morphometric comparisons were made among three isolated populations of pallid and shovelnose sturgeon from the upper Missouri River. Six measurements were made on 89 pallid and 204 shovelnose sturgeons. A cumulative morphometric characteristics index is described to aid managers in comparing individual fish within a population.

Keenlyne, K. D., C. J. Henry, A. Tews, and P. Clancey. 1994. Morphometric comparisons of upper Missouri River sturgeons. *Transactions of the American Fisheries Society* 123:779-785.

Authors took morphometric measurements from 89 pallid and 204 shovelnose sturgeon from three populations on the upper Missouri River. Pallid sturgeon showed morphometric changes in populations toward the headwaters, while shovelnose did not follow this trend. Morphometric ratios commonly used to distinguish between the species did not remain mutually exclusive with this larger sample size.

Keenlyne, K. D. and L. G. Jenkins. 1993. Age at sexual maturity of the pallid sturgeon. *Transactions of the American Fisheries Society* 122:393-396.

Authors report reproductive information for five males and nine females. Males became sexually mature at ages 5-7. Females began egg development at ages 9-12 and first spawned at age 15. GSI data is included for developmental stages of both males and females along with ages based on sections from pectoral fin rays. Paper includes specimens from the Atchafalaya River, a new site location.

Keenlyne, K. D. and S. J. Maxwell. 1993. Length conversions and length-weight relations for the pallid sturgeon. *North American Journal of Fisheries Management* 13:395-397.

Authors developed conversion formulae for SL to FL, SL to TL, and FL to TL, based on 30 pallid sturgeon collected from the Missouri River in Nebraska, South and North Dakota, and Montana. Length-weight formulae were also calculated for each of the length measurements that have been commonly used for the species. Weight and length data for the 30 specimens are included in the paper.

Keenlyne, Kent D. 1989. A report on the pallid sturgeon. MRC-89-1. U.S. Fish and Wildlife Service, Pierre. 20pp.

Report summarizes status of pallid sturgeon throughout its range and examines threats through review of the literature. Author also summarizes sighting data on species from scientific literature, gray literature, and Heritage Program data. Report contains appendix of all known sightings, by river section and by river mile, along with several historic photos of large pallid sturgeon.

Keenlyne, Kent D. 1989. Pallid sturgeon update.

Updated status report of the pallid sturgeon prior to its listing as an endangered species.

Keenlyne, Kent D. 1993. Recent North American studies on pallid sturgeon, *Scaphirhynchus albus*. International Symposium on Sturgeons. Pages 225-234. VNIRO Publishing, Moscow.

A summary of studies conducted on pallid sturgeon in North America prior to 1994. Contaminants were found in pallid sturgeon collected in the Mississippi and Atchafalaya Rivers.

Keenlyne, Kent D. 1996. Validity of the pallid sturgeon as a species. Validity of the Pallid Sturgeon as a species - an issue paper prepared for the Pallid Sturgeon Recovery Team. U.S. Fish and Wildlife Service, Pierre. 16pp.

Validation of the pallid sturgeon as a separate species from shovelnose sturgeon is legitimate due to the two species morphometric and meristic differences.

Keenlyne, Kent D. and S. J. Maxwell. 1992. Ponderal index studies on the pallid sturgeon (*Scaphirhynchus albus*). U.S. Fish and Wildlife Service, Pierre. 30pp.

Ponderal indexes were calculated for 131 pallid sturgeon observed between 1948 and 1991 from throughout the sturgeon's range. Condition coefficients were found to increase as fish weight and length increased. Low condition coefficients were attributed to changing habitats and the loss of bottom-dwelling cyprinids as a food source.

Kim, J. B., B. A. Barton, and J. M. Conlon. 2002. Characterization of two molecular forms of vasoactive intestinal polypeptide (VIP) from the pallid sturgeon, *Scaphirhynchus albus* (*Acipenseriformes*). Pages 231-238. Kluwer Academic Publishers.

The isolation of two distinct VIP gene products provides some support for the hypothesis that *S. albus*, with approximately 120 chromosomes, is functionally tetraploid, but the alternative view that the species is functionally diploid and the two peptides arose from a local duplication of the VIP gene with the *Scaphirhynchus* lineage, cannot be rejected.

Kim, J. B., Vibeke Gadsboll, Jonathon Whittaker, B. A. Barton, and J. M. Conlon. 2000. Gastroenteropancreatic hormones (insulin, glucagon, somatostatin, and multiple forms of PYY) from the pallid sturgeon, *Scaphirhynchus albus* (*Acipenseriformes*). Pages 353-363.

The results of this study provides insight into the ploidy status of the pallid sturgeon but do not permit an unambiguous conclusion. The amino acid sequences of the pallid sturgeon PYY peptides are appreciably different from the proposed "ancestral" PYY sequence that has otherwise been very strongly conserved among the actinopterygian and elasmobranch fish.

King, Wade L. and Ryan H. Wilson. 2003. Movements and habitat preferences of adult post spawn pallid sturgeon. Biological Report 19. U.S. Fish & Wildlife Service, Bismarck. 34pp.

A progress report on an ongoing telemetry study involving adult pallid sturgeon on the upper Missouri and Yellowstone Rivers. Fifteen post-spawn pallid sturgeons were implanted with combined acoustic and radio tags. Their movements are tracked both by boat and fixed data logging stations.

Kreil, Randy. The old man, the old fish, and tomorrow. *North Dakota Outdoors* 52(4):25-27.

Popularized fictional article on catching pallid sturgeon. Author uses article to educate public about life history and habitat needs of pallid sturgeon, and what has happened to habitat in North Dakota to cause additional restrictions on capturing the species. Article describes new restrictions placed in North Dakota on harvest of sturgeon where it became illegal to harvest any sturgeon species.

Kreil, Randy and Greg Power. 1991. Preliminary status investigation of the pallid sturgeon in North Dakota. Endangered Species Project SE-1. Report. North Dakota Game and Fish Department, Bismarck.

Primarily a proposal for obtaining section 6 study funding under the Endangered Species Act. Provides summary of management activities recently performed in North Dakota to benefit pallid sturgeon, including information and education activities and changes in regulations to protect both the pallid sturgeon and the shovelnose sturgeon.

Krentz, Steve. 1995. Observations and findings of the Missouri River Fish and Wildlife Assistance Office. Pages 105-109. Proceedings of the First Joint Meeting of the Montana/North Dakota Pallid Workgroup and the Fluvial Arctic Grayling Workgroup. U.S. Fish and Wildlife Service, Bismarck.

Status reports on the pallid sturgeon (circa 1995) from three river reaches, the upper Missouri River above Fort Peck Dam, the Missouri River from the Montana/North Dakota border to the headwaters of Lake Sakakawea, and the Yellowstone River.

Krentz, Steve. 1995. Draft 1995 summary report Missouri-Yellowstone Rivers pallid sturgeon status. 10pp.

Summary report of 1995 pallid sturgeon activities of the USFWS's Missouri River FWMAO office in the Missouri - Yellowstone confluence area.

Krentz, Steve. 1997. 1997 summary report of work conducted by the Missouri River FWMAO on Missouri-Yellowstone Rivers' pallid sturgeon. MRFA097-03. U.S. Fish and Wildlife Service, Bismarck. 6pp.

1997 summary of work conducted by the Missouri River FWMAO on the Missouri and Yellowstone Rivers' pallid sturgeon. The summary includes netting effort and results for broodstock collection.

Krentz, Steve. 1998. 1998 draft summary report of work conducted by the Missouri River FWMAO on Missouri-Yellowstone Rivers' pallid sturgeon. MRFA099-01. 6pp.

1998 summary of work conducted by the Missouri River FWMAO on the Missouri and Yellowstone Rivers' pallid sturgeon. The summary includes netting effort and results for broodstock collection.

Krentz, Steve. 1999. 1999 summary report of work conducted by the Missouri River FWMAO on Missouri-Yellowstone River's pallid sturgeon. MRFA000-01. 7pp.

1999 summary of work conducted by the Missouri River FWMAO on the Missouri and Yellowstone Rivers' pallid sturgeon. The summary includes netting effort and results for broodstock collection.

Krentz, Steve. 2001. 2000 summary report of work conducted by the Missouri River FWMAO on Missouri-Yellowstone Rivers' pallid sturgeon. MRFA001-01. 11pp.

