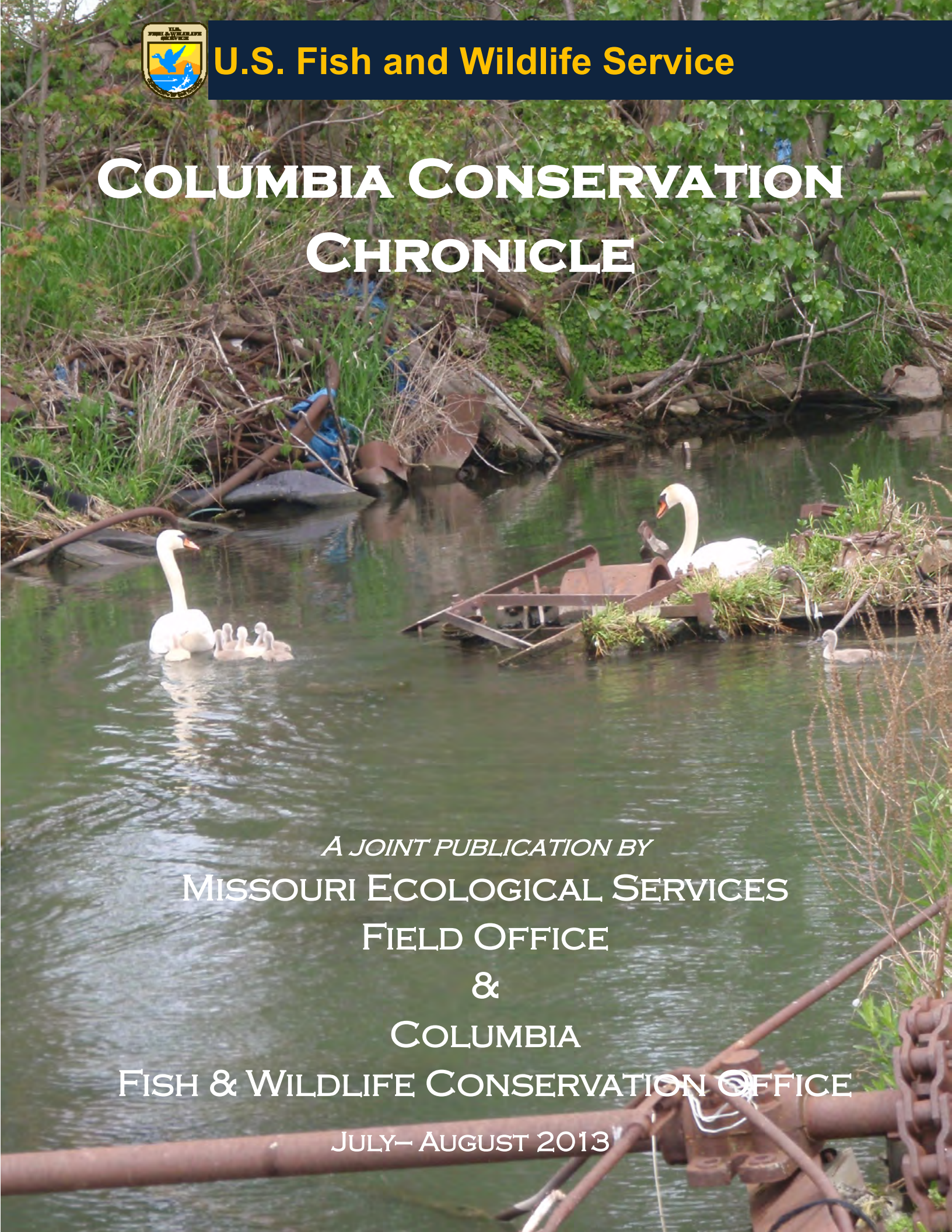

U.S. Fish and Wildlife Service

Columbia Conservation Chronicle

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Inside This Issue

On the Cover: Mute swans (Cygnus olor) with cygnets swim gracefully through a rusting tangle of discarded metal in the Chicago Area Waterway System. Photo credit: Heather Calkins, USFWS.

Above: Historical map of The Illinois and Michigan Canal. Map Courtesy of the Illinois State Archives. From The Illinois and Michigan Canal, 1827-1911: A Selection of Documents from the Illinois State Archives (Springfield: Illinois State Archives, 1998).

