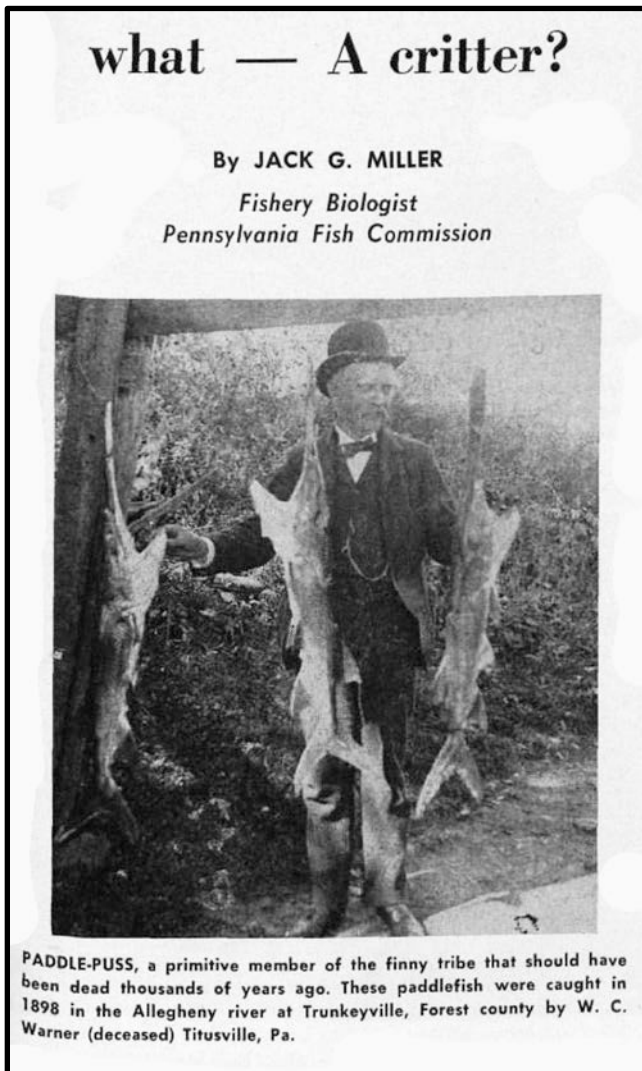


Allegheny and Ohio River Paddlefish

Western Pennsylvania

2011-2013 Evaluation of our Paddlefish Restoration Program

Paddlefish are native to the Allegheny-Ohio river system of western Pennsylvania. Considered migratory, Paddlefish are known to travel tremendously long distances throughout their large river habitats. They require precise timing of environmental cues, including water temperature, photoperiod, and river flows to induce migration and achieve successful reproduction. Early records of Paddlefish are few for Pennsylvania (Photograph 1). We believe the last historical account was a 1919 collection made at the confluence of the Kiskiminetas and Allegheny rivers. Since that time, Paddlefish have been extirpated from Pennsylvania. Poor water quality, reduction of habitats, and blocked migration routes caused by navigation dams lead to the demise of this fish species throughout a substantial portion of its native range. Over the intervening years, water quality has dramatically improved so much that in 1991, the Pennsylvania Fish and Boat Commission (PFBC), under the guidance of the Mississippi Interstate Cooperative Resource Association ([MICRA](#)) initiated a program to restore Paddlefish to the Allegheny and Ohio rivers. This report summarizes California University of Pennsylvania's (CalU) evaluation of our program from 2011 through 2013. Previous investigation results were presented in our [2005](#) and [2003](#) *Biologist Reports*.



Our Paddlefish restoration program primarily consisted of hatchery production, tagging, and stocking operations completed annually in an attempt to re-establish self-sustaining populations in the Allegheny and Ohio rivers (Photographs 2 and 3). From 1991 through 2006, we stocked paddlefish fingerlings throughout 30 miles of the lower Allegheny River and 40 miles of the upper Ohio River. From 2007 through 2011, stocking locations were condensed to only include Pool 2 of the Allegheny River in odd years and Dashields Pool of the Ohio River in even years. The 2007 change was implemented due to CalU's research findings at that time that rationalized concentrating stocking efforts to develop a higher density population.

Also included as part of our Paddlefish restoration program were studies conducted to evaluate the potential for establishment of self-sustaining populations. Ten years following our initial stocking efforts, a point at which adult Paddlefish would be sexually mature, and in partnership with biologists from CalU, Penn State University, and the West Virginia Division of Natural Resources, radio-telemetry studies were conducted from 2002 through 2004 to determine post-stocking movements and survival, and to assess food availability. Data collected during these investigations were later used to identify "hot spots" (*i.e.*, locations where Paddlefish were congregating) as well as to identify the composition and densities of river plankton – the primary forage of Paddlefish.