2000 summary of work conducted by the Missouri River FWMAO on the Missouri and Yellowstone Rivers' pallid sturgeon. The summary includes netting effort and results for broodstock collection.

Krentz, Steve, Wade King, Shane Hellman, and Ryan Wilson. 2001. 2001 summary report of work conducted by the Missouri River FWMAO on Missouri-Yellowstone Rivers' pallid sturgeon. MRFA001-02.

Summary report of 2001 pallid sturgeon activities of the USFWS's Missouri River FWMAO office in the Missouri - Yellowstone confluence area.

Krentz, Steven. 1992. Pallid sturgeon seasonal use and habitat studies on the Yellowstone River within the Highway 200 bridge replacement project area. Progress Report. U.S. Fish and Wildlife Department, Bismarck. 10pp.

A biological assessment of the Highway 200 Bridge Replacement Project in McKenzie County, North Dakota, was completed in 1992. Sampling of the area indicated that pallid sturgeon do not use the area in the fall. Potential spawning grounds are present in the area.

Krentz, Steven. 1994. Observations and findings of the Missouri River Fish and Wildlife Management Assistance Office. Unpublished Work.

1994 summary of work conducted by the Missouri River FWMAO on the Missouri and Yellowstone Rivers' pallid sturgeon. The summary includes netting effort and results for broodstock collection.

Krentz, Steven. 1995. 1995 summary report; Missouri - Yellowstone Rivers pallid sturgeon status. U.S. Fish and Wildlife Service, Bismarck. 10pp.

Annual report of pallid sturgeon activities in the Yellowstone and Missouri River confluence region. Population estimate, catch data, length frequency and relative weight information is provided on that year's captures.

Krentz, Steven. 1996. Character index for pallid sturgeon and shovelnose sturgeon. U.S. Fish and Wildlife Service, Bismarck.

Character index to provide a means to differentiate pallid sturgeon and shovelnose sturgeon using six morphological measurements.

Krentz, Steven. 1999. 1998 summary report of work conducted by the Missouri River FWMAO on Missouri-Yellowstone Rivers' pallid sturgeon. MRFAO99-01. Missouri River FWMAO, U.S. Fish and Wildlife Service, Bismarck. 6pp.

1998 summary of work conducted by the Missouri River FWMAO on the Missouri and Yellowstone Rivers' pallid sturgeon. The summary includes netting effort and results for broodstock collection.

Krentz, Steven. 2000. Draft 1999 summary report of work conducted by the Missouri River FWMAO on Missouri-Yellowstone Rivers' pallid sturgeon. MRFAO00-01. U.S. Fish and Wildlife Service, Bismarck. 7pp.

1999 summary of work conducted by the Missouri River FWMAO on the Missouri and Yellowstone Rivers' pallid sturgeon. The summary includes netting effort and results for broodstock collection.

Kuhajda, Bernard R. and Richard L. Mayden. 2001. Morphological comparisons of hatchery-reared specimens of *Scaphirhynchus albus*, *S. platyrhynchus*, and *S. albus* x *S. platyrhynchus* hybrids. Final Report. University of Alabama, Tuscaloosa. 119pp.

A review of implications of results from character indexes and alternative approach is evaluated. Utilizing principle components analysis (PCA) on a correlation matrix of 13 meristic characters, and a sheared PCA on a covariance matrix of 51 morphometric variables provided complete or almost complete separation between known sturgeon specimens and their hybrids.

Kynard, B. and M. Horgan. 2001. Guidance of yearling shortnose and pallid sturgeon using vertical bar rack and louver arrays. North American Journal of Fisheries Management 21:561-569.

A report on the guidance of yearling shortnose and pallid sturgeon using vertical bar rack and louver arrays, found that both species were guided efficiently by the louver array and less efficiently by the bar rack.

Kynard, Boyd, Erika Henyey, and Martin Horgan. 1998. Studies on pallid sturgeon. U.S. Geological Survey, Biological Resource Division, Conte Anadromous Fish Research Center. Progress Report, Turners Falls.

Report on a study performed at Conte Anadromous Fish Research Center on the downstream migration and behavior of juvenile pallid sturgeon, as well as illumination, color, and depth preferences.

Kynard, Boyd, Erika Henyey, and Martin Horgan. 1998. Studies on early life behavior of shovelnose sturgeon. Progress Report. U.S. Geological Survey, Biological Resource Division, Conte Anadromous Fish Research Center., Turners Falls. 9pp.

Report on a study performed at Conte Anadromous Fish Research Center on the downstream migration and behavior of juvenile shovelnose sturgeon, as well as illumination, color, and depth preferences.

Kynard, Boyd, Erika Henyey, and Martin Horgan. 2001. Ontogenetic behavior, migration, and social behavior of pallid sturgeon, *Scaphirhynchus albus*, and shovelnose sturgeon, *S. platyrhynchus*, with notes on the adaptive significance of body color. Pages 389-403. Environmental Biology of Fishes.

This study follows through the early life history of shovelnose and pallid sturgeon in a laboratory setting. Observed behavior and movements are documented during the first few weeks of life.

Lee, D. S. 1978. Atlas of North American freshwater fishes. 43pp.

A map that identifies the distribution of pallid sturgeon.

Lee, D. S., C. R. Gilbert, C. H. Hocutt, R. E. Jenkins, D. E. McAllister, and J. R. Stauffer. 1980. Atlas of North American freshwater fishes. North Carolina State Museum of Natural History, Raleigh.

General reference on range and distribution of freshwater fishes in North America. Pallid sturgeon listed as one of two genera in subfamily and one of two or three in genus. Range given as main channels of Missouri and lower half of Mississippi rivers. Habitat preference is excessively turbid waters in strong current over firm bottom. Considered one of most poorly known fishes in North America.

Lee, Jason. 1996. Status of selected species of concern in North Dakota's Missouri River system. North Dakota Game and Fish Department, Riverdale.

A compilation of general distribution and abundance of species of special concern found in North Dakota including the pallid sturgeon. In 1993 and 1994, 72 of 74 pallid sturgeons were captured between river mile 0-12 in the Yellowstone River and river mile 1566-1582 in the Missouri River.

Liebelt, James. 1998. Lower Missouri River and Yellowstone River pallid sturgeon study. 29pp.

Summary of 1996 field research of the lower Missouri and Yellowstone Rivers on pallid sturgeon conducted by Montana Fish, Wildlife and Parks.

Liebelt, James E. 1995. Preliminary report: Fort Peck pallid sturgeon study. Montana Fish, Wildlife and Parks, Glasgow. Pages 81-93. Proceedings of the First Joint Meeting of the Montana/North Dakota Pallid Workgroup and the Fluvial Arctic Grayling Workgroup.

Preliminary report on a 1994 study to investigate the relationships between shovelnose sturgeon, pallid sturgeon, and other associated fish species and aquatic organisms in the Missouri River.

Liebelt, James E. 1996. Lower Missouri River and Yellowstone River pallid sturgeon study. Grant Agreement No. BAO-709. 1994-1995 Report. 57pp.

An annual report on a 1994 study to investigate the relationships between shovelnose sturgeon, pallid sturgeon, and other associated fish species and aquatic organisms in the Missouri River.

Liebelt, James E. 1998. Lower Missouri River and Yellowstone River pallid sturgeon study, 1996 report. Grant Agreement No. 94-BAO-709. Montana Fish, Wildlife, and Parks, Fort Peck. 29pp.

An annual report on a 1996 study to investigate the relationships between shovelnose sturgeon, pallid sturgeon, and other associated fish species and aquatic organisms in the Missouri River.

Liebelt, James E. 2003. Lower Missouri River and Yellowstone River pallid sturgeon study - 1999 report. Montana Fish Wildlife and Parks. Grant 94-BAO-709. Montana Fish Wildlife and Parks. 27pp.

An annual report on a 1999 study to investigate the relationships between shovelnose sturgeon, pallid sturgeon, and other associated fish species and aquatic organisms in the Missouri River.

Liebelt, Jim. 1994. Preliminary report, Ft. Peck pallid sturgeon study - 1994.

Progress report of pallid sturgeon sampling activities conducted by Montana Fish, Wildlife and Parks in the Missouri River below Fort Peck Dam.

Lopinot, A. C. and Philip W. Smith. 1973. Rare and endangered fish of Illinois. Illinois Department of Conservation, Division of Fisheries, Champaign.