THE CAUSE FOR THE CAWS
PART I: THE ILLINOIS & MICHIGAN CANAL

Our office has been working in the Chicago Area Waterway System, or CAWS, since 2009. We make monthly trips, give-or-take, to the Chicagoland area looking for Asian carp and their DNA in the watery labyrinth that makes up the CAWS. The CAWS is made-up of a network of canals, rivers, locks and dams, barge slips and shallow lakes. It's all in a name…the Chicago Sanitation and Shipping Canal explains the two main reasons for the creation of the waterway system - commerce and sanitation. Long days on the boat and the associated idle conversations lead to questions and speculation about the history of the canals. My curiosity was peaked. I began my research by "Google™-ing" the CAWS. My search results led me to an interesting story that starts with a canal - not the Chicago Sanitary and Shipping Canal that we are so fondly acquainted with but the Illinois & Michigan Canal (I&M Canal)…

A historical picture of a man standing on a pile of sewage sludge in Bubbly Creek, part of the Chicago Area Waterway System. Photo courtesy of Chicago History Museum, Photographer Chicago Daily News.

The story of the CAWS actually starts in the late 1600's, with a gentleman named Louis Jolliet. He was the first to realize, or at least that's known, the great potential the Chicago area held with its location on a continental divide. It was a busy area for portage, which inspired Jolliet's idea of a canal connecting Lake Michigan to the Illinois River- in effect linking the Great Lakes to the Mississippi River and ultimately the Atlantic Ocean to the Gulf of Mexico. It wasn't until more than 150 years later that his vision came to fruition. Ground was broken on the Illinois & Michigan Canal in 1836 and, despite the financial crisis in the nation, the feat was accomplished and flowing with water by 1848. This was made possible by the Irish immigrants that hand dug the 96 mile long, 60 foot wide by 6 foot deep channel through Illinois between LaSalle and Chicago. Fifteen locks were built to accommodate the 141 foot descent at the divide of the two basins. At one point rock was found only a foot beneath the surface of where the canal was to be dug. Luckily the stone was layered and workers were able to excavate it and used the stone to build the locks. Five aqueducts and four hydraulic power basins were also constructed within the canal. It took merely months for about 70 canal boats to be in operation with as many as 288 at its peak. Initially these boats were mule-drawn, but eventually the I & M became the first inland canal to shift to steam-driven vessels in the 1870's. In the first few years it was a popular means of travel until the mid-1850's, when the railroad proved a quicker means for passengers. However, the I&M Canal remained useful for another 40 or so years in transporting lumber from the Great Lakes, merchandise from the East, grain from the Midwest and tropical fruit from the South; moving over a million tons in 1882. By the 1900's,

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commercial use of the canal had all but ceased. The flood of immigrant workers and the success of the I&M Canal contributed to a population boom of more than 400% in the first five years, with 600% growth in a decade. With the massive population expansion, it didn't take long for waste disposal problems to arise in the city.

The influx of people wreaked havoc on the sanitation system and human waste began leaching into the canal and even into the city's source for drinking water- Lake Michigan. The canal became a "greasy sludge, thick as pea soup and red with blood." This rancid slurry even caught aflame during the Great Fire of 1871. Knowing something must be done, the city hired Ellis Sylvester Chesbrough to create a sewage disposal plan. To allow drainage into the canal, pipes were built above street level. The canal was re-dredged and the soil used as fill to raise the streets to the level of the new sewage pipes. This system worked very well, too well in fact, allowing the city to grow even more and once again causing sanitation problems. Issues arose with the intake system as well. Small fish near the warm shallows of Lake Michigan were sucked up through the water intake and reportedly transported through the pipes and out the faucets of Chicago residence. To solve this, water intake pipes were moved two miles out into the lake. It took until spring for floods to push the polluted water far enough into the lake to once again be transferred to the water intake system. It was at this time that Chesbrough decided to reverse the flow of the Chicago River, sending the city's waste down the Mississippi River. The intake had to be dug an additional four miles out in the lake to ensure clean drinking water and communities downstream were complaining about the foul odors from the waterway. In a year, flows had already slowed, filling the canal with 'silt' and finally halting completely - leaving a stagnant mess. It was then that officials realized a new, deeper canal must be built to dispose of the city's sewage. In the late 1880's, the Chicago Sanitary and Shipping Canal (CSSC) was conceived and ultimately so was the beginning of the CAWS…

The Illinois & Michigan Canal as it looks today in Morris, IL. Though no longer used for moving supplies, the canal and its corridor provide recreational opportunities for Illinois residents. The paved trail seen on the left was created in the path worn by mule teams pulling cargo on the canal.