In 2012, a Kentucky angler captured one of our tagged Paddlefish nearly 350 miles downstream from where it was stocked. This 10-year-old fish navigated through at least 10 Ohio River navigation locks and dams (L/D) structures and weighed just over 20 pounds.

Photograph 1. This headline photograph is from an article featured in our [October 1960](#) edition of the *Pennsylvania Angler* (page 19), and provides hard evidence that the native range of Paddlefish extended to the upper Allegheny River.



Photograph 2. A CalU student injecting the rostrum of a fingerling Paddlefish August 2011 with a coded wire tag (CWT) at our Linesville State Fish Hatchery where we produced Paddlefish. Each CWT is a short length of magnetized stainless steel wire laser-etched with a unique numerical code. The presence of a CWT can be detected in live Paddlefish to differentiate hatchery-reared from wild origin. If detected, the CWT can also be removed to read the unique code to determine stocking year and location (Photograph by David Argent, CalU).



Photograph 3. Frank Pokol, a Fish Culturist 2 at our Linesville State Fish Hatchery, stocking fingerling Paddlefish August 2008 in the Ohio River's Dashiels Pool at the Sewickley boat launch. That year, 4,500 Paddlefish were stocked in the Ohio River (Photograph by Bob Ventorini, PFBC).

A U.S. Fish and Wildlife Service (USFWS) State Wildlife Grant (SWG) was secured to continue the evaluation of our Paddlefish restoration program in 2005 and 2006. Applying what was learned from the telemetry studies, researchers from CalU used fisheries survey gear to begin the first intensive effort to target Paddlefish in the Allegheny and Ohio rivers (Figure 1) since the reintroduction program began. On May 12, 2005, a 32-pound Paddlefish was collected in a large-mesh gill net deployed at the tailwaters of the Dashiels L/D on the Ohio River near Leetsdale (Photograph 4). Further inspection by the PFBC's Area 8 Fisheries Manager Rick Lorson confirmed that this fish was a mature female – perhaps 8-12 years old, suggesting that natural reproduction was possible. This Paddlefish was the first documented capture in Pennsylvania since 1919.



The 2005 and 2006 surveys yielded six adult Paddlefish: four and two from the Allegheny and Ohio rivers, respectively. Additionally, in concurrent studies on the Monongahela River, four juvenile paddlefish were collected during various surveys (e.g., [night boat electrofishing](#), [lockchamber surveys](#), benthic trawling) by CalU and the PFBC between 2006 and 2010.

Photograph 4. Bill Kimmel, Ph.D. (left) and David Argent, Ph.D. (right), researchers from the Department of Biological and Environmental Sciences at CalU, hoisting a 32-pound Paddlefish collected May 2012 from the Ohio River (Photograph by Lora Belback, CalU).

Another SWG was secured to continue the evaluation of our Paddlefish restoration program in 2011 and 2012. During that time, researchers at CalU intensively surveyed navigation pools of the lower Allegheny and upper Ohio rivers using gill nets to target adult Paddlefish and benthic trawls and plankton nets (Photographs 5, 6, and 7) to target juveniles and larvae, respectively. Surveys were conducted on the Emsworth Pool and Pool 2 of the Allegheny River and on the Montgomery and Dashields Pools of the Ohio River (Figure 1). In terms of effort, nearly 9,000 gill net hours, 8 benthic trawling hours, and 160 plankton net hours were expended for these surveys.





Photograph 5. Jeff Ambrose, student of CalU's Fisheries and Wildlife Biology program, deploying the plankton net June 2011 on the Emsworth Pool of the Allegheny River (Photograph by David Argent, CalU).



Photograph 7. Plankton net in tow (Photograph by David Argent, CalU).



Photograph 6. Net Cam! Underwater view of the plankton net in action (Photograph by David Argent, CalU).

The 2011 and 2012 surveys yielded four sub-adult Paddlefish collected from the Allegheny River using gill nets (Photograph 8). No Paddlefish were collected during that time from the Ohio River. Also in 2012, the first larval Paddlefish was found in plankton net samples collected from the Allegheny River (Photographs 9 and 10). These results suggest low numbers of free-ranging adults in the two rivers and the first evidence of natural reproduction.