General reference on rare and endangered fishes of Illinois. Authors list the pallid sturgeon as occurring in the Mississippi River in Illinois below the confluence with the Missouri River. The authors recommended that the pallid sturgeon be classified as "rare" in Illinois and placed under the state's endangered species code.

Madsen, T. I. 1985. The status and distribution of the uncommon fishes of Nebraska. M.A. thesis. University of Nebraska, Omaha. 97pp.

Author summarizes life history and capture data on rare fishes of Nebraska. Pallid sturgeon is listed as having been caught in the Missouri and the lower 30 km of the Platte River in Nebraska. A total of 25 fish are referenced as having been caught in Nebraska waters.

May, Bernie, Gregory Tranah, Harold L. Kincaid, Charles C. Krueger, and Donald E. Campton. 1997. Genetic confirmation of reproductive isolation in pallid and shovelnose sturgeon. Draft report. University of California, Davis. 6pp.

Reproductive and taxonomic status of pallid and shovelnose sturgeon as different species using genetic confirmation.

Mcquown, E., B. L. Sloss, R. J. Sheehan, J. Rodzen, G. Tranah, and B. May. 2001. Microsatellite analysis of genetic variation in sturgeon: new primer sequences for *Scaphirhynchus* and *Acipenser*. Transactions of American Fisheries Society 129:1380-1388.

The study identifies primer sequences and uses microsatellite analysis for *Scaphirhynchus* and *Acipenser*. Process for amplification and DNA extraction described in the methods section. For *Scaphirhynchus*, 93% of all loci amplified with 76% of those were found to be polymorphic.

Mestl, Gerald. 2003. Summary report: evaluation of the bethnic trawl as a means to sample juvenile and adult pallid sturgeon from main channel habitats of the Missouri River.

Evaluation of the bethnic trawl as a means to sample juvenile and adult pallid sturgeon from main channel habitats of the Missouri River, and to establish baseline data that can be used to measure restoration efforts on the pallid sturgeon's habitat.

Metcalf, A. L. 1966. Fishes of the Kansas River system in relation to zoogeography of the Great Plains. University of Kansas Publications Museum of Natural History 17:23-189.

Author looks at ancestral development of fish species in relation to zoogeographics of Kansas and the Great Plains. Author indicates that no pallid sturgeon have been found in the Kansas River since the large flood of 1952, when several specimens presumably entered from the Missouri River. Author suggests pallid developed in preglacial Hudson Bay drainage, becoming sympatric with shovelnose later.

Mississippi Power and Light Company. 1973. Environmental field measurements programs final report. Mississippi Power and Light Company.

Mimeographed environmental report for the Grand Gulf Nuclear Station between June 1972 and August 1973. Report references capture of a pallid sturgeon in the Mississippi River with subsequent vouchering of the specimen in the Museum of Zoology, University of Michigan. Specimen served as a distributional record of the species.

Missouri Department of Conservation. 1981. Abundance and life history of the lake, pallid, and shovelnose sturgeons in Missouri. Endangered Species Project SE-1-6. Sturgeon Studies in Missouri, Job No.1. Final Report. 63pp.

Final report on the abundance and life history of the lake, pallid, and shovelnose sturgeons in Missouri prior to 1981.

Missouri River Fish and Wildlife Management Assistance Office, U. S. Fish and Wildlife Service. 1996. Pallid sturgeon and shovelnose sturgeon activities conducted for propagation at Miles City State Fish Hatchery- spring, 1995. U.S. Fish and Wildlife Service, Bismarck. 13pp.

A report on the 1995 propagation activities of the Miles City State Fish Hatchery involving pallid and shovelnose sturgeon. Two female and three male pallid sturgeon were used in propagation. The two female's eggs were in poor condition and resulted in no offspring. The milt from two males was used to fertilize eggs from shovelnose sturgeon to create hybrid sturgeon for future study.

Missouri River Fish Wildlife Management Assistance Office. 1999. 1998 summary report of work conducted by the Missouri River FWMAO on Missouri-Yellowstone Rivers and pallid sturgeon. MREA098-05. Missouri River FWMAO, U.S. Fish and Wildlife Service, Bismarck. 3pp.

Summary report of 1998 pallid sturgeon activities of the USFWS's Missouri River FWMAO office in the Missouri - Yellowstone confluence area.

Missouri River Fish Wildlife Management Assistance Office. 1999. 1997 summary report of work conducted by the Missouri River FWMAO on Missouri-Yellowstone Rivers and pallid sturgeon. MRFAO98-04. Missouri River FWMAO, U.S. Fish and Wildlife Service, Bismarck.

Summary report of 1997 pallid sturgeon activities of the USFWS's Missouri River FWMAO office in the Missouri - Yellowstone confluence area.

Montana-Dakota Pallid Sturgeon Work Group. 2000. Montana-Dakota pallid sturgeon work group- 1999 work groups. 1999 Work Reports. 137pp.

A consolidation of pallid sturgeon work reports from Montana Fish, Wildlife and Parks, U.S. Fish and Wildlife Service, U.S. Geological Survey, Gavin's Point National Fish Hatchery, Garrison National Fish Hatchery, and Miles City State Fish Hatchery presented at the 1999 Upper Pallid Workgroup Meeting.

Montana Department of Fish, Wildlife, and Parks. 1991. Montana Fish Wildlife and Parks job progress report.

A study to evaluate the status of the pallid sturgeon in the Missouri River above Ft. Peck reservoir. A total of five pallid and 382 shovelnose sturgeon were captured during this 1990 field season.

Montana Department of Fish, Wildlife, and Parks. 1994. Montana Department of Fish, Wildlife and Parks Fisheries Division job progress report: July, 1993-June 1994. 29pp.

A summary of an inventory conducted on the Missouri River above Fort Peck Dam, Montana, from 1993 through 1994. A total of nine adult pallid sturgeon were sampled with three being recaptures.

Montana Department of Fish, Wildlife, and Parks. 1995. Missouri River pallid sturgeon inventory: July 1994-June 1995. Montana Fish, Wildlife, and Parks.

A summary of an inventory conducted on the Missouri River above Fort Peck Dam, Montana, from 1993 through 1994. A total of nine adult pallid sturgeon were sampled with three being recaptures.

Montana Department of Fish, Wildlife, and Parks. 1995. Proceedings of the first joint meeting of the Montana/North Dakota pallid workgroup and the fluvial arctic grayling workshop. Montana Department of Fish, Wildlife, and Parks, Bozeman. 118pp.

Status reports on the pallid sturgeon (circa 1995) from three river reaches: the upper Missouri River above Fort Peck Dam, the Missouri River from the Montana/North Dakota border to the headwaters of Lake Sakakawea, and the Yellowstone River.

Montana Department of Fish, Wildlife, and Parks. 1996. Missouri River pallid sturgeon inventory: July 1995-June 1996. Montana Fish, Wildlife, and Parks.

A summary of an inventory conducted on the Missouri River above Fort Peck Dam, Montana, from 1995 through 1996. A total of four adult pallid sturgeon were sampled with one being a recapture.

Montana Department of Fish, Wildlife, and Parks. 1996. Missouri River pallid sturgeon inventory. F-78-R-3. Statewide Fisheries Investigations, Montana Department of Fish, Wildlife, and Parks, Lewiston. 34pp.

A study to evaluate the status of the pallid sturgeon in the Missouri River above Ft. Peck reservoir. A total of four pallid sturgeon were captured during this 1996 field season.

Montana Department of Fish, Wildlife, and Parks. 1997. Middle Missouri River fisheries evaluations: 1997 annual report. 1997 Annual Report. Montana Fish, Wildlife, and Parks.

A summary of an inventory conducted on the Missouri River above Fort Peck Dam, Montana, from 1995 through 1996. A total of four adult pallid sturgeon were sampled with one being a recapture.

Montana Department of Fish, Wildlife, and Parks. 1999. Montana endangered fishes program: July 1998-June 1999. Montana Fish, Wildlife, and Parks. 9pp.

A study designed to determine habitat preferences, movements, and stocking success of hatchery-reared juvenile pallid sturgeon by implanting 44 pallid sturgeon with radio transmitters.

Montana Department of Fish, Wildlife, and Parks. 2003. Lower Missouri/Yellowstone River pallid sturgeon study - recap of late August - fall field activities. 2pp.