Most of the Illinois & Michigan Canal still exists today. It no longer serves its historical purpose, but was transformed into the I&M Canal National Heritage Corridor in 1984. President Reagan signed a bill preserving the canal, creating the first heritage corridor in the nation. The idea was

to preserve and highlight the canal's paramount role in Chicago's (and the state of Illinois itself) growth and success. The corridor covers 862 square miles in five counties, extends through 57 municipalities and is associated with four state parks. Mule paths paralleling the canal were converted to trails now popular for biking, hiking and snowmobiling. The canal itself is often utilized by fishermen and kayakers when conditions are favorable. The corridor boasts a unique blend of heritage, conservation and recreation.

Fisheries
Heather Garrison (Calkins)

Stay tuned for Part II: The New Canals in a future issue of the CCC!

Hope After the Storm (A Beetle Story)

When I last wrote, things were not looking good for the American Burying Beetle. Obviously, this is an endangered species, so most reports on this animal are at least tempered with a bleak history of decline, or a remark on its past abundance, now mysteriously reduced to the edges of its former range. But this story has a little hope. I last reported that the St. Louis Zoo, along with many volunteers, had paired up 600 beetles and introduced them to Missouri soil for the first time in their little beetle lives. Our otherwise successful day was spoiled by the next when an unexpected cloudburst filled the area with rain and washed the beetles from their burrows. The "brood check", where we dug up 1/3 of our constructed burrows to measure breeding success, found only 5 grubs (last year we found 300) ten days after our reintroduction. Per our monitoring plan, Zoo staff laid out baited pitfall traps near our reintroduction sites a couple months after we put the beetles in the ground.

Rick Hansen and Paul McKenzie of the US Fish & Wildlife Service place American Burying Beetles into constructed burrows the day before the big storm. Photo Credit: Scott Hamilton, USFWS.

Honestly, we weren't expecting much. Much to our surprise, on the second day of trapping, 7 American Burying Beetles flew in to the pitfalls overnight. The next day, we found 3 more. At the end of the monitoring cycle, 15 total beetles were found, a considerably better showing than the 2 beetles found the previous year. None of the beetles captured had the elytra notches we put on the zoo-bred adults, so we were actually finding the offspring of the beetles we put in the ground. Could it be possible that the beetles escaping the deluge found mates, raised their young, and completed their life-cycle largely without our help? I can't say this for sure, because the grubs found during our brood count (after extrapolation) could be the exact same ones that matured and later fell into our pitfall traps. But I have a little hope.

Ecological Services
Scott Hamilton

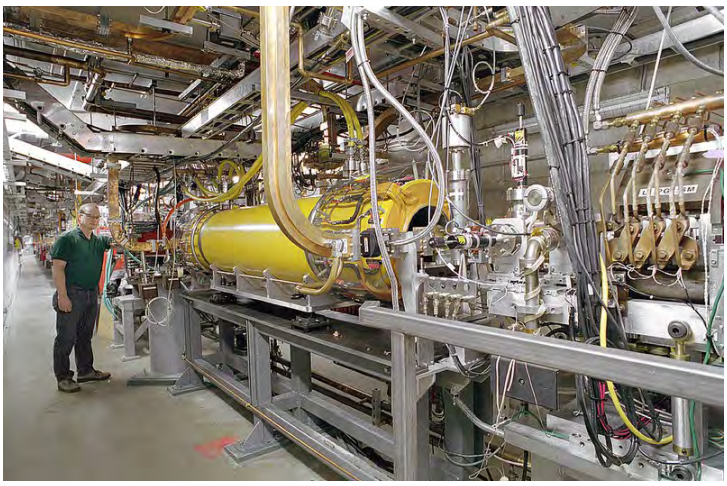
Columbia, MO Ecological Services Performs Environmental Research at Argonne National Laboratory

Environmental contaminants specialist John Weber, of the Columbia, MO Ecological Services Field Office, was fortunate enough to be given the opportunity to perform critical environmental research at the Department of Energy's Argonne National Laboratory, Advanced Photon Source.

The Advanced Photon Source. Photo courtesy of: Department of Energy.

The Advanced Photon Source is a national synchrotron facility and is one of the most technologically complex machines in the world. This premier national research facility provides the brightest x-ray beams in the Western Hemisphere and is used by a wide spectrum of scientists in a variety of disciplines from around the globe.

Mr. Weber's investigation focused on the analysis of lead (Pb) contaminated floodplain soils originating from a historic mining district surrounding the Big River of southeast Missouri. As a part of a multi-million dollar restoration effort under the Natural Resource Damage Assessment and Restoration program, the U.S. Fish & Wildlife Service and our state partners are actively engaged in the development of environmentally sound restoration technologies. The restoration projects could then be implemented in southeast Missouri to reduce the toxicity of Pb contaminated soils. Analytical work at the Advanced Photon Source was used to confirm the formation of low bioavailability Pb and phosphorus compounds. In conjunction with scientists from the US Environmental Protection Agency and the University of Missouri, Mr. Weber was able to document the formation of the Pb and phosphorus compounds, which is a critical step in the selection of the most appropriate restoration technologies. As the restoration science is developed, the US Fish & Wildlife Service and our state partners will select and implement the most environmentally sustainable projects that serve to restore and replace the injured natural resources of southeast Missouri.