Photograph 8. Jeff Ambrose (front) and Chris Warden (rear), students of CalU's Fisheries and Wildlife Biology program, displaying a 10-pound Paddlefish collected June 2011 downstream of L/D 2 on the Allegheny River (Photograph by David Argent, CalU).





Photograph 9. Larval Paddlefish collected June 2012 downstream of L/D 3 on the Allegheny River. The arrow points to the developing rostrum. Also notice the formation of an eye (Photograph by David Argent, CalU).



Photograph 10. Larval Paddlefish on display at our Linesville State Fish Hatchery. The morphology of the wild Paddlefish larvae collected from the Allegheny River is consistent with these hatchery-reared fish (Photograph by Devin DeMario, PFBC).

Under the support of another SWG awarded in 2013, CalU biologists partnered with the PFBC, this time to investigate the upper Allegheny River's burgeoning Paddlefish population (Figure 1). Since 1998, the New York State Department of Environmental Conservation (NYSDEC) has [stocked Paddlefish](#) in Allegheny Reservoir. Over the past several years, angler observations and catches, PFBC collections made during other surveys (Photograph 11), and radio-telemetry work performed by the NYSDEC all confirmed that a number of Paddlefish were able to swim underneath the massive (6-foot wide by 10-foot tall) sluice gates of [Kinzua Dam](#) and survive in the Allegheny River. We also wanted to determine if any of these Paddlefish moved upriver from stocking that occurred around Pittsburgh. In 2013, CalU biologists captured five adult and juvenile Paddlefish from the upper Allegheny River with gill nets (Photograph 12). CalU biologists also assisted the PFBC with the collection of 10 additional adult Paddlefish during night boat electrofishing surveys of Kinzua Dam's tailwaters (Photographs 13 and 14). Coded wire tags were recovered from 12 of the 15 Paddlefish captured in 2013. The tag data for location of stocking was not available at press time. While the upper Allegheny River Paddlefish population appears to thrive on abundant plankton resources, evidence of natural reproduction has yet to be documented there. Similarly, work by the NYSDEC has yet to show that natural reproduction has occurred in Allegheny Reservoir.



Photograph 11. Assortment of Paddlefish collected October 2012 during night boat electrofishing surveys targeting Walleye at the tailwaters of Kinzua Dam. From left-to-right are Brian Ensign, Fisheries Biologist with the PFBC's Area 2 office in Tionesta; Bob Hoskin, Fisheries Biologist with the U.S. Army Corps of Engineers' Pittsburgh District office in Warren; and Brent Pence, Biologist with the U.S. Forest Service's Allegheny National Forest office in Warren (Photograph by Bob Ventrini, PFBC).



Photograph 12. David Drescher (left) and Brian Deleonibus (right), students of CalU's Fisheries and Wildlife Biology program, hoisting a 37-pound Paddlefish collected June 2013 from the Allegheny River in the vicinity of Mead Island, just downstream of Warren (Photograph by David Argent, CalU).



Photograph 13. David Argent vaunting a 28-pound Paddlefish collected May 2013 from the Allegheny River at the tailwaters of Kinzua Dam (Photograph by Bob Ventorini, PFBC).



Photograph 14. Rick Lorson proudly displaying a 30-pound Paddlefish collected May 2013 from the Allegheny River at the tailwaters of Kinzua Dam (Photograph by Bob Ventorini, PFBC).

Since 1991, the PFBC has stocked the Allegheny and Ohio rivers with over 120,000 Paddlefish – testament to the commitment our Agency has had for maintenance of riverine biodiversity within the Commonwealth and of the interagency collaborative that has formed with neighboring states. While MICRA has offered guidance to each state with the restoration of this species, it falls to each agency to appropriately manage its recovery. Thanks to the financial support of the U.S. Fish and Wildlife Service’s State Wildlife Research Grants program, dedicated funding has been made available. It is anticipated that continued evidence of Paddlefish natural reproduction will be found and that one day, this charismatic fish species may provide recreational angling opportunities as it does in the Midwestern U.S. Additional work in the Allegheny and Ohio Rivers will be necessary to determine the population and reproductive status. These data will enable a determination of natural reproduction and consideration of a status upgrade for Paddlefish in Pennsylvania. Data will also be used to revise the Paddlefish Restoration Plan for Pennsylvania.

Throughout the duration of this 10-year monitoring project, the opportunity to partner with local universities has provided hands-on field training for over 25 undergraduate students, as well as resulted in research to support two Master’s theses and several publications in the scientific literature.

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