Field activities from Montana Fish, Wildlife, and Parks for the fall of 2000. Includes the results of sampling efforts on the Missouri and Yellowstone Rivers.

Montana Department of Fish, Wildlife, and Parks. 2003. Lower Missouri/Yellowstone River pallid sturgeon study - recap of June-early August field activities. 2pp.

Field activities from Montana Fish, Wildlife, and Parks for June-August of 2000. Includes the results of sampling efforts on the Missouri and Yellowstone Rivers

Morris, J., L. Morris, and L. Witt. 1972. Fishes of Nebraska. Nebraska Game and Parks Commission, Lincoln. 98pp.

General treatise on the fishes of Nebraska. Authors mention that pallid sturgeon weighing from 10 to 12 lb are taken immediately below the Gavins Point Dam. Pallid sturgeon and lake sturgeon both considered to be rare in state. Pallid sturgeon mentioned as seeming to prefer muddy water.

Nebraska Game and Parks Commission. 1977. Nebraska's endangered and threatened wildlife. Nebraska Game and Parks Commission, Lincoln.

General public document on threatened and endangered fauna of Nebraska. Pallid sturgeon is classified as "threatened" due to destruction of spawning and feeding grounds, pollution, and siltation. Species is fully protected in Nebraska.

Nelson, W. R. 1962. Report of fisheries investigations during the seventh year of impoundment of Gavins Point Reservoir, South Dakota, 1961. DJ Project F-1-R-11. Report. South Dakota Department of Game, Fish and Parks, Pierre.

Summary of fishery studies in Gavins Point Reservoir during seventh year of impoundment. Author reports three pallid sturgeon being captured in the reservoir headwaters in 36 gill net sets. Fish collected June 26-28 and July 10-12 in 1961 averaged 31 inches in length and 3.7 lb, having condition factors during the two periods of 13.8 (2) and 9.2 (1), respectively.

Olson, Mike M. 1998. Saving a living dinosaur. North Dakota Outdoors 1988 (November), 20-22. North Dakota Game and Fish Department, Bismarck.

Article in the North Dakota Outdoors magazine on the pallid sturgeon recovery efforts in North Dakota, including the release of 750 hatchery reared pallid sturgeon in the Missouri River.

Peterka, John J. and C. G. Scalet. 1978. Report to members of the committee on "endangered fishes", Upper Missouri River Chapter of the American Fisheries Society. 1978-A. North Dakota State University, Fargo. 7pp.

A 1978 report submitted by the Dakota Chapter of the American Fisheries Society on the status of four threatened species: the paddlefish, pallid, lake, and shovelnose sturgeons.

Peterman, Larry G. and Michael H. Haddix. 1975. Lower Yellowstone River fishery study. Montana Department of Fish and Game. 47pp.

Survey results of the lower Yellowstone River by Montana Department of Fish and Game. Fish abundance and distribution information presented.

Peters, Edward J. 2002. Ecology and management of the pallid sturgeon and sturgeon chub in the lower Platte River. University of Nebraska, Lincoln. 25pp.

A study designed to quantitatively describe habitat use by pallid sturgeon and sturgeon chub in the lower Platte River. The study also includes an analysis of the ecological relationships among pallid sturgeon and sturgeon chub and other fish species.

Peters, Edward J., Jason Olnes, James Parham, Cory N. Reade, Ryan Ruskamp, Dane Shuman, Vaughn A. Snook, and Benjamin Swigle. 2001. Ecology and management of the pallid sturgeon and sturgeon chub in the lower Platte River. Progress Report May 2000/May 2001. University of Nebraska, Lincoln. 23pp.

A study designed to quantitatively describe habitat use by pallid sturgeon and sturgeon chub in the lower Platte River. The study also includes an analysis of the ecological relationships among pallid sturgeon and sturgeon chub and other fish species.

Pflieger, W. L. and T. B. Grace. 1987. Changes in the fish fauna of the lower Missouri River, 1940-1983. Pages 166-177 in W. J. Matthews and D. C. Heins (eds) Community and Evolutionary Ecology of North American Stream Fishes. University of Oklahoma Press, Norman.

Authors analyzed changes in the fish community of lower Missouri River from sampling at about 20-year intervals. Pallid sturgeon and flathead chub had declined markedly, and authors postulated competition with other more generalist species. Reduced habitat diversity may no longer permit survival of two sturgeon species in the river, with loss of pallid sturgeon the likely result.

Pflieger, William L. 1975. Fishes of the Missouri. Missouri Conservation Department, Jefferson City. 343pp.

General work on the fishes of Missouri. Key provided to separate pallid from shovelnose sturgeon, noting differences in relative length of inner barbel and a general lack of scutation on abdomen of pallid sturgeon. Although once abundant, overharvest during early 1900's had seriously reduced numbers of pallid sturgeon. Overfishing, pollution, dams, and channelization were considered threats.

Pflieger, William L. and Timothy B. Grace. 1987. Community and evolutionary ecology of North American stream fishes. University of Oklahoma Press, Norman and London. Changes in the Fish Fauna of the Lower Missouri River, 1940-1983. 17pp.

A summary of fish fauna found in the lower Missouri River and the change in abundance of the species from 1940-1983.

Phelps, S. R. and F. W. Allendorf. 1983. Genetic identity of pallid and shovelnose sturgeon (*Scaphirhynchus albus* and *S. platyrhynchus*). Copeia 3:696-700.

Pallid and shovelnose sturgeon are electrophoretically indistinguishable at 37 loci. They share the same allele at 34 monomorphic loci and have similar allelic frequencies at three polymorphic loci.

Phelps, S. R. and F. W. Allendorf. 1993. Genetic identity of pallid and shovelnose sturgeon (*Scaphirhynchus albus* and *S. platyrhynchus*). Copeia 3:696-700.

Pallid and shovelnose sturgeon are electrophoretically indistinguishable at 37 loci. They share the same allele at 34 monomorphic loci and have similar allelic frequencies at three polymorphic loci.

Phelps, Stevan R. and Fred W. Allendorf. 1983. Genetic identity of pallid and shovelnose sturgeon (*Scaphirhynchus albus* and *S. platyrhynchus*). Copeia 1983:696-700.

Examined fish collected by Carlson *et al.* (1985) electrophoretically at 37 loci. Two species shared same allele at 34 monomorphic loci and had similar allelic frequencies at three polymorphic loci. Close genetic similarity attributed to recent or incomplete reproductive isolation accompanied by rapid morphological differentiation or recent divergence.

Power, G. and R. Kreil. 1992. Preliminary status investigation of the pallid sturgeon in North Dakota. Endangered Species Project SE-1. Report. North Dakota Game and Fish Department, Bismarck.

Report describes work intended to be performed by agency in relation to pallid sturgeon. It summarizes management activities recently initiated, including review of catch data obtained by the Department, information and education efforts, new regulations to prohibit capture of pallid sturgeons, and development of a cooperative study agreement with Montana for interjurisdictional populations.

Power, Greg and Chris Grondahl. 1995. Preliminary status investigations of the pallid sturgeon in North Dakota. North Dakota Game and Fish Department, Bismarck. 11pp.

A summary of the North Dakota Game and Fish Department Endangered Species Program for the year 1993-1994 as it relates to the pallid sturgeon

Power, Greg, Jeff Hendrickson, Jason Lee, and Fred Ryckman. 1994. Missouri River system fishery reference and operational management document. Fisheries Inv Rep 10. North Dakota Game and Fish Department, Bismarck.

Authors summarize fishery data on the Missouri River as part of the North Dakota Game and Fish Department "Fisheries Investigations" series. Data on commercial harvest of sturgeon from Lake Sakakawea (Garrison Reservoir) are included. In 1953, 256 sturgeon (3.6 lb ave) were harvested, 186 in 1954 (ave 6.8 lb), 116 in 1955 (ave 7.2 lb), and 322 in 1957 (ave 5.9 lb). Size suggests some were pallids.

Power, Greg and Randy Kreil. 1992. Preliminary status investigations of the pallid sturgeon in North Dakota. Endangered Species Program. North Dakota Game and Fish Department, Bismarck. 5pp.

A summary of the North Dakota Game and Fish Department Endangered Species Program as it relates to the pallid sturgeon.