The Linear Accelerator at the Advanced Photon Source. Photo courtesy of: Department of Energy.

Ecological Services
John Weber

Passage on the Dry Fork

A few years in the completing, the Dry Fork in the Meramec River Basin is free of one more barrier. Funded in fiscal year 2011 by the National Fish Passage Program, a project on private land to remove one of only two barriers on the Dry Fork in Phelps County, Missouri is now complete. The barrier itself, a low water slab crossing acting as a dam, was removed in 2012. After a couple of high water events stabilized the stream bed, a light-duty equipment and livestock crossing was installed in May of this year. The new crossing is basically gravel, level with the stream bed that allows for access at low to normal flows.

Removing this barrier opened up 37 miles of the Dry Fork to aquatic organisms. That is nearly half the entire Dry Fork itself! This sub-watershed is the most diverse in the Meramec River Basin. It is home to 68 species of fish and one third of native fish species in Missouri are found here. This project was led by the Missouri Department of Conservation and another great opportunity for the Fish & Wildlife Service to collaborate with our state partners.

Fisheries
Heather Garrison (Calkins)

Before, during and after replacement of slab crossing with light-duty equipment and livestock crossing on Dry Fork, Phelps County, Missouri.

Columbia Parks and Recreation Family Fun Fest

The Columbia FWCO once again participated in the "Explore Outdoors" themed Family Fun Fest held in June. Family Fun Fest is sponsored by Columbia Parks and Recreation and is a free event geared towards families with young children. The event was held on a lovely evening in June at Flat Branch Park and many families turned out for the event. The Columbia FWCO had a fun activity for children where they could design their own pond "habitat" using stamps, crayons and their imagination. We also distributed information on fishing, our work and the Big Muddy NWR. We were joined by many other local organizations that participated including the Boone County Library, Missouri Department of Conservation and a local 4-H club.

Fisheries
Anna Clark

Over the Mountains and Far Away

Congratulations to Jeffrey Muchard, who recently started his new job at the Dworshak National Fish Hatchery in Orofino, Idaho. Jeff worked at Columbia FWCO for two years as a Bioscience Aide. His eternally positive attitude and strong work ethic quickly garnered the respect of his coworkers and supervisors. Although Jeff had little prior experience with big rivers or fisheries, he worked hard to learn the trade and made himself into a valuable member of the field crew. When Jeff wasn't on the water helping us chase fish, he was busy in the shop repairing and cleaning equipment. Prior to his time with Columbia FWCO, Jeff proudly served his country with the US Navy from 2002-2005. He also spent time as a wildlife rehabilitator for Texas A&M Agrilife Research Center. Originally from the state of New York, Jeff is a graduate of the State University of New York at Cobelskill, and he is also a diehard Buffalo Bills fan (for which he received much good natured razzing). In his free time Jeff enjoys running, watching hockey, and listening to obscure music. Jeff Muchard is easily one of the most unique and popular employees to ever grace Columbia FWCO, and I'm told his karaoke version of "Ice Ice Baby" is unforgettable. We wish Jeff the best of luck as he chases his dreams across the country.

Fisheries
Colby Wrasse

Jeff Muchard prepares to release a Lake Sturgeon back into the Missouri River.

U. S. Fish and Wildlife Service

101 Park DeVille Drive, Suite A

Columbia, MO 65203

573/234-2132

Missouri Ecological Services Field Office

Field Supervisor: Amy Salveter

Office Clerk: Jennifer Gorman

Fish & Wildlife Biologists: Trisha Crabill, Scott Hamilton, Rick Hansen, Josh Hundley, Jane Ledwin, Shauna Marquardt, Paul McKenzie, Dave Mosby, Andy Roberts, Bryan Simmons and John Weber

STEP Student: Elizabeth Phillips

Columbia Fish & Wildlife Conservation Office

Project Leader: Tracy Hill

Assistant Project Leader: Wyatt Doyle

Team Leaders: Jeff Finley and Clayton Ridenour

Crew Leader: Colby Wrasse

Lead Technicians: Patty Herman and Adam McDaniel

Technicians: Heather Calkins, Jordan Fox, Jeremiah Smith and Brett Witte