Power, Greg and Fred Ryckman. 1996. The Yellowstone River. North Dakota Outdoors April/May. Pages 24-27. North Dakota Game and Fish Department, Bismarck.

An article written for North Dakota Outdoors magazine on the importance and history of the Yellowstone River.

Reed, Bobby C. 1990. Pre-management plan for pallid sturgeon, *Scaphirhynchus albus* in Louisiana. Draft. Louisiana Department of Wildlife and Fisheries. 20pp.

Objective of this draft plan is to present life history information on the pallid sturgeon, review current studies, list areas where additional research is needed, and report activities of the Pallid Sturgeon Recovery Team.

Reed, Bobby C. 1995. Louisiana pallid sturgeon survey: July 1994-June 1995. Annual Performance Report. Louisiana.

Annual report for Louisiana from July 1994 through June 1995. Section 6 report

Reed, Bobby C. 1995. Pallid sturgeon surveys, annual report. F-1105. Louisiana Department of Wildlife and Fisheries. 4pp.

Annual report for Louisiana from July 1994 through June 1995. Section 6 report

Reed, Bobby C. 1998. Louisiana pallid sturgeon surveys endangered species. 1998 Annual Performance Report. Inland Fisheries Division, Louisiana Department of Wildlife and Fisheries.

Primary objective of this project was to document the status and distribution of the pallid sturgeon in Louisiana on the Red/Atchafalaya River system during 1997.

Reed, Bobby C. 1999. The status and distribution of pallid sturgeon in Louisiana. 1999 Annual Performance Report, 1. Inland Fisheries Division, Louisiana Department of Wildlife and Fisheries.

Annual report for Louisiana from July 1998 through June 1999. Section 6 report.

Reed, Bobby C. and Michael S. Ewing. 1993. Status and distribution of pallid sturgeon at the old river control complex, Louisiana. Department of Wildlife and Fisheries, Lake Charles. 104pp.

The status and distribution of pallid sturgeon at the Old River Control Complex were studied during 1992 through 1993. Basic information is presented including capture, species, habitat, and evaluation of effort.

Riis, J. 1993. Pallid sturgeon. South Dakota Conservation Digest 60 (July/August): 16-19.

Popular article on the pallid sturgeon alerting sportsmen about the species and about changing regulations prohibiting the harvest of both the pallid sturgeon and shovelnose sturgeon within the state. Several photos including one of a 68-lb pallid sturgeon caught by Bruce Hoyer in North Dakota in 1956. Article discusses recovery plan for species, recent telemetry studies, and asks fishermen for sighting information.

Robison, H. W. 1974. Threatened fishes of Arkansas. Arkansas Academy of Science Proceedings 27:59-64.

General article on the rare and threatened fishes of Arkansas, listing the pallid sturgeon as "rare." Author gave Arkansas distribution of this species on the Mississippi and St. Francis rivers, and noted general lack of availability of voucher specimens within the state.

Ruelle, Richard and Catherine Henry. 1992. Contaminant information bulletin, organochlorine compounds in pallid sturgeon. U.S. Fish and Wildlife Service, Pierre. 7pp.

Organochlorine pesticide concentrations were compared between tissues, with fish weight, and with percent lipid in tissues for pallid sturgeon. There was strong correlation between fish weight and fish length and p,p'-DDE concentrations in fish livers. This indicates that the liver is a good tissue to collect for this analysis and that concentrations accumulate proportionally to increase in size.

Ruelle, Richard and Catherine Henry. 1992. Organochlorine compounds in pallid sturgeon. Contaminant Information Bulletin. U.S. Fish and Wildlife Service, Pierre. 7pp.

Organochlorine pesticide concentrations were compared between tissues, with fish weight, and with percent lipid in tissues for pallid sturgeon. There was strong correlation between fish weight and fish length and p,p'-DDE concentrations in fish livers. This indicates that the liver is a good tissue to collect for this analysis and that concentrations accumulate proportionally to increase in size.

Ruelle, Richard and Catherine Henry. 1993. Contaminant evaluation of sturgeon, paddlefish and blue sucker.

Contaminant evaluation of sturgeon, paddlefish, and blue suckers. Draft Report.

Ruelle, R. and K. D. Keenlyne. 1993. Contaminants in Missouri River pallid sturgeon. Bulletin of Environmental Contaminants Toxicology 50:898-906.

Authors identified several contaminants of concern which may cause adverse effects to pallid sturgeon and especially to sturgeon reproduction. Contaminants of greatest concern were three heavy metals (mercury, cadmium, and selenium) and four organic compounds (PCBs, chlordane, dieldrin, and DDT and isomers). Late maturation and periodic reproduction makes this species vulnerable to contaminants.

Ruelle, R. and K. D. Keenlyne. 1994. The suitability of shovelnose sturgeon as a surrogate for pallid sturgeon. Proceedings South Dakota Academy of Science 73:67-81.

This report examined the use of the more common shovelnose sturgeon as a surrogate for the pallid sturgeon in contaminant and other studies. Because of differences in life history, the shovelnose sturgeon may not meet all the traits desired for a surrogate; however, they may be the best surrogate available because of the many similarities to the pallid sturgeon.

Ruelle, Richard and Kent D. Keenlyne. 1991. A contaminant evaluation of Missouri River pallid sturgeons. U.S. Fish and Wildlife Service, Pierre. 25pp.

Tissue analysis from three Missouri River pallid sturgeon to evaluate contaminant loading for 23 elements and organochlorine pesticides.

Ruelle, Richard and Kent D. Keenlyne. 1992. Contaminants in Missouri River sturgeon. SD-FWE-93-01. U.S. Fish and Wildlife Service, Pierre. 12pp.

Data on contaminant loads in liver, kidney, muscle, and reproductive tissue of two pallid sturgeon from North Dakota and one from Nebraska. Analysis was made for 23 elements and organochlorines. Cadmium, mercury, and selenium were elevated in all tissues. Isomers of DDT, PCBs, and chlordanes were relatively high in reproductive tissues and may be related to reproduction problem.

Ruelle, Richard and Kent D. Keenlyne. 1994. Contaminant information bulletin, the suitability of shovelnose sturgeon as a pallid sturgeon surrogate. SD-ES-94-03. U.S. Fish and Wildlife Service, Pierre. 13pp.

This report examined the use of the more common shovelnose sturgeon as a surrogate for the pallid sturgeon in contaminant and other studies. Because of differences in life history, the shovelnose sturgeon may not meet all the traits desired for a surrogate; however, they may be the best surrogate available because of the many similarities to the pallid sturgeon.

Ryckman, Fred. 1985. Missouri River relic-pallid sturgeon. North Dakota Outdoors 47(4) 37-39.

Popular article on pallid sturgeons in North Dakota. Author provides life history information, how to identify species, and capture information for Departmental studies. Photos include one taken from a Williston newspaper showing six pallid sturgeon caught by a setline fisherman near Williston. The largest specimen reportedly weighed 85 lb. and measured 66 inches in length.

Ryckman, Fred. 1995. Paddlefish snagger creel and incidental sturgeon snagging survey. Pages 110-116. Proceedings of the First Joint Meeting of the Montana/North Dakota Pallid Workgroup and the Fluvial Arctic Grayling Workgroup. North Dakota Game and Fish Department, Williston.

Status reports on the pallid sturgeon (circa 1995) from three river reaches: the upper Missouri River above Fort Peck Dam, the Missouri River from the Montana/North Dakota border to the headwaters of Lake Sakakawea, and the Yellowstone River.

Scalet, C. G. 1985. Endangered and threatened fishes in South Dakota. South Dakota State University. 7pp.

Brief descriptions of various threatened, endangered, or fishes of concern for South Dakota.

Scalet, Charles G. Endangered and threatened fishes of South Dakota. ESS 27B. South Dakota Cooperative Extension Service; U.S. Fish and Wildlife Service; South Dakota Department of Game, Fish, & Parks; Department of Wildlife & Fisheries Sciences, South Dakota State University. Endangered Species. 7pp.

Brief descriptions of various threatened, endangered, or fishes of concern for South Dakota.

Schill, William B. and Robert L. Walker. 1994. Phylogenetic relationships of sturgeon inferred from cytochrome b sequences. National Fish Health Research Lab, Kearneysville. 16pp.

Examination of phylogenetic relationships of sturgeon from cytochrome b sequences. The authors concluded from the available information that there was a lack of observed divergence within *Scaphirhynchus*, and that sequences for the three species were identical.

Schmulbach, James C. 1974. An ecological study of the Missouri River prior to channelization. Project Number B-024-SDAK. Completion Report. Water Resources Institute, Brookings.

Community assessment of the unchannelized Missouri River during 1970 through 1973. Study evaluates benthic and zooplankton abundance and distribution, bionomics of sauger and walleye, movement, population estimates, growth, feeding behavior, and selectivity of shovelnose sturgeon.

Scholz, Allan T., Ronald J. White, Mary Beth Tilson, Jennifer L. Miller, and Kamia N. Kunttgen. 2000. Evaluation of thyroxine content in egg and larval pallid sturgeon, *Scaphirhynchus albus* (Forbes and Richardson, 1905), as a potential indicator of imprint timing. 77pp.

This work documents the thyroxine levels in pallid sturgeon eggs and larvae to determine potential imprint timing. Results indicated that pallid sturgeon experience elevated thyroid content at the time of hatch, and at the time they are developing from protolarvae to mesolarvae life stages.

Schuckman, J. 1989. Nebraska's sturgeon. *Nebraskaland* 67(7):50.

General article on sturgeon in a popularized format. Informational article for fishermen advising them that it is illegal to keep pallid sturgeon in Nebraska, and showing how to distinguish between Nebraska sturgeon species. Author indicates that most pallid sturgeon caught in Nebraska are approximately 3 feet long and weigh from 6 to 8 lb.

Schuckman, Jeff. Nebraska's sturgeon. 1. *Nebraskaland*. Notes on Nebraska Fauna.

Article from *Nebraskaland* magazine on Nebraska's sturgeon.

Schwartz, Ted R. 1992. Pallid sturgeon egg chemical analysis. National Fisheries Contaminant Research Center, Columbia. 8pp.

Results from pallid sturgeon egg analysis in 1992. Results were within acceptable or normal range for cadmium, mercury, and nickel; however, selenium concentrations were slightly elevated relative to bluegill eggs.

Sheehan, Robert J. and Roy C. Heidinger. 2002. Middle Mississippi River pallid sturgeon habitat use project. 90pp.

Annual progress report on middle Mississippi River pallid sturgeon studies from sixth year of work. Primary objectives of this study were to describe the micro- and macro-habitat components of spawning, feeding, staging, and rearing areas.

Sheehan, Robert J., Roy C. Heidinger, Keith L. Hurley, Paul S. Wills, and Michael A. Schmidt. 1997. Middle Mississippi River pallid sturgeon habitat use project. 52pp.

Progress report from Southern Illinois University researchers from 1997 of work on the middle Mississippi River. Project objectives are primarily to identify habitat use, life history information, further genetic research, and monitor movements.

Sheehan, Robert J., Roy C. Heidinger, Keith L. Hurley, Paul S. Wills, and Michael A. Schmidt. 1998. Middle Mississippi River pallid sturgeon habitat use project. Year 3. Annual Progress Report. Fisheries Research Laboratory and Department of Zoology, Carbondale. 85pp.

Progress report from Southern Illinois University researchers from 1998 or year 3 of continued work on the middle Mississippi River. Project's objectives are primarily to identify habitat use, life history information, further genetic research, and monitor movements.

Sheehan, Robert J., Roy C. Heidinger, Paul S. Wills, Michael A. Schmidt, Greg A. Conover, and Keith L. Hurley. 1997. Middle Mississippi River pallid sturgeon habitat use project. 48pp.

Middle Mississippi River study developing methods and collection of habitat data. Determined that it was possible to collect sufficient numbers of sturgeon to utilize tracking technology. Sonic transmitters allowed researchers to track study fish at tracking velocities of 11 to 13 km/h in the river. Character index developed from meristic and morphology data collected on study fish.

Sheehan, Robert J., Roy C. Heidinger, Paul S. Wills, Michael A. Schmidt, Keith L. Hurley, and Miguel Nuevo Alarcon. 1998. Middle Mississippi River pallid sturgeon studies. Southern Illinois University, Fisheries Research Laboratory, Carbondale.

Summary of work from year 3 of continued work on the middle Mississippi River.

Sheehan, Robert J., Roy C. Heidinger, Paul S. Wills, Michael A. Schmidt, Greg A. Conover, and Michael E. Hurley. 1999. Guide to the pallid sturgeon shovelnose sturgeon character index (CI) and morphometric character index (mCI). Fisheries Research Laboratory, Southern Illinois University, Carbondale. 16pp.

Guide to calculating pallid sturgeon/shovelnose sturgeon character index and morphometric character index using morphometric and meristic characteristics.

Shields, J. R. 1957. Report of the fisheries investigations during the second year of impoundment of Gavins Point Reservoir, 1956. D-J Project F-1-R-6. Report. South Dakota Department of Game, Fish, and Parks, Pierre.

Author indicates that reservoir conditions are not suitable for sturgeon. All specimens caught were from the upper portion of the reservoir where riverine conditions existed.

Shields, T. J. 1958. Report of fisheries investigations during the third year of impoundment of Gavins Point Reservoir, South Dakota. 1957. D-J Project F-1-R-7. Report. South Dakota Department Game, Fish, and Parks, Pierre.

Report of fishery survey results for Gavins Point Reservoir during 1957. Author reports capturing nine pallid sturgeon in gill nets that ranged in size from 26 to 51 inches total length and from 3.5 to 18.75 lb in weight. Individual condition factors ranged from 9.7 to 15.2, generally increasing with increasing fish length. Pallids noted to use upstream section of reservoir.

Simons, A. M., R. M. Wood, Lucie S. Heath, Bernard R. Kuhajda, and Richard Mayden. 2000. Phylogenetics of *Scaphirhynchus* based on mitochondrial DNA sequences. Transactions of the American Fisheries Society 130:359-366.

A hierarchical pattern of relationships was produced from analysis of mitochondrial DNA indicating inconsistency with that produced by morphological data. However, it was consistent with the hypothesis of a low rate of evolution of these genes in *Scaphirhynchus*, and reflects recent hybridization between the shovelnose and pallid sturgeon probably due to habitat degradation.

Smith, P. W. 1979. The Fishes of Illinois. University of Illinois Press, Urbana. 314pp.

General reference on fishes of Illinois. Author mentions that most pallid sturgeon enter the Mississippi River out of the Missouri River, and are primarily found between the mouth of the Missouri and the mouth of the Ohio River in the Mississippi. Species is considered rare in the Mississippi River, and previous report of a specimen found upriver near Keokuk, Iowa, is considered an error.

Snook, V. A. 2001. Movements and habitat use by hatchery-reared pallid sturgeon in the lower Platte River, Nebraska. MS Thesis. University of Nebraska.

Work conducted on the Platte River in Nebraska on stocked pallid sturgeon movements and habitat use. Author identifies depths, velocities, and locations of relocated fish through the use of radio transmitters. Approximately 85% of the observations were at depths of 0.33 to 1.21 meters, and bottom velocities of less than 0.70 meters per second were observed about 91% of the time.

Snook, Vaughn A., Edward J. Peters, and Linda J. Young. 2000. Movements and habitat use by hatchery-reared pallid sturgeon in the lower Platte River, Nebraska. 18pp.

Research continued in 1999 with the implantation of 15 age-7 hatchery reared pallid sturgeon. Movements and habitat use were assessed using water and aerial surveys. Movements upstream of 20 km were observed; however, the majority of the fish remained between the release site and the mouth of the Platte River. Most of the observations occurred at depths of 0.33 to 1.21 m and mean column velocities of 0.41 to 1.00 m/s.

Snyder, Darrel E. 1994. Morphological development and identification of pallid, shovelnose, and hybrid sturgeon larvae. Contribution 71. Colorado State University Larval Fish Lab, Fort Collins.

Larvae from shovelnose sturgeon adults collected in Montana and pallid and hybrid sturgeon collected in Missouri were studied to develop a morphologic key for larvae and protolarvae. Protolarvae could be differentiated using inner and outer barbel length ratios (61-70% I:O pallids; 77-109% shovelnose). For larvae, turns of the hindgut spiral valve was best criterion (5-6 pallid; 6-8 shovelnose).

Snyder, Darrel E. 1999. Pallid and shovelnose sturgeon larvae-morphological development and identification. Department of Fishery and Wildlife Biology, Fort Collins. Final Report. 31pp.

This report is a revised description of pallid sturgeon larvae based on a preserved series reared in 1997 and comparison with shovelnose sturgeon.

Sprague, J. W. 1959. Report of fisheries investigations during the fourth year of impoundment of Gavins Point Reservoir, South Dakota, 1958. DJ Project F-1-R-8. Report. South Dakota Department Game, Fish and Parks, Pierre.

Summarizes fishery studies for Gavins Point Reservoir for 1958. Author reports capturing three pallid sturgeon ranging from 36 to 50 inches in length, and from 6 to 16.25 lb with individual condition factors ranging from 11.0 to 13.0. Reported that sport fishermen occasionally catch pallid sturgeon on hook and line. Pallid sturgeon represented 2.8% of catch by weight.

Sprague, J. W. 1960. Report of fisheries investigations during the fifth year of impoundment of Gavins Point Reservoir South Dakota, 1959. DJ Project F-1-R-9. Report. South Dakota Department Game, Fish and Parks, Pierre.

Summary of fishery investigations on Gavins Point Reservoir during 1959. Author reports capturing two pallid sturgeon in gill nest which averaged 37 inches and 5.5 lb. The average condition factor was 10.7, lower than that recorded in 1958. Author also mentions that commercial netting operations took 36 pallid sturgeon averaging 20 pounds in one 24-hour period.

Sprague, J. W. 1964. Test netting survey of Garrison Reservoir, creel census of Garrison tailrace, pre-impoundment survey of the Missouri River Snake Creek Reservoir, commercial fishing in Garrison Reservoir. DJ Project F-2-R-11. Report. North Dakota Game and Fish Department, Bismarck.

Summarizes results of fishery surveys on Garrison Reservoir on the Missouri River for 1963. Author reports capturing one pallid sturgeon weighing 14 lb, 8 oz and measuring 49.5 inches in 1426 hours of gill net fishing.

Stewart, Phillip A. 1994. Effects of the intake diversion dam on pallid sturgeon and shovelnose sturgeon in the lower Yellowstone River.

Study detailing effects of the irrigation diversion dam near Glendive, Montana on the sturgeon species of the Yellowstone River.

Stewart, Phillip A. 1995. Effects of intake diversion dam on pallid and shovelnose sturgeon in the lower Yellowstone River. Pages 94-109. Proceedings of the First Annual Joint Meeting of the Montana/North Dakota Pallid Workgroup and the Fluvial Arctic Grayling Workgroup. Montana Fish, Wildlife, and Parks, Miles City.

Status reports on the pallid sturgeon (circa 1995) from three river reaches, the upper Missouri River above Fort Peck Dam, The Missouri River from the Montana-North Dakota border to the headwaters of Lake Sakakawea, and the Yellowstone River.

Swain, D. P., A. J. Derksen, and J. S. Loch. 1980. A literature review of life histories of some species of fish that may be introduced into the Hudson Bay Watershed from the Missouri River Watershed as a result of Garrison Diversion. MS Rep. 80-37:92-110. Manitoba Department Natural Resources, Winnipeg.

Life history data on several Missouri River fish species that could be introduced into Canada by diversion of water from the Missouri River, into basins draining northward through the proposed Garrison Irrigation Unit in North Dakota. This section contains life histories of the shovelnose and pallid sturgeon.

Tews, A. and P. Clancey. 1993. Fort Peck pallid sturgeon study. Montana Department Fish, Wildlife and Parks, Helena. 70pp.

This the final report under contract to the Corps of Engineers for the 1992 field season. In 38 hr of drift netting, 35 pallid and 402 shovelnose sturgeon were captured. One pallid was from the Yellowstone; the rest were from below the confluence of the Yellowstone and Missouri Rivers. Pallids were usually found in narrow channels along sandbars at an average depth of 3.1 m and at velocity of 0.5 m/s. Weights were from 15 to 54 lb.

Tews, Anne. 1993. Pallid sturgeon and shovelnose sturgeon in the Missouri River from Fort Peck Dam to Lake Sakakawea and in the Yellowstone from intake to its mouth. Final Report. Montana Department of Fish, Wildlife, and Parks. Fort Peck Pallid Sturgeon Study. 87pp.

Final report of population sampling and pallid sturgeon information collected in the Missouri and Yellowstone Rivers in eastern Montana and western North Dakota. Sampling was conducted in the area downstream of Fort Peck Dam.

Tews, Anne. 1994. Pallid sturgeon and shovelnose sturgeon in the Missouri River from Fort Peck Dam to Lake Sakakawea and in the Yellowstone from intake to its mouth. Final Report. Montana Department of Fish, Wildlife and Parks, Helena. 87pp.

Fifty-five different pallid sturgeon were caught, ranging from 1090-1566 mm FL. Drift netting for 123 hours yielded 0.4 pallids/hr. All pallids caught in nets were in the lower Yellowstone or below its confluence in the Missouri. One fish moved 300 km in a 9-month period.

Tews, Anne and Pat Clancey. 1992. Fort Peck pallid sturgeon study. Montana Department of Fish, Wildlife, and Parks, Livingston. 69pp.

Final report of pallid and shovelnose sturgeon studies conducted in the Missouri River below Ft. Peck Dam in 1992.

The Sturgeon Society. 1996. The Sturgeon Quarterly 4(1-2). 11pp.

Listings of published articles with abstracts from all over the world concerning sturgeon species.

The Sturgeon Society. 1996. The Sturgeon Quarterly 4(3). 15pp.

Listings of published articles with abstracts from all over the world concerning sturgeon species.

Tranah, G., H. L. Kincaid, C. C. Krueger, D. E. Campton, and B. May. 2001. Reproductive isolation in sympatric populations of pallid and shovelnose sturgeon. North American Journal of Fisheries Management 21:367-373.

Pallid sturgeon from northern population in the upper Missouri River were genetically distinct from the southern Atchafalaya River population, suggesting that these two areas are reproductively isolated. Shovelnose sturgeon from three locations were genetically indistinguishable and showed no population structure.

Tranah, Gregory, Harold L. Kincaid, Charles C. Krueger, Donald E. Campton, and Bernie May. 1995. Genetic confirmation of reproductive isolation in pallid and shovelnose sturgeon.

Draft report of genetic confirmation of reproductive isolation in pallid and shovelnose sturgeon.

Tranah, Gregory, Harold L. Kincaid, Charles C. Krueger, Donald E. Campton, and Bernie May. 1996. Genetic confirmation of reproductive isolation in pallid and shovelnose sturgeon. Draft Report. UC-Davis.

Draft report of genetic confirmation of reproductive isolation in pallid and shovelnose sturgeon.

U.S. Army Corps of Engineers. 2002. Preliminary final lower Yellowstone River intake dam fish passage alternatives analysis. U.S. Army Corp of Engineers, Omaha. 55pp plus appendices.

Preliminary final report on the alternative analysis for the lower Yellowstone intake dam fish passage.

U.S. Fish and Wildlife Service. 1965. A documentation of 1963-64 activities and findings. Bureau of Commercial Fisheries, Mobridge. 74pp.

Mimeographed report on results of test netting of commercial fishing gear on Oahe Reservoir by Bureau of Commercial Fishery staff located in Mobridge. Reports harvest of 106 lb. of pallid sturgeon in the upper reaches of reservoir with up to 0.2 lb/trap net/day. Also mentions tagging and releasing 13 pallid sturgeons (8 fin clip, 5 dart tags). Pallids noted in upper reservoir only.

U.S. Fish and Wildlife Service. 1991. Biological assessment bridge over Lake Oahe, North Dakota. Appendix B. U.S. Fish and Wildlife Service, Bismarck. 17pp.

Appendix for a Biological Assessment for construction of a bridge over Lake Oahe in North Dakota.

U.S. Fish and Wildlife Service. 1991. Fisheries review. Data Search. U.S. Fish and Wildlife Service, Fort Collins. Fisheries Review. 48pp.

Database search of sturgeon from the U.S. Fish and Wildlife Service's Office of Information Transfer.

U.S. Fish and Wildlife Service. Status report on pallid sturgeon. U.S. Fish and Wildlife Service. 9pp.

Preliminary status report for the pallid sturgeon

US Fish and Wildlife Service. 1993. Pallid sturgeon seasonal use and habitat studies on the Yellowstone River within the Highway 200 bridge replacement project area. U.S. Fish and Wildlife Service, Bismarck. Spring Use 1993 and Final Report. 8pp.

Final Report of a highway replacement project on the lower Yellowstone River. Information included in report includes pallid sturgeon captures during the study and habitat information for the site.

Unknown author. 2000. The shovelnose sturgeons. Pages 101-102.

Excerpt from the *Fishes of Tennessee* on the pallid and shovelnose sturgeon.

Van Whye, G. L. 1960. Test netting survey of the Garrison Reservoir. DJ Project F-3-R-7. Report. North Dakota Game and Fish Department, Bismarck.

Results of test netting in Garrison Reservoir for 1959. Author reports catching six pallid sturgeon in 1083 hours of fishing with a variegated gill net. Lengths ranged from 16.0 to 26.5 inches and averaged 23.5, and weights ranged from 0.5 to 2.4 lb and averaged 1.4 lb.

Vance, Joel M. 1994. The million year citizen. Missouri Conservationist (December). Pages 223-225. Missouri Department of Conservation.

Article from the Missouri Conservationist on the Conservation Department's effort to restore sturgeon populations.

Vladykov, V. D. and J. R. Greeley. 1963. Order *Acipenseroidi*. Pages 24-60 in Y.H. Olsen (ed), Fishes of the western North Atlantic, part 3. Sears Foundation for Marine Research, Yale University, New Haven.

Authors list in a footnote the capture of a pallid sturgeon that measured 532 mm FL and weighed 553 g in the brackish water of Vermillion Bay at Cypremont Point, Louisiana, by a shrimp fisherman in a trawl on May 10, 1954. This sighting would be after some large flooding on the Mississippi River and not a great distance from one of the outlets to the Atchafalaya River where pallids were found.

Walburg, C. H. 1964. Fish population studies, Lewis and Clark Lake, Missouri River, 1956-1962. Spec Fish Rep 48. U.S. Fish and Wildlife Service, Washington DC. 27pp.

Documents decline of most fish species in Lewis and Clark Lake (Gavins Point Dam) during the first seven years after impoundment. Nine pallid sturgeon were captured in 1957, three in 1958, two in 1959, and three in 1961. Lengths ranged from 26 to 51 inches and weights from 3.5 to 18.8 lb. Growth rates of many species also declined, leaving the author to conclude rapid water exchange harmed fish.

Walburg, C. H. 1976. Changes in the fish population of Lewis and Clark Lake, 1956-1974, and their relation to water management and the environment. Research Rep 79. U.S. Fish and Wildlife Service, Washington DC. 34pp.

References to captured pallid sturgeon during first 19 years after the impoundment of Lewis and Clark Lake (Gavins Point Dam) on the Missouri River. No specific data on pallid sturgeon is provided; however, the decline of sympatric species such as shovelnose sturgeon and silvery minnows is indicated.

Walburg, C. H. 1977. Lake Francis Case, a Missouri River Reservoir: changes in fish population in 1954-75, and suggestions for management. Tech Paper 95. U.S. Fish and Wildlife Service, Washington DC. 12pp.

Frequently used reference on status of pallid sturgeon. Author provides a list of fish species and their apparent trends in Lake Francis Case (Gavins Point Dam Reservoir) on the Missouri River over a 22-year study period. The pallid sturgeon is classified as "rare" with "no trend" on population numbers. Also termed "rare" are three sunfish species, black bass, flathead chub, silvery minnows, and other species.

Walburg, C. H., G. L. Kaiser, and P. L. Hudson. 1971. Lewis and Clark Lake tailwater biota and some relations of the tailwater and reservoir fish populations. Pages 449-467 in *Reservoir Fisheries and Limnology*. Spec Pub 8. American Fisheries Society, Bethesda.

Authors studied fish dynamics of Lewis and Clark Lake (Gavins Point Dam) on Missouri River from February 1968 to April 1969, 13 and 14 years after enclosure. Only one pallid sturgeon was captured out of 5486 fish in 61 gill net sets below the reservoir in the tailwater area.

Walker, C. R. 1952. Sturgeon. *Missouri Conservationist* 13(10):16.

Popular article on sturgeon in Missouri. Mentions pallid, or white sturgeon, as one of three Missouri sturgeons and explains how to identify between the species. Author also mentions that commercial sturgeon harvest in Missouri has been between 6000 and 13,000 lb. with most of these being shovelnose. Fish are eaten smoked, the eggs used as caviar, and the skin as leather. Trammel nets are used in harvesting.

Wang, Yuqi, B. A. Barton, Per F. Nielsen, and J. M. Conlon. 1999. Tachykinins (Substance P and Neuropeptide Y) from the brains of the pallid sturgeon, *Scaphirhynchus albus* and the paddlefish, *Polyodon spathula* (Acipenseriformes). Pages 21-29. *General and Comparative Endocrinology*.

The structural similarity between the sturgeon and the trout tachykinins supports the hypothesis that the *Acipenseriformes* (sturgeons and paddlefish) represent the sister group of the *Neopterygii* (gars, bowfin, teleosts).

Warren, Jr., M. L., B. M. Burr, and B. R. Kuhajda. 1986. Mississippi River sturgeons: new Kentucky records and comments on status. *Transactions Kentucky Academy of Science* 47(1-2):52-53.

Authors report first vouchered specimen of pallid sturgeon in Kentucky. Specimen was obtained November 5, 1985, from Mississippi River about 9 km south of Columbus, Hickman County. Fish was a 685-mm SL female weighing 1.8 kg, captured with six shovelnose sturgeon on a setline baited with worms. Authors note that commercial fishermen find species less common than shovelnose.

Warren, Jr., M. L., Wayne H. Davis, et al. 1986. Endangered, threatened, and rare plants and animals of Kentucky. *Transactions Kentucky Academy of Science* 47(3-4):83-98.

Authors are the Endangered Species Committee for the Kentucky Academy of Science and the Kentucky Nature Preserves Commission. Report updates rare animal and plant list. Pallid sturgeon listed as "endangered" in state.

Watson, Jay H. and Phillip A. Stewart. 1991. Lower Yellowstone River pallid sturgeon study. Montana Department of Fish, Wildlife and Parks, Helena.

Covers work for Bureau of Reclamation on Yellowstone River. Authors report capturing one pallid sturgeon on July 19, 1991, in a trammel net near RM 129.3 near the town of Fallon. Specimen weighted 11.34 kg and was 134.0 cm FL. Authors captured 724 fish, including the pallid sturgeon and 349 shovelnose sturgeon.

Webster, Joe. 1993. FY 1993 accomplishments: framework for the management and conservation of paddlefish and sturgeon species in the United States. FFA PGR-3. U.S. Department of the Interior, Bozeman. 24pp.

Accomplishment report outlining various stations efforts in 1993 toward the Framework for the Management and Conservation of Paddlefish and Sturgeon Species in the United States.

Werdon, S. and M. Dryer. 1992. Pallid Sturgeon recovery update. 10pp.

Pallid sturgeon recovery update. Information collected range wide concerning pallid sturgeon recovery from a wide range of agencies.

Whitmore, Sharon and Kent D. Keenlyne. 1990. Rare, threatened, and endangered endemic species of the Missouri River floodplain. Missouri River Coordinator's Office, Pierre. 24pp.

Comprehensive list and brief biology of rare, threatened, and endangered endemic species of the Missouri River Floodplain.

Wills, B. 1998. Sturgeons of the Mississippi River drainage (Volume 1).

Excerpt from Volume One, Sturgeons of the Mississippi River Drainage by Earthwave.

Young, Melanie Y. 1997. Assessment of endocrine-disrupting contaminants in reference to the federally endangered pallid sturgeon in the middle Missouri River. 3F25. Rock Island Field Office, U. S. Fish and Wildlife Service.

Interim report on the endocrine disrupting contaminants in middle Mississippi River. No data to report.

Zuerlein, G. 1993. Nebraska's threatened and endangered species: pallid and lake sturgeons. Nebraskaland Magazine.

Popular article on the lake sturgeon and pallid sturgeon giving fishermen information on how to distinguish between the species, life history information, and status. Article includes map showing location of reports received since 1970, which are 15 locations on the Missouri River and two sites on the lower Platte River.